























1. Bushman
2. Namaqua Woman
3. Scotchman
4. Negro of Darfur

5. New Hebrides Islander
6. Georgian
7. Italian
8. Italian (Sicily)

9. Southwest Australian
10. Nubian Woman
11. Swede
12. Great Russian





13. Young Woman of the  
Tonga Islands  
14. Dyak of Borneo  
15. Tarantchi Mongol

16. Khalkha Mongol Woman  
17. Chinese  
18. Yakut Woman  
19. North American Indian

20. South American Indian  
Squaw  
21. Koriak Woman  
22. Eskimo of Greenland







# THE STANDARD AMERICAN ENCYCLOPEDIA

*A Dictionary  
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## VOLUME I

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THE STANDARD  
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Volume I  
A—BOOK









**A**, the first letter in the English and other alphabets ultimately derived from the Phœnician, is traced by some to a character belonging to the Egyptian hieratic alphabet. Alpha, the Greek name of the letter, corresponds closely to *aleph* ("an ox"), the Phœnician name (see ALPHABET). The form which it has as a capital is the earliest—that as a "small" or "lower-case" letter being developed from this. The sound which originally belonged to it, and which is still its characteristic sound except in English, is that heard in *far*, *father*, *palm*, etc. This may be regarded as the simplest and easiest of all sounds to produce, the mouth being merely opened, without being either contracted or extended, and neither the back nor the front of the tongue being raised, as in the utterance of any of the other vowels. The above sound of *a* is the sound with which children generally begin to articulate. Though one of the simplest, it is at the same time one of the most perfect and melodious of sounds, and its sweetness and capability of expansion make it a favorite sound of singers. Various modern languages, as French, Italian, Spanish, etc., have only one sound for *a*, namely, the *ah*-sound, pronounced short or long. In the Teutonic languages it may be varied in pronunciation by the use of diacritical marks, as in the German *ä*, etc. In English, owing to the composite nature of the language and the numerous striking changes it has undergone, this character now represents as many as seven or eight sounds, as in the words *father*, *ask*, *mat*, *mate*, *mare*, *many*, *ball*, *what*. It is very common in the digraph *ea*, which is pronounced differently in different words; compare *seat* with *break*, *tea* with *yea*. The last two words are among the few in which it appears as a final letter in English, others being *sea*, *pea*, *flea*, *lea*. It also appears in the compound character *æ*, which was very common in Anglo-Saxon, but now occurs only in words that still retain more or less of a Latin or Greek form. *A*, in music, is the sixth note in the diatonic scale of *C*, and stands when in perfect tune to the latter note in the ratio of

$\frac{3}{2}$  to 1 (see MUSIC). The open or un-stopped second string of the violin gives this note. For the use of the letter in abbreviations see ABBREVIATIONS.

**Al**, the character attached to vessels of the highest class in Lloyd's "Register of Shipping." *A* refers to the hull of the vessel, while *l* intimates the sufficiency of the rigging and whole equipment. This rank is assigned to new ships for a certain term of years, the length of which depends on the quality of the materials employed and the mode of building; but in order to retain their class the vessels must be subjected to periodical survey. Iron (or steel) ships are classed *Al* with a numeral (100, 90, 80) prefixed. The character *A* in red denotes the second, and *Æ* in black the third class of vessels. In all cases the *l* is omitted if the rigging and equipments are deficient. The colloquial use of *Al* as denoting excellence is familiar to all.

**Aa**, the name of a large number of rivers in the N., W., and central countries of Europe, among the chief of which is a river of France that rises in the department of Pas-de-Calais, flows into that of the Nord, and reaches the Strait of Dover near Gravelines. It is about 50 miles long, and is navigable below St. Omer. Canals connect it with Calais and Dunkirk.

**Aachen.** See AIX-LA-CHAPELLE.

**Aahmes**, or **Amasis**, the name of two kings of Egypt. (1) Aahmes I. lived in the 17th century B. C. He was the conqueror of the Hyksos or Shepherd Kings; united the country under one head; and established the 18th dynasty. There have been discovered and deciphered two stone tablets at Turah and Massaarah, celebrating the 22d year of his reign. (2) Aahmes II. lived in 570–526 B. C., and was the 5th ruler of the 26th dynasty. He is noted as having forced the deposition of Nahabra and of having cultivated friendly relations with the Greek States. In 548 B. C. he sent gifts to Greece to aid in the reconstruction of the burnt temple at Delphi, and also for the founding of a Greek commercial settlement at Naucratis. According to excavations by Dr. Flinders-Petrie the Greeks had been in possession of Nau-



cratis long prior to the time of Aahmes II., and it is thought likely that they had occupied it before the 26th dynasty. The action of Aahmes, therefore, must have been a recognition and confirmation of the rights of the Greeks to the site of Naucratis. It is also evident that he drew up a charter giving them absolute and exclusive title to its perpetual occupation. There was also an Egyptian naval officer of the same name, who fought under Aahmes I. against the Hyksos. His tomb, with an inscription relating his services, is preserved at El-Kab, near Thebes. AAHMES-NEFERTARI was the queen of the first King Aahmes. Her mummy case is now in the museum at Gizeh. It is one of the most magnificent ever discovered.

**Aalborg**, a seaport of Denmark, on the S. side of the Limfiord. It was an important commercial town as far back as the 11th century, is the see of a bishop, and has two old churches, an old castle, etc. The manufactures include leather, soap, spirits, etc., and it has a considerable trade by sea. Pop. (1906), 31,509.

**Aali (Alee) Pasha, Mehemed Emin**, a Turkish statesman; born in Constantinople in 1815. He was minister of foreign affairs in the troublous days from 1846 to 1852. After having for a short time served as grand vizier he fell into disgrace in 1852. Recalled during the war of 1854, he became minister of foreign affairs, and in March, 1855, took part in the treaty concerning the four guarantees. In July, 1855, he again became grand vizier. In the peace of Paris he showed great decision and cleverness in looking after Turkish interests, but, nevertheless, did not succeed in carrying out all his wishes. On Nov. 1, 1856, political circumstances caused him to retire from the grand viziery. He remained, however, a member of the great council and a minister without a portfolio. In January, 1858, after the death of Reshid Pasha, he again became grand vizier, but held the post for only a short time, owing to his relations to the proposed reforms. In November, 1861, he once more became minister of foreign affairs. During the journey of the Sultan to the Paris exposition, in the summer of 1867, he was regent of the kingdom, and, while he was the very soul of the reform movement, he, nevertheless, opposed the independence of Egypt with as much energy as success. In the midst of his activities he died suddenly, Sept. 6, 1871.

**Aar**, or **Aare**, a Swiss river, a tributary of the Rhine, being, next to it and the Rhone, the longest river in Switzerland. It is formed by torrents from two vast glaciers of the Bernese Alps in the E. part of the canton of Bern, flows N. W. through the romantic valley of Hasli, expands into the

lakes of Brienz and Thun, becomes navigable, passes Bern, turns first N. and then N. E., passes Solothurn and Aarau, and after giving its name to the canton of Aargau falls into the Rhine; total course about 170 miles. The Oberaar and Unteraar glaciers, which give rise to the river, are among the most celebrated in Switzerland, and are connected with the names of Agassiz and other scientists. By its tributary the Lütchine it also receives supplies of water from the two Grindelwald glaciers, which are among the finest in Switzerland.

**Aarau** (ä'rou), a town in Switzerland, capital of the canton of Aargau, on the right bank of the Aar. Has manufactures of scientific instruments and bells, a library of more than 60,000 volumes, and historic, scientific, and ethnographic museums. Here, in December, 1797, the ancient Swiss confederacy held its last session; from April to September, 1798, it was capital of the Helvetic republic. Pop. (1900), 7,824.

**Aard=vark** (that is, "earth-pig"), a burrowing insect-eating animal of the order *Edentata* found in South Africa. It is the *Orycteropus Capensis* of naturalists, and has several other popular names, such as Cape-pig and ant-bear. The name "pig" is given to it from the shape of its snout.

**Aard=wolf**, the *Proteles Lalandii*, a singular carnivorous animal, first brought from South Africa by the traveler Delalande. It forms the connecting link between three genera widely separated from each other, having externally the appearance and bone structure of the hyena united to the head and feet of the fox, with the intestines of the civet. Its size is about that of a full grown fox, which it resembles in both its habits and manners, being nocturnal, and constructing a subterranean abode.

**Aarestrup, Emil** (ä'rè-strüp), a Danish poet (1800-1856). He was not duly appreciated until after his death, but is now acknowledged as one of the foremost lyric poets of Denmark, being ranked by critics next to Christian Winther. "Collected Poems," with critical sketch by G. Brandes (Copenhagen, 1877).

**Aargau**, or **Argovie**, a canton of Switzerland, bounded on the N. by the Rhine, which separates it from the grand-duchy of Baden, elsewhere by the cantons Zürich, Zug, Lucerne, Bern, Solothurn, and Basel; area, 543 square miles. It is hilly, being composed chiefly of spurs of the Alps and Jura, but has no mountains more than 3,000 feet above sea-level. There are numerous fertile valleys, watered by the Aar and its many tributaries from the right, the Limmat and Reuss being the largest. The climate is moist and variable, and agriculture is in an advanced state. Timber is abundant. Fruit and vegetables abound, and



vineyards are numerous, but the wines are of inferior quality. Cattle rearing is pursued with success. Cottons, silks, ribbons, linens, straw-plait, hosiery, etc., are made, and there are important machine works. A considerable number of people find employment in the boat traffic on the Aar and Rhine, and in the transit trade, which is carried on actively both by land and by water. Aargau formed part of the canton Bern till the year 1798. Its constitution was first fixed by the Congress of Vienna in 1815. The present constitution is purely democratic. The legislative power is vested in the great council, the members of which are chosen one for every 1,100 inhabitants. It has to submit its laws and decrees to the popular vote (referendum). The executive power is vested in the small council of seven members elected by and from the great council. Pop. (1905), 211,430, of whom more than half are Protestants. The language almost universally spoken is German. The capital is Aarau.

**Aarhus** (-hüs), one of the districts into which Denmark is divided. It embraces the most eastern part of the peninsula of Jütland, and is divided into two bailiwicks, Aarhus and Randers. Area, 1,821 square miles. Population, about 325,000, chiefly occupied in the fisheries.

**Aarhus**, a seaport of Denmark, on the E. coast of Jutland, on a bay of the Catte-gat. It is well built, the chief edifice being a Gothic cathedral (begun in 1201), which is one of the largest and finest ecclesiastical structures in the kingdom. It has a cathedral school and a museum. It carries on shipbuilding, iron-founding, the cotton manufacture, and other industries. There is a good harbor, and a considerable trade in grain, cattle, foreign goods, etc. Pop. (1906), 55,193.

**Aaron**, son of Amram (tribe of Levi), elder brother of Moses, and divinely appointed to be his spokesman in the embassy to the court of Pharaoh. By the same authority, avouched in the budding of his rod, he was chosen the first high-priest. He was recreant to his trust in the absence of Moses upon the Mount, and made the golden calf for the people to worship. He died on Mount Hor in the 123d year of his age, and the high-priesthood descended to his third son, Eleazar.

Aaron's rod, in architecture, is a rod like that of Mercury, but with only one serpent, instead of two, twined around it.

**Aaron ben Asher**, a Jewish scholar; lived in Tiberias early in the 10th century. He completed one of the two existing recensions of the vowels and accents of the Hebrew Bible. His rival, Ben Naftali, also completed a similar work, but the readings of the former are usually preferred.

**Aaron, Hill of**, a lofty mountain range of Arabia Petrea, in the district of Sherah or Seir, 15 miles S. W. of Shobeck. On its highest pinnacle — called by the Arabs Nebi Haroun — is a small building supposed by the natives to inclose the tomb of Aaron; and there seems no reason to doubt that this is the Mount Hor mentioned in Numbers, xxxiii.

**Aasen, Ivar Andreas** (â'-sen), a Norwegian philologist and poet; born in Orsten, Aug. 5, 1813. His great aim was to construct from the older elements of the various Norwegian dialects a new national language ("Landsmaal"), as a substitute for Danish, in pursuance of which end he published several valuable philological works. Other works: "Smyra," a collection of lyrics, and "Ervingen," a drama. He died in 1896.

**Ab**, the eleventh month of the civil year of the Hebrews, and the fifth of their ecclesiastical year, which begins with the month Nisan. It answers to the moon of July, that is, to part of our month of July and to the beginning of August; it consists of 30 days.

**Aba**, or **Abou Hanifah** or **Hanfa**, surnamed Alnooma, born in the 80th and died in the 150th year of the Hegira. He is the most celebrated doctor of the orthodox Muslims, and his sect is the most esteemed of the four which they severally follow.

**Aba**, a mountain in Armenia, part of Mount Taurus, where the famous rivers Araxes and Euphrates have their rise.

**Ababde**, a tribe of Bedouins who inhabit the country south of Kosseir, nearly as far as the latitude of Derr. Many of this race have settled in Upper Egypt, but the greatest part of them still live like Bedouins. Their savage neighbors, the Bisharye, inhabit the mountains southward from Derr. Their women are said to be as handsome as those of Abyssinia, but are reported to be of very depraved habits.

**Ababde**, a village of Middle Egypt, on the right bank of the Nile, 8 miles S. of Beni Hassan. Near it are the ruins of the ancient Antinoë or Antinoöpolis, a city built by the Emperor Hadrian, and named from his favorite Antinous, who was drowned in the Nile. These remains, entirely Roman, are supposed to occupy the site of a still more ancient city, named Besa, celebrated for its oracles.

**Abaco, Great and Little**, two islands of the Bahamas, West Indies. Great Abaco, the largest of the Bahamas, is about 20 miles in breadth and 80 miles in length. Population of both, 2,400.

**Abacus**, in architecture, a constituent part of the capital of a column, which supports the horizontal entablement. In the



Tuscan, Doric, and Ionic orders, it is flat and square; but, in the Corinthian and Composite orders, its four sides are arched inward, with generally a rose in the center. In Gothic architecture the abacus was very variously employed, according to the fancy of the architect.

In arithmetic, the name of an instrument employed in England to teach the elementary principles of the science of numbers. The ancient mathematicians also employed the term abacus to designate a table covered with sand, upon which they traced their diagrams. The Chinese abacus, or *Shwan-pan*, is also an instrument for facilitating arithmetical calculations. It consists of several series of beads or counters strung upon brass wires stretched from the top to the bottom of an instrument, and divided in the middle by a cross-piece from side to side. In the upper compartment every wire has two beads, each of which counts five; in the lower space every wire has five beads of different values; the first being counted as one, the second as 10, the third as 100, and so on. In China, where the entire system is decimal, that is, when every weight and measure is the tenth part of the next greater one, the abacus is used with wonderful rapidity. This instrument is now a part of modern kindergarten equipment in the United States.

Abacus is also a Roman table, or high shelf, placed against the wall, and serving as a cupboard or buffet.

*Abacus Pythagoricus* was formerly the name of the multiplication table. Pythagoras is supposed to have introduced it from Babylon into Greece.

**Abad, Diego José**, a Mexican poet; born in Michoacan, Mexico, July 1, 1727. When 14 years old he united with the Society of Jesus, and afterward spent several years in teaching. Sometime prior to 1767 he was appointed rector of the College of Querétaro, and when, in that year, the Jesuits were expelled from Mexico, he went in exile to Italy, where he lived for several years in Ferrara. Subsequently he removed to Barcelona, and there died Sept. 30, 1779. Abad is best remembered by his Latin poem, "*Heroica de Deo Carmina*," a work begun while he was living in Mexico, and of which a portion, comprising 29 cantos, was first published in Cadiz in 1769. Several editions followed, and the last and complete one was brought out in Cesena in 1780, a year after the author's death.

**Abad y Queypeo, Manuel**, a Spanish clergyman; born in the Asturias about 1770; spent the greater part of his life in Mexico; was appointed Bishop of Michoacan in 1809; was soon afterward driven from his see by revolutionists; returned in 1813; was deposed in 1820 for opposing the Inquisition and sent to Spain a prisoner; was

released and made Bishop of Tortosa; and in 1823 was imprisoned by order of the Inquisition, and died in prison in the following year.

**Abaddon**, in the Bible, and in every rabbinical instance, means the angel of death, or the angel of the abyss or "bottomless pit," or the place of destruction, the subterranean world.

**Abadiotes**, the name of a Mohammedan settlement of pirates, situated on the island of Candia, south of Mount Ida, consisting of a population of about 7,000. They are a branch of the Saracens whom Nicephorus expelled from Candia in the 10th century. They are a smaller and weaker race than the other inhabitants, and speak the Arabic language.

**Abadir**, the name of a stone which Saturn swallowed by the contrivance of his wife Ops, believing it to be his new-born son Jupiter; hence it became the object of religious worship.

**Abakansk**, a range of mountains in the government of Tomsk, in Siberia, extending from the river Tom to the Yenisei, parallel to the Altai mountains. Also the name of a fortified town of Siberia, in the government of Tomsk, on the river Abakan. This is considered the mildest and most salubrious place in Siberia.

**Abancay**, a district of Peru, in the department of Cusco. The plains produce rich crops of sugar cane and the principal cereals. The mountains afford silver, and pasturage for large herds of cattle. The chief town is Abancay, 74 miles from Cusco.

**Abandonment**, the act of abandoning, giving up, or relinquishing.

In commerce it is the relinquishment of an interest or claim. Thus, in certain circumstances, a person who has insured property on board a ship may relinquish to the insurers a remnant of it saved from a wreck, as a preliminary to calling upon them to pay the full amount of the insurance effected. The term is also used of the surrender by a debtor of his property.

**Abano**, a town in the province of Lombardy, Italy, at the foot of the Vicentine Hills. It is visited by invalids for the benefit of its baths, which were well known to the ancients, and are noticed by Martial and Claudian as *Fontes Aponi*.

**Abantes**, a people of ancient Greece, who came originally from Thrace, and settled in Phocis, where they built a town which they called Aba, after the name of Abas, their leader.

**Abarim**, the range of highlands, or mountains, to the E. of the Jordan, in the land of Moab. The highest point is Mount Nebo, from which Moses had his "Pisgah view" of Palestine. It is somewhat uncer-



tain whether Pisgah was the same as Abarim, or merely a part of it. Ancient rude altars, probably as old as the time of the Amorites, were discovered here by Captain Conder in 1881.

**Abaris** (ab'ar-is), the Hyperborean, a celebrated sage of antiquity, whose history and travels have been the subject of much learned discussion. Everything relating to him is apocryphal, and even his era is doubtful. Some refer his appearance in Greece to the 3d Olympiad, others to the 21st, while some transfer him to the 52d Olympiad, or 570 years B. C.

**Abatement**, in law: (1) A removal or putting down, as of a nuisance. (2) A quashing; a judicial defeat; the rendering abortive by law, as when a writ is overthrown by some fatal exception taken to it in court. A plea designed to effect this result is called a plea in abatement. All dilatory pleas are considered pleas in abatement, in contradistinction to pleas in bar, which consider the merits of the claim. (3) Forcible entry of a stranger into an inheritance when the person seized of it dies, and before the heir or devisee can take possession. (4) The termination of an action in a court of law or the suspension of proceedings in a suit in equity in consequence of the occurrence of some event, as, for example, the death of one of the litigants.

In heraldry, an abatement was formerly an addition to a coat-of-arms indicative of disgrace or inferiority; now it is confined to the bend sinister, marking illegitimate descent.

**Abatis**, or **Abattis** (äb-ä-tē'), in military affairs, a kind of defense made of felled trees. In sudden emergencies, the trees are merely laid lengthwise beside each other, with the branches pointed outward to prevent the approach of the enemy. When the abatis is employed for the defense of a pass or entrance, the boughs of the trees are stripped of their leaves and pointed, the trunks are planted in the ground, and the branches interwoven with each other.

**Abatos**, an island in the lake of Mæris, in Egypt, famous for being the sepulcher of Osiris, and for producing the papyrus, of which the ancients made their paper.

**Abattoir** (äb-ät-wär'), a term borrowed from the French, with whom it signifies a slaughter house. The abattoir system was, in 1818, adopted in France. There are at present near Paris five immense establishments of this kind, where butchers are provided with a place for slaughtering their cattle and keeping their meat in store. There are also places for supplying the beasts with water, receptacles for the fat, hoofs, blood, brains, etc. In the neighborhood of the abattoirs there are manufac-

tories of blood manure, gelatine, glue, and the other products of the offal. In several of the large cities of the United States, slaughter houses are placed under similar regulations to those which are in operation in Paris.

**Abba, Giuseppe Cesare**, an Italian poet; born in 1838 at Cairo Montenotte. He took part in the expedition of Garibaldi into Sicily in 1860, which he celebrated in his poem "Arrigo." Among his other works are a tragedy, "Spartaco," a historical novel, and lyric poems.

**Abbadie, Antoine Thomson and Arnaud Michel d'**, brothers and explorers; born in Dublin, Ireland, Jan. 3, 1810, and July 24, 1815, respectively. In 1837-1848 they explored Abyssinia and Upper Egypt, traveled up the White Nile, visited Darfur, and made a remarkably large collection of Ethiopic and Amharic manuscripts. Antoine published "Geodesy of Part of Upper Ethiopia" (1860-1873), and "Dictionary of the Amarin Language" (1881), and Arnaud, "Twelve Years in Upper Ethiopia" (1868). Antoine died in 1897; Arnaud in 1893.

**Abbas**, the uncle of Mohammed, at first hostile to him, but ultimately the chief promoter of his religion, was born in 566, and died 652. He was the founder of the family of the Abbassides, who ruled as caliphs of Bagdad from 750 till the Mongol conquest in 946, but continued to exercise the spiritual functions of the caliphate, first at Bagdad, and from 1258 in Egypt, under the protection of the Mamelukes, till 1517, when that dignity passed to the Turkish Sultan. The Abbassides in Persia were descended from the race of the Sofi, who ascribed their origin to the Caliph Ali. This race acquired dominion in 1500, and became extinct in 1736. Among them, Abbas I., surnamed the Great, was the most eminent ruler. He came to the throne 1586, and died 1628. His reign was marked by a series of victories over the Turks. In alliance with England, he destroyed, in 1621, the Portuguese colony at Ormuz.

**Abbas-Mirza**, a Persian prince and warrior, the favorite son of the Shah Feth-Ali; born in 1783. He was early convinced of the advantages of Western civilization, and, with the help of European officers, he first of all applied himself to the reform of the army. He led the Persian armies with great bravery, but with little success, in the wars with Russia, 1811-1813, and 1826-1828. In 1829 he visited St. Petersburg, and was sent back to Persia loaded with presents. He died in 1833.

**Abbas Pasha**, Viceroy of Egypt, was grandson of the famous Mehemet Ali. Born in 1813, he was early initiated into public life, and in 1841 he took an active



part in his grandfather's Syrian war. The death of his uncle, Ibrahim Pasha, in 1848, called him to the viceregal throne at Cairo. During his brief reign he did much to undo the progress that had been made under Mehemet Ali. At the outbreak of the Crimean war he placed a force of 15,000 men and his fleet at the disposal of the Sultan. He was found dead, not without suspicion of foul play, on the morning of July 13, 1854.

**Abbas Pasha Hilmi**, Khedive of Egypt, born in 1874, oldest son of the Khedive Mehemet-Tewfik. He studied at the Theresianum at Vienna. On his father's death in 1892 he became Khedive. He won popularity by reducing the taxes, and he tried to throw off the English influence. In 1893 he dismissed four of his ministers, but Lord Cromer interfered and he agreed to follow England's recommendations in all important matters. In 1895, he married a young Circassian slave, Ikbâl Hanum, and replaced his minister Nubar Pasha by Mustapha-Fehmi Pasha, who was wholly devoted to English interests.

**Abbas I.**, surnamed the GREAT; born in 1557, was the seventh Shah or King of Persia of the dynasty of the Sufis. In his childhood he was sent to Khorasan as nominal governor, and at the age of 25 was proclaimed king by the discontented nobles of that province. His father, Mohammed Khodabendeh, under whose officers the country had suffered great oppression, was soon driven from the throne, and Abbas obtained the sovereignty at a time when the Turks had invaded the W. provinces of the kingdom, and hordes of Usbeck Tartars made repeated incursions into Khorasan. His first act was to transfer his residence from Kasbin to Ispahan. He then concluded a treaty with the Turks, to whom he ceded and confirmed all their conquests, with the view of gaining time to chastise the Usbecks. In 1597 he surprised and completely defeated these Tartar plunderers in a battle which was fought in the neighborhood of Herat. Then followed the conquest of Ghilan, Mazanderan, several parts of Tartary, and almost the whole of Afghanistan. Abbas then declared war against the Turks, and in 1605, with an army of 60,000 men, he defeated a Turkish army of nearly twice that number in a battle near Bussorah. By this victory he recovered all his lost provinces, and secured a complete immunity from Turkish aggression during the rest of his lifetime. He also subdued a vast extent of country to the W. of the Tigris and Euphrates, and in 1611 he dictated to Achmet I. the conditions of a treaty of peace which secured to Persia the possession of Shirvan and Kurdistan. He died Jan. 27, 1628, having reigned over Persia 41 years.

**Abbassa**, sister of the Caliph Haroun-al-Raschid, who was given in marriage to his vizier Giaffar, on the strange condition that she should remain a virgin, the violation of which, and its terrible consequences, have been the theme of oriental stories.

**Abbassides**, the name of a race who possessed the caliphate for 524 years. There were 37 caliphs of this race who succeeded one another without interruption. They drew their descent from Abbas-ben-Abd-el-Motallib, Mahomet's uncle. The princes of this family made war on the dynasty of Omniades, A. D. 746, and in 750 defeated the last caliph of the rival family in the bloody battle of Zab, near Mosul. The most celebrated monarchs of this family were Al Mansur and Haroun-al-Raschid. Their empire terminated in Mostazem, who fell in battle against the Tartar prince Hulaku, in 1257.

**Abbé** (äb-ä'), originally the French name for an abbot, but often used in the general sense of a priest or clergyman. By a *concordat* between Pope Leo X. and Francis I. (1516), the French king had the right to nominate upward of 200 *abbés commendataires*, who, without having any duty to perform, drew a third of the revenues of their monasteries. They were not necessarily clergy, but were expected, unless exempted by a dispensation, to take orders. The hope of obtaining one of those sinecures led multitudes of young men, many of them of noble birth, to enter the clerical career, which, however, seldom went further than taking the inferior orders; and it became customary to call all such aspirant abbés, jocularly, Abbés of St. Hope. They formed a considerable and influential class in society, and an abbé, distinguished by a short, violet-colored robe, was often found as chaplain or tutor in noble households, or engaged in literary work. This class of nominal clergy disappeared at the Revolution.

**Abbe, Cleveland**, an American meteorologist, born in New York city, Dec. 3, 1838. He studied astronomy in Germany, and was director of the Cincinnati Observatory from 1868 to 1870. Since 1871 he has been Professor of Meteorology in the National Weather Bureau. Among his chief publications are "Treatise on Meteorological Apparatus," "Preparatory Studies for Deductive Methods in Meteorology," "Solar Spots and Terrestrial Temperature," and "Atmospheric Radiation."

**Abbeokutta**, or **Abbeokoota**, a city of West Africa, and capital of the Egba nation, is situated on the E. bank of the river Ogoon, 60 miles N. E. from Badagry, on the Bight of Benin. Pop. about 75,000; greatly civilized by the labors of missionaries.



**Abbeville**, town and county seat of Abbeville co., S. C., on the Southern and the Seaboard Air Line railroads; 106 miles W. by N. W. of Columbia, the State capital. It is in a rich, cotton-growing region; is noted for its fine climate, which makes it a popular resort for Northern invalids, and has a National bank, excellent public schools, several large manufactories connected with the cotton industry, a property valuation of over \$500,000, bonded debt of less than \$55,000, and several periodicals. Pop. (1890) 1,696; (1900) 3,766; (1910) 4,459.

**Abbeville**, a city of France, capital of the *arrondissement* of the same name (Department of the Somme), situated in a pleasant and fertile valley on both sides of the river Somme, 12 miles above its mouth, and 25 miles N. W. of Amiens. This town, which is strongly fortified on Vauban's system, is neat and well built; it is one of the most thriving manufacturing towns in France. Besides black cloths of the best quality, there are produced velvets, cottons, linens, serges, sackings, hosiery, pack-thread, jewelry, soaps, glasswares, etc. By help of the tides, vessels of 150 tons come up to the town. Its most interesting building is the church of St. Wolfram, begun in 1488, one of the richest existing examples of the flamboyant style. Pop. (1901), 20,388.

**Abbey**, a monastery or religious community of the highest class, governed by an abbot, assisted generally by a prior, sub-prior, and other subordinate functionaries; or, in the case of a female community, superintended by an abbess. A priory differed from an abbey only in being scarcely so extensive an establishment, and was governed by a superior named a prior. Abbeys or monasteries first arose in the East. Among the most famous abbeys on the European continent were those of Clugny, Clairvaux, and Citeaux in France; the abbey of St. Galle in Switzerland, and of Fulda in Germany; among the most noteworthy English abbeys were those of Westminster, St. Mary's of York, Fountains, Kirkstall, Tintern, Rievaulx, Netley, Paisley, and Arbroath.

The abbeys in England were wholly abolished by Henry VIII. at the Reformation. Abbeys were usually strongly built, with walls which served as a defense against enemies. Within the walls were large buildings in which the occupants carried on the work to which they had been assigned.

**Abbey, Edwin Austin**, an American artist, born in Philadelphia, April 1, 1852. Besides illustrating many books and painting a number of notable pictures, he designed a series of paintings for the walls of the Boston Public Library, on the sub-

ject of the "Holy Grail." He was one of the American jurors on paintings in the Paris exposition of 1900, and in 1901 was commissioned by King Edward VII. to paint the coronation scene in Westminster Abbey.

**Abbey, Henry Eugene**, an American operatic manager, born in Akron, O., June 27, 1846; was engaged for several years in theatrical, and, from 1883, in operatic management, producing Italian and German operas with the most distinguished singers of the day. He died in 1896.

**Abbitibbi**, or **Abbitibbe**, the name of a river, a lake, and a former important trading post of the Hudson's Bay Company in N. Ontario, Canada.

**Abbot**, the superior of a monastery of monks erected into an abbey or priory. The principal distinction observed between abbots are those of regular and commendatory. The former take the vow and wear the habit of their order; whereas the latter are seculars, who have received tonsure, but are obliged by their bulls to take orders when of proper age. Other distinctions also arose among abbots when abbeys were flourishing in Europe; as, mitred, those privileged to wear the mitre and exercise episcopal authority within their respective precincts; crosiered, so named from their carrying the crosier, or pastoral staff; ecumenical, such as exercised universal dominion; and cardinal, from their superiority over all others. Abbot is also a title given to others besides the superiors of monasteries; thus, bishops, whose sees were formerly abbeys, are called abbots. Among the Genoese, the chief magistrate of the republic formerly bore the title of "Abbot of the People."

**Abbot, Ezra**, an American Greek scholar, born at Jackson, Me., April 28, 1819. Besides his valuable work as one of the editors of the American edition of Smith's "Bible Dictionary," he wrote "The Authorship of the Fourth Gospel" (1880), in which was announced the important discovery of Tatian's "Diatessaron," and which took high rank; compiled "Literature of the Doctrine of a Future Life" (1864), etc. He was one of the American committee of New Testament revisers. He died at Cambridge, Mass., March 21, 1884.

**Abbot, Francis Ellingwood**, an American philosophical writer and journalist, born at Boston, in 1836. Besides notable magazine articles, he wrote "Scientific Theism" (1886), "The Way Out of Agnosticism" (1890), etc. He was for a number of years editor of the liberal journal, "The Index." He died Oct. 23, 1903.

**Abbot, Henry Larcom**, an American military engineer, born in Beverly, Mass., Aug. 13, 1831; graduated at the United

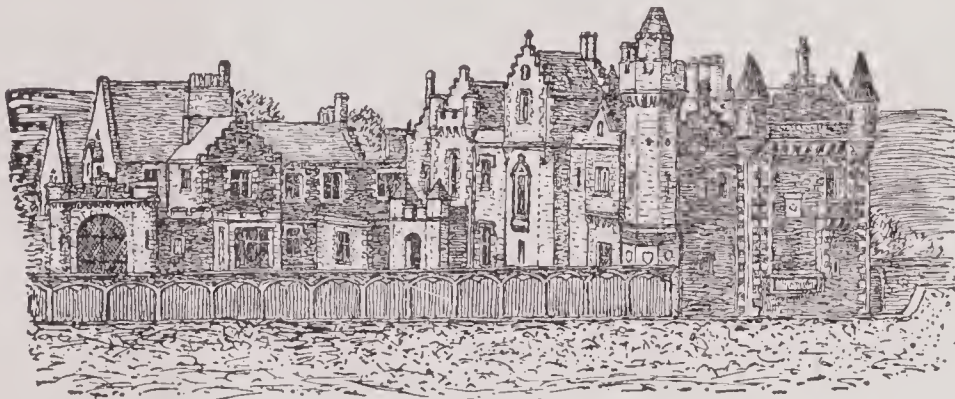


## Abbot

**States Military Academy** in 1854; became brevet Major-General of Volunteers in the Civil War, and subsequently Colonel and Chief of Engineers of the United States army, and was retired in 1895. He is a member of many scientific societies and received the degree of LL. D. from Harvard in 1886.

**Abbot, Willis John**, an American journalist and author, born in Connecticut in 1863. With the exception of a "Life of Carter Harrison," his works consist principally of popular histories for young people, among which are "Blue-Jackets of 1776," "Blue-Jackets of 1812," "Blue-Jackets of '61," "Battle-Fields and Camp-Fires."

**Abbotsford**, the home of Sir Walter Scott, situated on the S. bank of the Tweed, and a few miles above Melrose. It takes its name from a ford formerly used by the monks of Melrose.



ABBOTSFORD.

**Abbott, Alexander Crever**, an American hygienist, born in Baltimore, Md., Feb. 26, 1860; was educated at the University of Maryland, Johns Hopkins University, and the universities of Munich and Berlin. He is a fellow of the College of Physicians in Philadelphia, and a member of numerous scientific societies; and, in 1900, was Professor of Hygiene and director of the laboratory of hygiene in the University of Pennsylvania. His publications include "The Principles of Bacteriology," and numerous papers pertaining to bacteriology and hygiene.

**Abbott, Austin**, an American lawyer and writer on legal subjects, born in 1831. He published two novels, "Conecut Corners" and "Matthew Caraby," besides several legal works. He died in 1896.

**Abbott, Benjamin Vaughan**, an American lawyer and legal writer, born in Boston, Mass., June 4, 1830. He published a number of able works on legal subjects, among them "Digest of Decisions on Corporations, from 1860 to 1870" (1872); "Dictionary of Terms in American and English Jurisprudence" (1879); "National

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**Digest**" (1884-1885), and a revision of the United States Statutes. He died in Brooklyn, N. Y., Feb. 17, 1890.

**Abbott, Charles Conrad**, an American archæologist, born at Trenton, N. J., 1843. He has discovered palæolithic human remains in the Delaware valley, and shown the likelihood of the early existence of the Eskimo race as far south as New Jersey. A large collection of archæological specimens made by him is now in the Peabody Museum, Cambridge, Mass., where he was stationed in 1876-1889. His principal works are "Primitive Industry" (1881); "A Naturalist's Rambles about Home" (1884); "Cyclopædia of Natural History" (1886); "Upland and Meadow" (1886); "Wasteland Wanderings" (1887); a bird series, including "The Birds About Us," and "Bird Land Echoes;" and the novels, "A Colonial Wooing," "When the Century was New," and "The Hermit of Nottingham."

**Abbott, Edward**, an American clergyman, son of Jacob Abbott, born in Farmington, Me., July 15, 1841. He was the editor of "The Congregationalist" from 1869 to 1878, and of "The Literary World" from 1878. Among his works are "Dialogues of Christ;" "Paragraph History of the American Revolution" (1875); "Revolutionary Times" (1876); "Long Look Series of Juvenile Tales" (1876-1880); and "Paragraph History of the United States." He was elected Protestant Episcopal Missionary Bishop of Japan in 1889, but declined. He died April 5, 1908.

**Abbott, Edwin Abbott**, an English theologian and Shakespearean scholar, born in London, Dec. 20, 1838. From the City of London School he passed, in 1857, to St. John's College, Cambridge. Senior classic and Chancellor's medallist (1861), he became a fellow, master at King Edward's School, Birmingham, and at Clifton College, and head master (1865-1889) of the City of London School. His works include the well-known "Shakespearean Grammar" (1870); "Through Nature to Christ" (1877); "Bacon and Essex" (1877); "Philochristus" (1878), and "Onesimus" (1882), two anonymous romances of the first age of the Church; "Francis Bacon" (1885); "The Kernel and the Husk" (1887); "Philomythus" (1891); "Anglican Career of Cardinal Newman" (1892), and "The Spirit on the Waters" (1897).

**Abbott, Emma**, American dramatic soprano, born in Chicago, Ill., in December, 1849. After years of hard work, she went



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abroad in 1872 and studied with Sangiovanni at Milan, and Delle Sedie in Paris, and afterward sang in opera with great success. In 1878 she married E. J. Wetherell, of New York. She died in Salt Lake City, Utah, Jan. 5, 1891.

**Abbott, Jacob**, an American writer, born in Hallowell, Me., Nov. 14, 1803. His works, comprising over 200 titles, chiefly of stories for the young, were widely read in his own day. Among the best known are "The Rollo Books" (28 vols.); "The Franconia Stories" (10 vols.); "The Marco Paul Series" (6 vols.). He died in Farmington, Me., Oct. 31, 1879.

**Abbott, Sir John Joseph Caldwell**, a Canadian statesman, born in 1821. He took an active part in the Senate, leading the Conservative side. On the death of Sir John Macdonald, in 1891, he became Premier, resigning in the following year on account of ill-health. He died in 1893.

**Abbott, John Stevens Cabot**, an American author, born at Brunswick, Me.; Sept. 18, 1805; brother of Jacob Abbott; author of "The Mother at Home" (1833); "History of Napoleon;" "History of the Civil War" (1863-1866); "History of Frederick the Great" (1871); "The French Revolution of 1789;" "Napoleon at St. Helena;" "History of Napoleon III." (1868); and numerous other works on kindred themes. He died at Fair Haven, Conn., June 17, 1877.

**Abbott, Lyman**, an American clergyman, born at Roxbury, Mass., Dec. 18, 1835. At first a lawyer, he was ordained minister of the Congregational Church in 1860. After a pastorate of five years, in Indiana, he went to New York, and rose rapidly to distinction through his contributions to periodical literature. He was pastor of Plymouth Church, Brooklyn, in 1888-1898, being the immediate successor of Henry Ward Beecher. He was associated with Mr. Beecher in the editorship of the "Christian Union," and is now editor of "The Outlook," formerly the "Christian Union." His writings include "Jesus of Nazareth" (1869); a "Life of Henry Ward Beecher" (1883); "In Aid of Faith" (1886); "Christianity and Social Problems" (1896); "The Evolution of Christianity;" "Signs of Promise;" "An Evolutionist's Theology," and "New Streams in Old Channels."

**Abbott, Russell Bigelow**, an American educator; born in Brookville, Ind., Aug. 8, 1823; was graduated at the University of Indiana in 1847; and received the degree of D. D. from Galesville University in 1884. After serving for several years as principal of public schools in Muncie and New Castle, Ind., and of Whitewater Presbyterian Academy, he was ordained in the Presbyterian

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Church in 1857; held pastorates in Brookville, Ind., seven years, in Knightstown, Ind., two years, and in Albert Lea, Minn., 15 years; and, founding Albert Lea College in the latter city, became its president in 1884. Dr. Abbott served as moderator of the Presbyterian Synod of Minnesota and several times as a delegate to the General Assembly of his church.

**Abbreviations**, or "shortenings," are used in writing to save time and space, or, it may be, to ensure secrecy. The ancient copiers of MSS. invented many contractions to facilitate their labor. Greek MSS. abound in such, and hence often cannot be read without a previous regular study of Greek paleography. From MSS. these contractions were transferred to the printed editions of Greek authors, and hence regular lists of them were given in the earlier Greek grammars, because the knowledge of them was absolutely essential to the student. Among the Romans the marks of abbreviation, called *notæ* or *compendia scribendi*, were so numerous that, in a classification by L. Annæus Seneca, they amount to 5,000. With the Latin language the ancient Roman abbreviations passed to the Middle Ages, appearing first on inscriptions and coins, then in manuscripts, and, more especially after the 11th century, in charters and other legal documents. The use of them in legal documents was forbidden by an act of Parliament passed in the reign of George II. In the following list most of the abbreviations that are likely to be met with by modern readers are alphabetically arranged:

A.—Acre.

A.—Acting.

A. or Ans.—Answer.

A. A. G.—Assistant Adjutant-General.

A. A. A. G.—Acting Assistant Adjutant-General.

A. A. P. S.—American Association for the Promotion of Science.

A. A. S.—*Academiæ Americanæ Socius*, Fellow of the American Academy (of Arts and Sciences).

A. A. S. S.—*Americanæ Antiquarianæ Societatis Socius*, Member of the American Antiquarian Society.

A. B.—Able-bodied seaman.

A. B.—*Artium Baccalaureus*, Bachelor of Arts.

A. B. C. F. M.—American Board of Commissioners for Foreign Missions.

Abl.—Ablative.

Abp.—Archbishop.

Abr.—Abridgment, or Abridged.

A. B. S.—American Bible Society.

A. C.—*Ante Christum*, before the birth of Christ.

A. C.—Archchancellor.

Acad.—Academy.

Acad. Nat. Sci.—Academy of Natural Sciences.

## Abbreviations

Acc.—Accusative.  
 Act.—Active; Acting.  
 Acct.—Account.  
 A. C. S.—American Colonization Society.  
 Advt.—Advertisement.  
 A. D.—*Anno Domini*, in the year of the Lord.  
 A. D. C.—Aide-de-camp.  
 Adj.—Adjective.  
 Adjt.—Adjutant.  
 Adjt.-Gen.—Adjutant-General.  
 Ad lib.—*Ad libitum*, at pleasure.  
 Adm.—Admiral; Admiralty.  
 Adm. Co.—Admiralty Court.  
 Admr.—Administrator.  
 Admx.—Administratrix.  
 Ad v.—*Ad valorem*, at (or on) the value.  
 Adv.—Adverb.  
 Æt.—*Ætatis*, of age; aged.  
 A. F. B. S.—American and Foreign Bible Society.  
 Afr.—African.  
 A. G.—Adjutant-General.  
 Agl. Dept.—Department of Agriculture.  
 Agr.—Agriculture.  
 A. G. S. S.—American Geographical and Statistieal Society.  
 Agt.—Agent.  
 A. H.—*Anno Hegiræ*, in the year of the Hegira.  
 A. H. M. S.—American Home Missionary Society.  
 Al.—Aluminium.  
 Ala.—Alabama.  
 Alas.—Alaska.  
 Alb.—Albany.  
 Alban.—Albanian.  
 Ald.—Alderman.  
 Alex.—Alexander.  
 Alf.—Alfred.  
 Alg.—Algebra.  
 Alt.—Altitude.  
 Am.—Amos.  
 A. M.—*Anno mundi*, in the year of the world.  
 A. M.—*Ante meridiem*, before noon; morning.  
 A. M.—*Artium Magister*, Master of Arts.  
 Am. Ass. Adv. Sei.—American Association for the Advancement of Science.  
 Am. Assn. Sci.—American Association for the Advancement of Science.  
 Amb.—Ambassador.  
 Amer.—American.  
 Amer. Acad.—American Academy.  
 A. M. E. Z.—African Methodist Episcopal Zion.  
 A. M. M.—*Amalgama*, amalgamation.  
 Amt.—Amount.  
 An.—*Anno*, in the year.  
 An. A. C.—*Anno ante Christum*, in the year before Christ.  
 Anal.—Analysis.  
 Anat.—Anatomy.  
 Anc.—Ancient; anciently.  
 And.—Andrew.  
 Ang.-Sax.—Anglo-Saxon.

## Abbreviations

Ann.—Annales; Annals.  
 Anon.—Anonymous.  
 Ans.—Answer.  
 Ant., or Antiq.—Antiquities.  
 Anth.—Anthony.  
 Aor., or aor.—Aorist.  
 A. O. S. S.—*Americanæ Orientalis Societatis Socius*, Member of the American Oriental Society.  
 Ap.—Apostle; Appius.  
 Ap.—*Apud*, in writings of; as quoted by.  
 Apo.—Apogee.  
 Apoc.—Apocalypse.  
 Apocr.—Apocrypha.  
 App.—Appendix.  
 Apr.—April.  
 Aq.—Water (*aqua*).  
 A. Q. M.—Assistant Quartermaster.  
 A. Q. M. G.—Assistant Quartermaster-General.  
 A. R.—*Anna Regina*, Queen Anne.  
 A. R.—*Anno regni*, year of the reign.  
 A. R. A.—Associate of the Royal Academy.  
 Ara.—Arabie.  
 Areh.—Arehibald.  
 Arch.—Arehiteet; Architecture.  
 Archd.—Arehdeacon.  
 Arg.—*Argumento*, by an argument drawn from such a law.  
 Ari.—Arizona.  
 Arith.—Arithmetie.  
 Ark.—Arkansas.  
 Arm.—Armenian.  
 Armor.—Armorie.  
 A. R. R.—*Anno regni regis*, in the year of the reign of the king.  
 Arr.—Arrive; Arrival.  
 A. R. S. A.—Associate of the Royal Scottish Academy.  
 A. R. S. S.—*Antiquariorum Regiæ Societatis Socius*, Fellow of the Royal Society of Antiquaries.  
 Art.—Artiele.  
 Artil.—Artillery.  
 A.-S.—Anglo-Saxon.  
 A. S., or Assist. Sec.—Assistant Seeretary.  
 As.—Arsenieum.  
 A. S. A.—American Statistieal Association.  
 Ass., Assn.—Association.  
 A. S. S. U.—American Sunday-School Union.  
 Astrol.—Astrology.  
 Astron.—Astronomy.  
 A. T. S.—American Tract Society.  
 Ats.—At suit of.  
 Atty.—Attorney.  
 Atty.-Gen.—Attorney-General.  
 A. U. A.—American Unitarian Associa-tion.  
 Aub. Theol. Sem.—Auburn Theological Seminary.  
 A. U. C.—*Anno urbis conditæ*, or *ab urbe condita*, in the year from the building of the eity (Rome).  
 Aug.—August.  
 Aus.—Austria; Austrian.



## Abbreviations

Auth. Ver., or A. V.—Authorized Version (of the Bible).  
 Av.—Average; Avenue.  
 Avdp.—Avoirdupois.  
 Avoir.—Avoirdupois.  
 A. Y. M.—Ancient York Masons.

B.—Born.  
 B. A.—Bachelor of Arts.  
 Bal.—Balance.  
 Balt.—Baltimore.  
 Bapt.—Baptist.  
 Bar.—Barometer.  
 Bar.—Baruch.  
 Bart. or bt.—Baronet.  
 Bbl.—Barrel.  
 B. C.—Before Christ.  
 B. C. L.—Bachelor of Civil Law.  
 B. D.—*Baccalaureus Divinitatis*, Bachelor of Divinity.  
 Bdls.—Bundles.  
 Bds., or bds.—Boards (bound in).  
 Bds.—Bonds.  
 Beau. & Fl., or B. & F.—Beaumont and Fletcher.  
 Beds.—Bedfordshire.  
 Belg.—Belgie; Belgian; Belgium.  
 Benj.—Benjamin.  
 Berks.—Berkshire.  
 Bi.—Bismuth.  
 B. I.—British India.  
 Bib.—Bible; Biblical.  
 Biog.—Biography; Biographical.  
 Disc.—Biscayan.  
 B. Jon.—Ben Jonson.  
 Bk.—Bark.  
 Bk.—Book.  
 B. LL.—*Baccalaureus Legum*, Bachelor of Laws.  
 B. LL.—Same as LL. B.  
 Bls.—Bales.  
 B. M.—*Baccalaureus Medicinæ*, Bachelor of Medicine.  
 B. M.—Same as M. B.  
 Bohem.—Bohemian.  
 Bost.—Boston.  
 Bot.—Botany.  
 Bp.—Bishop.  
 B. R.—*Banco Regis*, or *Reginæ*, the King's or Queen's Bench.  
 Br.—Brig.  
 Br.—Brother.  
 Br. Univ.—Brown University.  
 Braz.—Brazil; Brazilian.  
 Brig.—Brigade; Brigadier.  
 Brig.-Gen.—Brigadier-General.  
 Brit. Mus.—British Museum.  
 Bro.—Brother.  
 B. S.—Bachelor in the Sciences.  
 Burl.—Burlesque.  
 Bush.—Bushel; Bushels.  
 B. V.—*Bene vale*, farewell.  
 B. V.—*Beata Virgo*, Blessed Virgin.  
 Bx., Bxs.—Box; Boxes.

C.—Cent.  
 C.—Consul.

## Abbreviations

C., or Cels.—Celsius's Scale for the thermometer.  
 C., or Cent.—*Centum*, a hundred; Century.  
 C., Ch., or Chap.—Chapter.  
 Ca. sa.—*Capias ad satisfaciendum*, a legal writ.  
 Ca.—Year (*circa*).  
 C. A.—Chief Accountant; Commissioner of Accounts.  
 Ca. resp.—*Capias ad respondendum*, a legal writ.  
 Cæ. par.—*Cæteris paribus*, other things being equal.  
 Cal.—California; Calends.  
 Cam., Camb.—Cambridge.  
 Can.—Canon.  
 Cant.—Canticles.  
 Cantab.—Of Cambridge (*Cantabrigiensis*).  
 Cantuar.—Of Canterbury.  
 Cap. or C.—*Caput, capitulum*, chapter.  
 Caps.—Capitals.  
 Capt.—Captain.  
 Capt.-Gen.—Captain-General.  
 Car.—Carat.  
 Card.—Cardinal.  
 Cash.—Cashier.  
 Cat.—Catalogue.  
 Cata.—Catalogue.  
 Cath.—Catherine, Catholic, Cathedral.  
 C. B.—Cape Breton.  
 C. B.—Companion of the Bath.  
 C. B.—*Communis Bancus*, Common Bench.  
 C. C.—Caius College; Account Current.  
 C. C.—County Commissioner; County Court.  
 C. C.—Cubic centimeter.  
 C. C. C.—Corpus Christi College.  
 C. C. P.—Court of Common Pleas.  
 Cd.—Cadmium.  
 C. D. V.—*Carte-de-Visite*.  
 C. E.—Civil Engineer.  
 C. E.—Christian Endeavor (Young People's Society of).  
 Ce.—Cerium.  
 Cel., or Celt.—Celtic.  
 Cent.—Centigrade, a scale of 100° from freezing to boiling.  
 Cert.—Certify.  
 Certif.—Certificate.  
 Cf., or cf.—*Confer*, compare.  
 C. G.—Commissary-General; Consul-General.  
 C. G. H.—Cape of Good Hope.  
 C. H.—Court house.  
 Ch.—Church; Chapter; Charles.  
 Chal.—Chaldron.  
 Chald.—Chaldea; Chaldean; Chaldaic.  
 Chan.—Chancellor.  
 Chap.—Chapter.  
 Chas.—Charles.  
 Chem.—Chemistry.  
 Ches.—Chesapeake.  
 Chi.—China; Chinese.  
 Chic.—Chicago.  
 Chr.—Christ; Christian.  
 Chr.—Christopher.  
 Chron.—Chronicles.

## Abbreviations

Cic.—Cicero.  
 Cin.—Cincinnati.  
 Cire.—Circuit.  
 Cit.—Citation; Citizen.  
 C. J.—Chief-Justice.  
 Cl.—Chlorine.  
 Cld.—Cleared.  
 Clk.—Clerk.  
 C. M.—Common Meter.  
 C. M. G.—Companion of the Order of St. Michael and St. George.  
 Co.—Company; county.  
 Coeh., or Coehl.—A spoonful (*cochleare*).  
 C. O. D.—Cash (or collect) on delivery.  
 Col.—Colorado; Colonel; Colossians.  
 Coll.—Collector; Colloquial; College; Collection.  
 Com. Arr.—Committee of Arrangements.  
 Com.—Commerce; Committee; Commissioner; Commodore.  
 Com. & Nav.—Commerce and Navigation.  
 Comdg.—Commanding.  
 Comm.—Commentary.  
 Comp.—Compare; Comparative; Compound; Compounded.  
 Com. Ver.—Common Version (of the Bible).  
 Con.—*Contra*, against; in opposition.  
 Con. Cr.—Contra, credit.  
 Coneh.—Conehology.  
 Con. Sec.—Conie Sections.  
 Confed.—Confederate.  
 Cong.—Congress.  
 Conj., or eonj.—Conjunction.  
 Congl.—Congregational; Conglomerate.  
 Conn., or Ct.—Connecticut.  
 Const.—Constable; Constitution.  
 Cont.—Contra.  
 Cop., or Copt.—Coptic.  
 Corn.—Cornwall; Cornish.  
 Cor.—Corinthians.  
 Cor. Mem.—Corresponding Member.  
 Cor. Sec.—Corresponding Secretary.  
 Corol.—Corollary.  
 Cos.—Cosine.  
 Coss.—Consuls (*consules*).  
 C. P.—Common Pleas.  
 C. P.—Court of Probate.  
 C. P. S.—*Custos Privati Sigilli*, Keeper of the Privy Seal.  
 Cr.—Chromium.  
 Cr.—Creditor; credit.  
 C. R.—*Custos Rotulorum*, Keeper of the Rolls.  
 C. R.—King Charles (*Carolus Rex*).  
 Crim. Con.—Criminal conversation; adultery.  
 Cs.—Cases.  
 C. S.—Court of Sessions.  
 C. S.—*Custos Sigilli*, Keeper of the Seal.  
 C. S. A.—Confederate States of America; Confederate States Army.  
 Csk.—Cask.  
 C. S. N.—Confederate States Navy.  
 C. Theod.—*Codice Theodosiano*, in the Theodosian Code.  
 Ct.—Court.

## Abbreviations

Ctl.—Central.  
 Cts.—Cents.  
 Cub.—Cubic.  
 Cub. Ft.—Cubic Foot.  
 Cur.—Currency.  
 C. W.—Canada West.  
 Cwt.—Hundredweight.  
 Cyc.—Cyclopedia.  
 D.—Died.  
 D.—Five hundred.  
 D.—Penny; pence (*denarius*).  
 D. A. G.—Deputy Adjutant-General.  
 Dak.—Dakota.  
 Dan.—Daniel; Danish.  
 Dat.—Dative.  
 D. B. or Domesd. B.—Domesday-Book.  
 D. C.—*Da Capo*, again.  
 D. C.—District of Columbia.  
 D. C. L.—Doctor of Civil Law.  
 D. C. S.—Deputy Clerk of Sessions.  
 D. D.—*Divinitatis Doctor*, Doctor of Divinity.  
 D. D. S.—Doctor of Dental Surgery.  
 Dea.—Deacon.  
 Dee.—December; Declination.  
 Dee. of Ind.—Declaration of Independence.  
 Def.—Definition.  
 Def., Deft.—Defendant.  
 Deg.—Degree; degrees.  
 Del.—Delaware; Delegate.  
 Del., or del.—*Delineavit*, he (or she) drew it.  
 Dem.—Democrat; Democratic.  
 Dep.—Deputy.  
 Dept.—Department.  
 Deut.—Deuteronomy.  
 D. F.—Defender of the Faith.  
 D. G.—*Dei gratia*, by the grace of God.  
 D. G.—*Deo gratias*, thanks to God.  
 D. H.—Dead-head.  
 Diam.—Diameter.  
 Diet.—Dictionary; Dictator.  
 Dim.—Diminutive.  
 Diase.—Diasearides.  
 Dise.—Discount.  
 Diss.—Dissertation.  
 Dist.—District.  
 Dist. Atty.—District-Attorney.  
 Div.—Division.  
 D. L. O.—Dead-Letter Office.  
 D. M.—Doctor of Music.  
 Do.—*Ditto*, the same.  
 Doe.—Document.  
 Dols.—Dollars.  
 D. O. M.—*Deo optimo maximo*, to God, the best, the greatest.  
 Doz.—Dozen.  
 D. P.—Doctor of Philosophy.  
 Dpt.—Department.  
 Dr.—Debtor; Doctor.  
 Dr.—Drams; Draehms.  
 D. S.—*Dal segno*, from the sign.  
 D. S. B.—*Debit sans breve*.  
 D. Se.—Doctor of Science.  
 D. T.—Doctor of Theology (*doctor theologiae*).



## Abbreviations

Dub.—Dublin.  
 Duo.—Duodecimo, twelve folds.  
 D. V.—*Deo volente*, God willing.  
 Dwt.—Pennyweight.  
 Dyn.—Dynamics.

E.—East.  
 E. by S.—East by South.  
 E. & O. E.—Errors and omissions excepted.  
 Ea.—Each.  
 E. B.—English Bible.  
 Eben.—Ebenezer.  
 Ebor.—York (*Eboracum*).  
 Eccl.—Ecclesiastes.  
 Ecclus.—Ecclesiasticus.  
 E. D.—Eastern District.  
 Ed.—Editor; Edition.  
 Edin.—Edinburgh.  
 Edm.—Edmund.  
 Edw.—Edward.  
 E. E.—Errors excepted.  
 E. E. T. S.—Early English Text Society.  
 E. G.—*Exempli gratia*, for example.  
 E. G.—*Ex grege*, among the rest.  
 E. Fl.—Ells Flemish.  
 E. Fr.—Ells French.  
 E. I.—East Indies or East India.  
 E. I. C., or E. I. Co.—East India Company.  
 E. I. C. S.—East India Company's Service.  
 Eliz.—Elizabeth.  
 E. Lon.—East longitude.  
 E. M.—Mining Engineer.  
 Emp.—Emperor; Empress.  
 Encyc.—Encyclopedia.  
 Encyc. Brit.—Encyclopedia Britannica.  
 Encyc. Amer.—Encyclopedia Americana.  
 Eng. Dept.—Department of Engineers.  
 Eng.—England; English.  
 E.-N.-E.—East-North-East.  
 Ent., Entom.—Entomology.  
 Env. Ext.—Envoy Extraordinary.  
 E. o. w.—Every other week.  
 Ep.—Epistle.  
 Eph.—Ephesians; Ephraim.  
 Epis.—Episcopal.  
 E. S.—Ells Scotch.  
 Esd.—Esdras.  
 E.-S.-E.—East-South-East.  
 Esq.—Esquire.  
 Esth.—Esther.  
 E. T.—English Translation.  
 Et. al.—*Et alii*, and others.  
 Etc., or &c.—*Et cæteri, et cæteræ, et cætera*, and others; and so forth.  
 Eth.—Ethiopic; Ethiopian.  
 Et seq.—*Et sequentia*, and what follows.  
 Etym.—Etymology.  
 E. U.—Evangelical Union.  
 Ex.—Example.  
 Ex.—Exodus.  
 Exc.—Excellency; exception.  
 Exch.—Exchequer; Exchange.  
 Ex. Doc.—Executive Document.  
 Exec. Com.—Executive Committee.  
 Execx.—Executrix.  
 Ex. gr.—For example (*exempli gratiâ*).  
 Exon.—Exeter (*Exonia*).

## Abbreviations

Exr. or Exec.—Executor.  
 Ez.—Ezra.  
 Ezek.—Ezekiel.

F. and A. M.—Free and Accepted Masons.  
 F., or Fahr.—Fahrenheit (thermometer).  
 Far.—Farthing.  
 F. A. S.—Fellow of the Antiquarian Society.  
 F. B. S.—Fellow of the Botanical Society.  
 F. C.—Free Church of Scotland.  
 Fcap. or fcp.—Foolscap.  
 F. C. P. S.—Fellow of the Cambridge Philological Society.  
 F. C. S.—Fellow of the Chemical Society.  
 F. D.—Defender of the Faith.  
 F. E.—Flemish ell.  
 Feb.—February.  
 Fec.—*Fecit*, he did it.  
 Fem.—Feminine.  
 F. E. S.—Fellow of the Entomological Society; Fellow of the Ethnographical Society.  
 Ff.—Following.  
 Ff.—The Pandects.  
 F. F. V.—First Families of Virginia.  
 F. G. S.—Fellow of the Geological Society.  
 F. H. S.—Fellow of the Horticultural Society.  
 Fi. Fa.—*Fieri facias*, cause it to be done.  
 Fid. Def.—Defender of the Faith.  
 Fig.—Figure.  
 Fin.—Finland.  
 Finn.—Finnish.  
 Fir.—Firkin.  
 F. K. Q. C. P. I.—Fellow of King's and Queen's College of Physicians, Ireland.  
 Fl. E.—Flemish ell.  
 Fla.—Florida.  
 F. L. S.—Fellow of the Linnæan Society.  
 F. M.—Field-Marshal.  
 F. O.—Field-Officer.  
 F. o. b.—Free on board.  
 Fol.—Folio.  
 For.—Foreign.  
 F. P. S.—Fellow of the Philological Society.  
 Fr.—France; French.  
 Fr.—*Fragmentum*, fragment.  
 Fr.—Francis.  
 Fr.—From.  
 F. R. A. S.—Fellow of the Royal Astronomical Society.  
 F. R. C. P.—Fellow of the Royal College of Physicians.  
 F. R. C. S. L.—Fellow of the Royal College of Surgeons, London.  
 Fred.—Frederick.  
 Fr. E.—French ell.  
 Fr., Frs.—Franc; Francs.  
 F. R. G. S.—Fellow of the Royal Geographical Society.  
 F. R. Hist. Soc.—Fellow of the Royal Historical Society.  
 Fri.—Friday.  
 F. R. S.—Fellow of the Royal Society.  
 Frs.—Frisian.  
 F. R. S. S. A.—Fellow of the Royal Scot-



## Abbreviations

tish Society of Arts.  
F. R. S. E.—Fellow of the Royal Society, Edinburgh.  
F. R. S. L.—Fellow of the Royal Society, London.  
F. S. A.—Fellow of the Society of Arts, or of Antiquaries.  
F. S. A. E.—Fellow of the Society of Antiquaries, Edinburgh.  
F. S. A. Scot.—Fellow of the Society of Antiquaries of Scotland.  
F. S. S.—Fellow of the Statistical Society.  
Ft.—Foot; feet; Fort.  
Fth.—Fathom.  
Fur.—Furlong.  
F. Z. S.—Fellow of the Zoölogical Society.

G., or g.—Guineas.  
Ga.—Georgia.  
G. A.—General Assembly.  
Gal.—Galatians; Gallon.  
Galv.—Galvanism.  
Galv.—Galveston.  
G. B.—Great Britain.  
G. B. & I.—Great Britain and Ireland.  
G. C.—Grand Chapter; Grand Conductor.  
G. C. B.—Grand Cross of the Bath.  
G. C. H.—Grand Cross of Hanover.  
G. C. K. P.—Grand Commander of the Knights of St. Patrick.  
G. C. L. H.—Grand Cross of the Legion of Honor.  
G. C. M. G.—Grand Cross of St. Michael and St. George.  
G. C. S. I.—Grand Commander of the Star of India.  
G. D.—Grand Duke; Grand Duchess.  
G. E.—Grand Encampment.  
Gen.—Genesis; General.  
Gen.—Genus; Genera; Genealogy.  
Gent.—Gentleman.  
Geo.—George.  
Geog.—Geography.  
Geol.—Geology.  
Geom.—Geometry.  
Ger.—German; Germany.  
Gl.—*Glossa*, a gloss.  
G. L.—Grand Lodge.  
G. M.—Grand Master.  
G. M. K. P.—Grand Master of the Knights of St. Patrick.  
G. M. S. I.—Grand Master of the Star of India.  
G. O.—General Order.  
Goth.—Gothic.  
Gov.—Governor.  
Gov.-Gen.—Governor-General.  
Govt.—Government.  
G. P.—*Gloria Patri* ("Glory be to the Father").  
G. P. O.—General Post-Office.  
G. R.—*Georgius Rex*, King George.  
Gr.—Greek; Gross.  
Gr., Grs.—Grain; Grains.  
Grad.—Graduated.  
Gram.—Grammar.  
Grot.—Grotius.

## Abbreviations

G. S.—Grand Secretary; Grand Sentinel; Grand Scribe.  
G. T.—Good Templars; Grand Tyler.  
Gtt.—Drop; drops (*gutta* or *guttæ*).  
H. A.—*Hoc anno*, this year.  
Hab.—Habakkuk.  
Hab. corp.—*Habeas corpus*, you may have the body.  
Hab. fa. poss.—*Habere facias possessionem*.  
Hab. fa. seis.—*Habere facias seisinam*.  
Hag.—Haggai.  
Hants.—Hampshire.  
H. B. C.—Hudson Bay Company.  
H. B. M.—His or Her Britannic Majesty.  
H. C.—House of Commons; Herald's College.  
H. C. M.—His or Her Catholic Majesty.  
Hdkf.—Handkerchief.  
H. E.—*Hoc est*, that is, or this is.  
Heb.—Hebrews.  
Heb.—Hebrew.  
H. E. I. C.—Honorable East India Company.  
H. E. I. C. S.—Honorable East India Company's Service.  
Her.—Heraldry.  
Herp.—Herpetology.  
Hf.-bd.—Half-bound.  
Hg.—*Hydrargyrum*, mercury.  
H.-G.—Horse-guards.  
H. H.—His or Her Highness; His Holiness (the Pope).  
Hhd.—Hogshead.  
Hier.—Jerusalem (*Hicrosolyma*).  
H. I. H.—His or Her Imperial Highness.  
Hil.—Hilary.  
Hind.—Hindu; Hindustan; Hindustanee.  
Hipp.—Hippocrates.  
Hist.—History.  
H. J. S.—*Hic jacet sepultus*, Here lies buried.  
H. M.—His Majesty.  
H. L.—House of Lords.  
H. M. P.—*Hoc monumentum posuit*, erected this monument.  
H. M. S.—His or Her Majesty's Ship.  
Holl.—Holland.  
Hon.—Honorable.  
Hort.—Horticulture.  
Hos.—Hosea.  
H.-P.—High-priest; Horse-power; Half-pay.  
H. R.—House of Representatives.  
H. R. E.—Holy Roman Empire.  
H. R. H.—His Royal Highness.  
H. R. I. P.—*Hic requiescit in pace*, Here rests in peace.  
H. S.—*Hic situs*, Here lies.  
H. S. H.—His Serene Highness.  
H. T.—*Hoc titulum*, this title; *hoc tituli*, in or under this title.  
Hund.—Hundred.  
Hung.—Hungarian.  
H. V.—*Hoc verbum*, this word; *his verbis*, in these words.  
Hyd.—Hydrostatics.  
Hypoth.—Hypothesis; Hypothetical.



## Abbreviations

Ia.—Iowa.  
 Ib., or ibid.—*Ibidem*, in the same place.  
 Icel.—Iceland; Icelandic.  
 Ich.—Ichthyology.  
 Icon. Encyc.—Iconographic Encyclopedia.  
 I. Ch. Th. U. S.—(*Iχθvs*) Jesus Christ the Son of God, the Saviour (*Iesous Christos Theon Huios Sotor*).  
 Ictus.—*Juriconsultus*.  
 Id.—Idaho.  
 Id.—*Idem*, the same.  
 Id.—The Ides (*Idus*).  
 I. E.—*Id est*, that is.  
 I. G.—Inside Guardian.  
 I. H. S.—Jesus the Saviour of Men (*Jesus Hominum Salvator*).  
 I., II., III.—One, two, three, or first, second, third.  
 Ij.—Two (*med.*).  
 Ill.—Illinois.  
 Imp.—Imperative; imperfect.  
 Imp.—Imperial; Emperor (*Imperator*).  
 In.—Inch; inches.  
 In.—Indium.  
 Incog.—*Ineognito*, unknown.  
 Incor.—Incorporated.  
 Ind. Ter.—Indian Territory.  
 I. H. P.—Indicated horse power.  
 I. N. D.—*In nomine Dei*, in the name of God.  
 Ind.—Indiana; Index.  
 Indef.—Indefinite.  
 Inf.—*Infra*, beneath, or below.  
 In f.—*In fine*, at the end of the title, law, or paragraph quoted.  
 Inhab.—Inhabitant.  
 In lim.—*In limine*, at the outset.  
 In loc.—*In loco*, in the place; on the passage.  
 In pr.—*In principio*, in the beginning and before the first paragraph of a law.  
 I. N. R. I.—*Jesus Nazarenus, Rex Judæorum*, Jesus of Nazareth, King of the Jews.  
 Inst.—Instant, of this month; Institutes.  
 Inst.—Institute; Institution.  
 In sum.—*In summa*, in the summary.  
 Int.—Interest.  
 Interj.—Interjection.  
 In trans.—*In transitu*, on the passage.  
 Int. Dept.—Department of the Interior.  
 Int. Rev.—Internal Revenue.  
 Introd.—Introduction.  
 I. O. O. F.—Independent Order of Odd Fellows.  
 Ion.—Ionic.  
 I. O. S. M.—Independent Order of the Sons of Malta.  
 I. O. U.—I owe you.  
 Ipecac.—Ipecacuanha.  
 I. Q.—*Idem quod*, the same as.  
 Ire.—Ireland.  
 I. R. O.—Internal Revenue Office.  
 Isa.—Isaiah.  
 Is., Isl.—Island.  
 I. T.—Inner Temple.  
 It.—Italy.  
 Ital.—Italic; Italian.

## Abbreviations

IV.—Four or fourth.  
 I. W.—Isle of Wight.  
 IX.—Nine or ninth.  
 J.—Justice, or Judge.  
 J.—One (*med.*).  
 J. A.—Judge-Advocate.  
 Jac.—Jacob.  
 J. A. G.—Judge Advocate-General.  
 Jam.—Jamaica.  
 Jan.—January.  
 Jas.—James.  
 J. C. D.—*Juris Civilis Doctor*, Doctor of Civil Law.  
 J. D.—*Jurum Doctor*, Doctor of Laws.  
 J. C.—Juriconsult (*Juris Consultus*).  
 J. D.—Junior Deacon.  
 Jer.—Jeremiah.  
 J. G. W.—Junior Grand Warden.  
 JJ.—Justices.  
 Jno.—John.  
 Jona.—Jonathan.  
 Jos.—Joseph.  
 Josh.—Joshua.  
 J. P.—Justice of the Peace.  
 J. Prob.—Judge of Probate.  
 J. R.—*Jacobus Rex*, King James.  
 Jr., or Jun.—Junior.  
 J. U. D., or J. V. D.—*Juris utriusque Doctor*, Doctor of both laws (of the Canon and the Civil Law).  
 Jud.—Judicial.  
 Jud.—Judith.  
 Judg.—Judges.  
 Judge-Adv.—Judge-Advocate.  
 Jul. Per.—Julian Period.  
 Jus. P.—Justice of the Peace.  
 Just.—Justinian.  
 J. W.—Junior Warden.  
 K.—King.  
 K. A.—Knight of St. Andrew, in Russia.  
 Kal.—The Kalends (*Kalendæ*).  
 K. A. N.—Knight of Alexander Nevskoi, in Russia.  
 Kan.—Kansas.  
 K. B.—King's Bench.  
 K. B.—Knight of the Bath.  
 K. B. A.—Knight of St. Bento d'Avis, in Portugal.  
 K. B. E.—Knight of the Black Eagle, in Russia.  
 K. C.—King's Counsel.  
 K. C.—Knight of the Crescent, in Turkey.  
 K. C. B.—Knight Commander of the Bath.  
 K. C. H.—Knight Commander of Hanover.  
 K. C. S.—Knight of Charles III. of Spain.  
 K. E.—Knight of the Elephant, in Denmark.  
 K. F.—Knight of Ferdinand of Spain.  
 K. F. M.—Knight of St. Ferdinand and Merit, in Sicily.  
 K. G.—Knight of the Garter.  
 Kg., Kgs.—Keg; Kegs.  
 K. G. C.—Knight of the Grand Cross.  
 K. G. C. B.—Knight of the Grand Cross of the Bath.

## Abbreviations

K. G. F.—Knight of the Golden Fleece, in Spain.  
 K. G. H.—Knight of the Guelphs of Hanover.  
 K. G. V.—Knight of Gustavus Vasa of Sweden.  
 K. H.—Knight of Hanover.  
 Ki.—Kings.  
 Kil.—Kilometer.  
 Kilo.—Kilogram.  
 Kingd.—Kingdom.  
 K. J.—Knight of St. Joachim.  
 K. L.—Knight of Labor.  
 K. L., or K. L. A.—Knight of Leopold of Austria.  
 K. L. H.—Knight of the Legion of Honor.  
 K. M.—Knight of Malta.  
 K. Mess.—King's Messenger.  
 K. M. H.—Knight of Merit, in Holstein.  
 K. M. J.—Knight of Maximilian Joseph of Bavaria.  
 K. M. T.—Knight of Maria Theresa of Austria.  
 Knick.—Knickerbocker.  
 K. N. S.—Knight of the Royal North Star, in Sweden.  
 Knt. or Kt.—Knight.  
 K. P.—Knight of St. Patrick; Knight of Pythias.  
 K. R. C.—Knight of the Red Cross.  
 K. R. E.—Knight of the Red Eagle, in Prussia.  
 K. S.—Knight of the Sword, in Sweden.  
 K. S. A.—Knight of St. Anne of Russia.  
 K. S. E.—Knight of St. Esprit, in France.  
 K. S. F.—Knight of St. Fernando of Spain.  
 K. S. F. M.—Knight of St. Ferdinand and Merit, in Naples.  
 K. S. G.—Knight of St. George of Russia.  
 K. S. H.—Knight of St. Hubert of Bavaria.  
 K. S. J.—Knight of St. Januarius of Naples.  
 K. S. L.—Knight of the Sun and Lion, in Persia.  
 K. S. M. & S. G.—Knight of St. Michael and St. George of the Ionian Islands.  
 K. S. P.—Knight of St. Stanislaus of Poland.  
 K. S. S.—Knight of the Southern Star of the Brazils.  
 K. S. S.—Knight of the Sword, in Sweden.  
 K. S. W.—Knight of St. Wladimir of Russia.  
 K. T.—Knight of the Thistle; Knight Templar.  
 Kt.—Knight.  
 K. τ. λ.—The same as "etc."  
 K. T. S.—Knight of the Tower and Sword, in Portugal.  
 K. W.—Knight of William of the Netherlands.  
 K. W. E.—Knight of the White Eagle, in Poland.  
 Ky.—Kentucky.  
 L.—Fifty, or fiftieth.  
 L.—*Liber*, book.

## Abbreviations

L., or £. s. d.—Pounds, shillings, pence.  
 £, or l.—Pounds, English currency (*libra*).  
 £ T.—Pounds, Turkish currency.  
 La.—Louisiana.  
 L. A. C.—Licentiate of the Apothecaries' Company.  
 L. A. W.—League of American Wheelmen.  
 Lam.—Lamentations.  
 Lang.—Language.  
 Lat.—Latitude; Latin.  
 Lapp.—Lappish.  
 Lb., or lb.—*Libra*, or *libræ*, pound or pounds in weight.  
 L. C.—Lower Canada; Lord Chamberlain; Lord Chancellor.  
 L. C. B.—Lord Chief Baron.  
 L. C. J.—Lord Chief-Justice.  
 Ld.—Lord; Limited.  
 Ldp.—Lordship.  
 Leg.—Legate.  
 Legis.—Legislature.  
 Leip.—Leipsic.  
 Lett.—Lettish.  
 Lev.—Leviticus.  
 Lex.—Lexicon.  
 L. G.—Life Guards.  
 L. H. A.—Lord High Admiral.  
 L. H. C.—Lord High Chancellor.  
 L. H. D.—Doctor of Literature.  
 L. H. T.—Lord High Treasurer.  
 L. I.—Long Island.  
 Lib.—*Liber*, book.  
 Lieut.-Col.—Lieutenant-Colonel.  
 Lieut.-Gen.—Lieutenant-General.  
 Lieut.-Gov.—Lieutenant-Governor.  
 Lieut.—Lieutenant.  
 Lin.—Lineal.  
 Linn.—Linnæus; Linnæan.  
 Liq.—Liquor; Liquid.  
 Lit.—Literally; Literature.  
 Lith.—Lithuanian.  
 L., £, or l.—*Libra* or *libræ*, pound or pounds sterling.  
 L. l.—*Loco laudato*, in the place quoted.  
 L. L. A.—Lady Literate of Arts, a Scottish academic degree conferred on women.  
 L. Lat.—Low Latin; Law Latin.  
 LL. B.—*Legum Baccalaureus*, Bachelor of Laws.  
 LL. D.—*Legum Doctor*, Doctor of Laws.  
 LL. M.—Master of Laws.  
 L. M. S.—London Missionary Society.  
 Loc. cit.—*Loco citato*, in the place cited.  
 Lon.—Longitude.  
 Lond.—London.  
 L. P.—Lord Provost.  
 L. P.—Long Provost; Large Paper.  
 L. P. S.—Lord Privy Seal.  
 L. R. C. P.—Licentiate of the Royal College of Physicians.  
 L. R. C. S.—Licentiate of the Royal College of Surgeons.  
 L. S. D.—Pounds, shillings, and pence.  
 L. S.—*Locus sigilli*, place of the seal.  
 Lt.—Lieutenant.  
 LX.—Sixty, or sixtieth.



## Abbreviations

LXX.—Seventy, or seventieth.  
 LXX.—The Septuagint (Version of the Old Testament).  
 LXXX.—Eighty, or eightieth.

M.—Married.  
 M.—Mile.  
 M.—*Meridies*, noon.  
 M.—*Mille*, a thousand.  
 M., or Mons.—Monsieur.  
 M. A.—Master of Arts.  
 M. A.—Military Academy.  
 Macc.—Maccabees.  
 Maced.—Macedonian.  
 Mad.—Madam.  
 Mag.—Magazine.  
 Maj.—Major.  
 Maj.-Gen.—Major-General.  
 Mal.—Malachi.  
 Man.—Manassas.  
 Mar.—March.  
 March.—Marchioness.  
 Marg.—Margin.  
 Marg. Tran.—Marginal Translation.  
 Marq.—Marquis.  
 Masc.—Masculine.  
 Mass.—Massachusetts.  
 Math.—Mathematics; Mathematician.  
 Matt.—Matthew.  
 Max.—Maxim.  
 M. B.—*Medicinæ Baccalaureus*, Bachelor of Medicine.  
 M. B.—*Musicæ Baccalaureus*, Bachelor of Music.  
 M. B. F. et H.—Great Britain, France, and Ireland.  
 M. C.—Member of Congress; Master of Ceremonies; Master Commandant.  
 Meh.—March.  
 M. C. S.—Madras Civil Service.  
 M. D.—*Medicinæ Doctor*, Doctor of Medicine.  
 Md.—Maryland.  
 Mdle.—Mademoiselle.  
 Mdpn.—Midshipman.  
 M. E.—Methodist Episcopal; Military or Mechanical Engineer.  
 M. E., S.—Methodist Episcopal, South.  
 Me.—Maine.  
 Mech.—Mechanic; Mechanical.  
 Med.—Medicine.  
 M. E. G. H. P.—Most Excellent Grand High Priest.  
 Mem.—Memorandum.  
 Mem.—*Memento*, remember.  
 Merc.—Mercury.  
 Mess. & Docs.—Messages and Documents.  
 Messrs., or MM.—Messieurs, Gentlemen.  
 Met.—Metaphysics.  
 Metal.—Metallurgy.  
 Meteor.—Meteorology.  
 Meth.—Methodist.  
 Mex.—Mexico, or Mexican.  
 Mfd.—Manufactured.  
 Mfs.—Manufactures.  
 M. Goth.—Mæso-Gothic.  
 Mic.—Micah.

## Abbreviations

M. I. C. E.—Member of the Institution of Civil Engineers.  
 Mich.—Michaelmas.  
 Mich.—Michigan.  
 Mil.—Military.  
 Min.—Mineralogy.  
 Min.—Minute.  
 Min. E.—Mining Engineer.  
 Minn.—Minnesota.  
 Min. Plen.—Minister Plenipotentiary.  
 Mir. for Mag.—Mirror for Magistrates.  
 Miss.—Mississippi.  
 M. L. A.—Mercantile Library Association.  
 MM.—Their Majesties.  
 MM.—Messieurs; Gentlemen.  
 Mme.—Madame.  
 M. M. S.—Moravian Missionary Society.  
 M. M. S. S.—*Massachusetts Medicinæ Societatis Socius*, Fellow of the Massachusetts Medical Society.  
 Mn.—Manganese.  
 M. N. A. S.—Member of the National Academy of Sciences.  
 Mo.—Missouri; Month.  
 Mod.—Modern.  
 Mon.—Montana; Monday.  
 Mons.—Monsieur; Sir.  
 Mont.—Montana.  
 Morn.—Morning.  
 Mos., or mth.—Months.  
 Mos.—Months.  
 M. P.—Member of Parliament; Member of Police; Methodist Protestant.  
 M. P. S.—Member of the Philological Society; Member of the Pharmaceutical Society.  
 M. R.—Master of the Rolls.  
 Mr.—Mister.  
 M. R. A. S.—Member of the Royal Asiatic Society; Member of the Royal Academy of Science.  
 M. R. C. C.—Member of the Royal College of Chemistry.  
 M. R. C. P.—Member of the Royal College of Preceptors.  
 M. R. C. S.—Member of the Royal College of Surgeons.  
 M. R. C. V. S.—Member of the Royal College of Veterinary Surgeons.  
 M. R. G. S.—Member of the Royal Geographical Society.  
 M. R. I.—Member of the Royal Institution.  
 M. R. I. A.—Member of the Royal Irish Academy.  
 Mrs.—Mistress.  
 M. R. S. L.—Member of the Royal Society of Literature.  
 M. S.—*Memoriæ sacrum*, Sacred to the memory.  
 M. S.—Master of the Sciences.  
 MS.—*Manuscriptum*, manuscript.  
 MSS.—Manuscripts.  
 Mt.—Mount, or mountain.  
 M. T. C.—Marcus Tullius Cicero.  
 Mus. B.—Bachelor of Music.  
 Mus. D.—Doctor of Music.  
 M. W.—Most Worthy; Most Worshipful.

## Abbreviations

M. W. G. C. P.—Most Worthy Grand Chief Patriarch.  
M. W. G. M.—Most Worthy Grand Master; Most Worshipful Grand Master.  
M. W. P.—Most Worthy Patriarch.  
Myth.—Mythology.

N.—North; Number; Nonn; Neuter.  
N.—Note.  
N. A.—North America.  
Nah.—Nahm.  
Nap.—Napoleon; Napoleonic.  
N. A. S.—National Academy of Sciences.  
Nat. Ord.—Natural Order.  
Nat.—Natural.  
Nat. Hist.—Natural History.  
Nath.—Nathanael, or Nathaniel.  
Naut.—Nautical.  
Naut. Alm.—Nautical Almanac.  
N. B.—North Britain.  
N. B.—New Brunswick; North British.  
N. B.—*Nota bene*, mark well; take notice.  
N. C.—North Carolina.  
N. D.—North Dakota.  
N. E.—New England; North-east.  
Neb.—Nebraska.  
Neh.—Nehemiah.  
N. e. i.—*Non est inventus*, he is not found.  
Nem. con., or nem. diss.—*Nemine contradicente*, or *nemine dissente*, no one opposing; unanimously.  
Neth.—Netherlands.  
Neut.—Neuter (gender).  
Nev.—Nevada.  
New Test., or N. T.—New Testament.  
N. F.—Newfoundland.  
N. G.—New Granada; Noble Grand.  
N. H.—New Hampshire; New Haven.  
N. H. H. S.—New Hampshire Historical Society.  
Ni. pri.—*Nisi prius*.  
N. J.—New Jersey.  
N. l.—*Non liquet*, it does not appear.  
N. lat.—North latitude.  
N. M.—New Measurement.  
N. M.—New Mexico.  
N.-N.-E.—North-north-east.  
N.-N.-W.—North-north-west.  
N. O.—New Orleans.  
No.—*Numero*, number.  
Nol. Pros.—*Nolle prosequi*, unwilling to proceed.  
Nom., or nom.—Nominative.  
Non con.—Not content; dissenting (House of Lords).  
Non cul.—*Non culpabilis*, Not guilty.  
Non obst.—*Non obstante*, notwithstanding.  
N. o. p.—Not otherwise provided for.  
Non pros.—*Non prosequitur*, he does not prosecute.  
Non seq.—*Non sequitur*, it does not follow.  
No., or Nos.—Numbers.  
Nov.—November.  
N. P.—Notary Public.  
N. P. D.—North Polar Distance.  
N. s.—Not specified.

## Abbreviations

N. S.—New Style (after 1752); Nova Scotia.  
N. S. J. C.—Our Saviour Jesus Christ (*Noster Salvator Jesus Christus*).  
N. T.—New Testament.  
N. n.—Name or names unknown.  
Num.—Numbers; Numeral.  
N. V.—New Version.  
N. V. M.—Nativity of the Virgin Mary.  
N.-W.—North-West.  
N.-W. T.—North-West Territory.  
N. Y.—New York.  
N. Z.—New Zealand.

O.—Ohio.  
Ob.—*Obiit*, he or she died.  
Obad.—Obadiah.  
Obs.—Obsolete; Observatory; Observation.  
Obt., or Obdt.—Obedient.  
Oct., or Svo.—Octavo, eight pages.  
Oct.—October.  
O.-F.—Odd-Fellow, or Odd-Fellows.  
Okl.—Oklahoma.  
O. G.—Outside guardian.  
O. H. M. S.—On his or her Majesty's Service.  
Old Test., or O. T.—Old Testament.  
Olym.—Olympiad.  
O. M.—Old Measurement.  
Ont.—Ontario.  
Opt.—Optics.  
Or.—Oregon.  
Orig.—Originally.  
Ornith.—Ornithology.  
Os.—Osmium.  
O. S.—Old Style; Outside Sentinel.  
O. T.—Old Testament.  
O. U. A.—Order of United Americans.  
Oxf. Gloss.—Oxford Glossary.  
Oxf.—Oxford.  
Oxon.—*Oxonia*, *Oxonii*, Oxford.  
Oz.—Ounce.

P.—*Pondere*, by weight.  
P., or p.—Page; Part; Participle.  
Pa., or Penn.—Pennsylvania.  
Pal.—Palæontology.  
Par.—Paragraph.  
Par. Pas.—Parallel passage.  
Parl.—Parliament.  
Pat. Of.—Patent Office.  
Pathol.—Pathology.  
Payt.—Payment.  
P. B.—Primitive Baptist.  
P. B.—*Philosophiæ Baccalaureus*, Bachelor of Philosophy.  
P. C.—*Patres Conscripti*, Conscript Fathers; Senators.  
P. C.—Privy Council; Privy Councilor.  
P. C. P.—Past Chief Patriarch.  
P. C. S.—Principal Clerk of Sessions.  
P. D.—*Philosophiæ Doctor*, Doctor of Philosophy.  
Pd.—Paid.  
P. E.—Protestant Episcopal.  
P. E. I.—Prince Edward Island.  
Penn.—Pennsylvania.



## Abbreviations

Pent.—Pentecost.  
 Per.—Persia; Persian.  
 Per, or pr.—By the, or per lb.  
 Per an.—*Per annum*, by the year.  
 Per cent.—*Per centum*, by the hundred.  
 Peri.—Perigee.  
 Peruv.—Peruvian.  
 Pet.—Peter; Petrine.  
 P. G.—Past Grand.  
 Phar.—Pharmacy.  
 Ph. B.—*Philosophiæ Baccalaureus*, Bachelor of Philosophy.  
 Ph. D.—*Philosophiæ Doctor*, Doctor of philosophy.  
 Phil.—Philip; Philipians; Philosophy; Philemon.  
 Phila., or Phil.—Philadelphia.  
 Philem.—Philemon.  
 Philom.—*Philomathes*, a lover of learning.  
 Philomath.—*Philomathematicus*, a lover of the mathematics.  
 Phil. Trans.—Philosophical Transactions.  
 Phren.—Phrenology.  
 Pinx., or pxt.—*Pinxit*, he (she) painted it.  
 P.-L.—Poet-Laureate.  
 Pl., or Plur.—Plural.  
 Plff.—Plaintiff.  
 Plupf.—Pluperfect.  
 P. M.—*Post meridiem*, afternoon, evening.  
 P. M.—Postmaster; Passed Midshipman.  
 P. M. G.—Postmaster-General.  
 P. O.—Post-Office.  
 P. of H.—Patrons of Husbandry.  
 Pop.—Population.  
 Port.—Portugal, or Portuguese.  
 P. P.—Parish priest.  
 P. P. C.—*Pour prendre conge*, to take leave.  
 Pp., or pp.—Pages.  
 PP.—*Patres*, Fathers.  
 Pph.—Pamphlet.  
 P. Q.—Previous Question.  
 P. R.—*Populus Romanus*, the Roman people.  
 P. R.—Prize Ring; Porto Rico; the Roman People (*Populus Romanus*).  
 P. R. A.—President of the Royal Academy.  
 P. R. C.—*Post Romanum conditum*, from the building of Rome.  
 Preb.—Prebend.  
 Pref.—Preface.  
 Pref.—Preferred.  
 Prep.—Preposition.  
 Pres.—President.  
 Presb.—Presbyterian.  
 Prin.—Principally.  
 Priv.—Privatine.  
 Prob.—Problem.  
 Proc.—Proceedings.  
 Prof.—Professor.  
 Pron.—Pronoun; Pronunciation.  
 Prop.—Proposition.  
 Prot.—Protestant.  
 Prot. Epis.—Protestant Episcopal.  
 Pro tem.—*Pro tempore*, for the time being.  
 Prov.—Proverbs; Provost.  
 Prov.—Provinee.  
 Prox.—*Proximo*, next (month).

## Abbreviations

P. R. S.—President of the Royal Society.  
 Prs.—Pairs.  
 Prns.—Prussia; Prussian.  
 P. S.—*Post scriptum*, Postscript.  
 P. S.—Privy Seal.  
 Ps.—Psalm, or Psalms.  
 Pt.—Part; Pint; Payment; Point; Port.  
 Pt.—Platinum.  
 P. T. O.—Please turn over.  
 P.-twp.—Post-township.  
 Pub.—Publisher; Publication; Published; Public.  
 Pub. Doc.—Public Documents.  
 P. v.—Post-village.  
 P. W. P.—Past Worthy Patriarch.  
 Pwt.—Pennyweight; pennyweights.  
 Pxt.—*Pinxit*, he (or she) painted it.  
 Q.—*Quasi*, as it were; almost.  
 Q.—Queen.  
 Q.—Question.  
 Q. B.—Queen's Bench.  
 Q. C.—Queen's College.  
 Q. C.—Queen's Counsel.  
 Q. d.—*Quasi dicat*, as if he should say; *quasi dictum*, as if said; *quasi dixisset*, as if he had said.  
 Q. e.—*Quod est*, which is.  
 Q. e. d.—*Quod erat demonstrandum*, which was to be proved.  
 Q. e. f.—*Quod erat faciendum*, which was to be done.  
 Q. e. i.—*Quod erat inveniendum*, which was to be found out.  
 Q. l.—*Quantum libet*, as much as you please.  
 Q. M.—Quartermaster.  
 Qm.—*Quomodo*, how; by what means.  
 Q. M. G.—Quartermaster-General.  
 Q. p., or q. pl.—*Quantum placet*, as much as you please.  
 Qr.—Quarter.  
 Q. S.—Quarter Sessions.  
 Q. s.—*Quantum sufficit*, sufficient quantity.  
 Qt.—Quart.  
 Qu., or qy.—*Quære*, inquire; query.  
 Quar.—Quarterly.  
 Ques.—Question.  
 Q. Mess.—Queen's Messenger.  
 Que.—Quebec.  
 Q. v.—*Quod vide*, which see; *quantum vis*, as much as you will.  
 R.—*Recipe*, take.  
 R.—*Regina*, Queen.  
 R.—River; Rood; Rod.  
 R. A.—Royal Academy; Royal Aeademi-eian.  
 R. A.—Royal Arch.  
 R. A.—Royal Artillery.  
 R. C.—Roman Catholic.  
 RC.—*Rescriptum*, a counterpart.  
 R. D.—Rural Dean.  
 R. E.—Reformed Episcopal.  
 R. E.—Royal Engineers.  
 Rec.—Recipe, or Recorder.

## Abbreviations

Recd.—Received.  
 Rec. Sec.—Recording Secretary.  
 Rect.—Rector; Receipt.  
 Ref.—Reference.  
 Ref.—Reformed; Reformation; Reference.  
 Ref. Ch.—Reformed Church.  
 Reg.—Register; Regular.  
 Reg. Prof.—Regius Professor.  
 Regr.—Registrar.  
 Regt.—Regiment.  
 Rel.—Religion.  
 Rep.—Representative; Reporter.  
 Repts.—Reports.  
 Retd.—Returned.  
 Rev.—Reverend; Revelation (Book of);  
 Review; Revenue; Revise.  
 Rhet.—Rhetoric.  
 R. H. S.—Royal Humane Society; Royal  
 Historical Society.  
 R. I.—Rhode Island.  
 R. I. H. S.—Rhode Island Historical So-  
 ciety.  
 R. M.—Royal Marines; Royal Mail.  
 R. M. S.—Royal Mail Steamer.  
 R. N.—Royal Navy.  
 R. N. O.—*Riddare af Nordstjerne*, Knight  
 of the Order of the Polar Star.  
 R. N. R.—Royal Navy Reserve.  
 Ro.—*Recto*, right-hand page.  
 Robt.—Robert.  
 Rom.—Romans (Book of).  
 Rom. Cath.—Roman Catholic.  
 R. P.—Reformed Presbyterian.  
 R. P.—*Regius Professor*, the King's Profes-  
 sor.  
 R. R.—Railroad.  
 R. R. Junc.—Railroad Junction.  
 R. R. Sta.—Railroad Station.  
 R. S.—Recording Secretary.  
 Rs.—*Responsus*, to answer; Rupees.  
 R. S. A.—Royal Society of Antiquaries;  
 Royal Scottish Academy.  
 R. S. V. P.—*Repondez, s'il vous plait*, an-  
 swer, if you please.  
 R. T. S.—Religious Tract Society.  
 Rt. Hon.—Right Honorable.  
 Rt. Rev.—Right Reverend.  
 Rt. Wpful.—Right Worshipful.  
 Russ.—Russia; Russian.  
 R. V.—Revised Version.  
 R. W.—Right Worthy.  
 R. W. D. G. M.—Right Worshipful Deputy  
 Grand Master.  
 R. W. G. R.—Right Worthy Grand Rep-  
 resentative.  
 R. W. G. S.—Right Worthy Grand Secre-  
 tary.  
 R. W. G. T.—Right Worthy Grand Treasur-  
 er; Right Worshipful Grand Templar.  
 R. W. G. W.—Right Worthy Grand War-  
 den.  
 R. W. J. G. W.—Right Worshipful Junior  
 Grand Warden.  
 R. W. O.—Knight of the Order of Wasa  
 (*Riddare af Wasare Ordare*).  
 R. W. S. G. W.—Right Worshipful Senior  
 Grand Warden.

## Abbreviations

Ry.—Railway.  
 S.—*Solidus*, a shilling.  
 S.—South; Saint; Scribe; Sulphur; Sun-  
 day; Sun; Series.  
 S. Afr.—South Africa.  
 S. A.—South America; South Australia.  
 S. a.—*Secundum artem*, according to art.  
 Sam.—Samuel.  
 Sansc., or Sansk.—Sanskrit, or Sanskrit.  
 Sard.—Sardinia.  
 S. A. S.—*Societatis Antiquariorum Socius*,  
 Fellow of the Soc. of Antiquaries.  
 Sat.—Saturday.  
 Sax.—Saxon; Saxony.  
 Sax. Chron.—Saxon Chronicle.  
 S. C.—*Senatus Consultum*, a decree of the  
 Senate; South Carolina.  
 Sc.—*Sculpsit*, he (or she) engraved it.  
 Sc. B.—Bachelor of Science.  
 Sc., or scil.—*Scilicet*, namely.  
 Scan. Mag.—*Seandalum magnatum*, scan-  
 dal of the great.  
 Schol.—*Scholium*, a note.  
 Schr.—Schooner.  
 Slav.—Slavonic.  
 Scot.—Scottish; Scotland.  
 Scr.—Scruple.  
 Scrip.—Scripture.  
 Sculp.—*Sculpsit*, he (or she) engraved it.  
 S. D.—*Salutem dicit*, sends health; South  
 Dakota.  
 S. E.—South-East.  
 Sec.—Secretary; Second.  
 Sec. Leg.—Secretary of Legation.  
 Sec. leg.—*Secundum legem*, according to  
 law.  
 Sec. reg.—*Secundum regulam*, according to  
 rule.  
 Sect.—Section.  
 Sem.—*Semble*, it seems.  
 Sem.—Seminary.  
 Sen.—Senate; Senator; Senior.  
 Sept.—September; Septuagint.  
 Seq.—*Sequentia*, following; *sequitur*, it fol-  
 lows.  
 Ser.—Series.  
 Serg.—Sergeant.  
 Serg.-Maj.—Sergcant-Major.  
 Servt.—Servant.  
 Sess.—Session.  
 S. G.—Solicitor-General.  
 Shak.—Shakespeare.  
 S. H. S.—*Societatis Historiæ Socius*, Fel-  
 low of the Historical Society.  
 Sic.—Doubtful.  
 S. I. M.—Soc. for Increase of the Ministry.  
 Sing.—Singular.  
 S. Isl.—Sandwich Islands.  
 S. J.—Society of Jesus.  
 S. J. C.—Supreme Judicial Court.  
 S. L.—Solicitor at Law (Scot).  
 S. lat.—South latitude.  
 S. M.—State Militia; Short Meter; Ser-  
 geant-Major; Sons of Malta.



## Abbreviations

S. M. Lond. Soe. Cor.—*Societatis Medicæ Londonensis Socius Cor.*, Corresponding Member of the London Medical Soe.  
 Soc. Isl.—Society Islands.  
 Sol.—Solomon; Solution.  
 Sol.-Gen.—Solicitor-General.  
 S. of Sol.—Song of Solomon.  
 S. P.—*Sine prole*, without issue.  
 Sp.—Spain; Spanish.  
 S. P. A. S.—*Societatis Philosophicæ Americancæ Socius*, Member of the American Philosophical Society.  
 S. P. G.—Society for the Propagation of the Gospel.  
 Sp. gr.—Specific gravity.  
 S. P. C. A.—Society for the Prevention of Cruelty to Animals.  
 S. P. C. C.—Society for the Prevention of Cruelty to Children.  
 S. P. Q. R.—*Senatus Populusque Romani*, the Senate and people of Rome.  
 S. P. R. L.—Society for the Promotion of Religion and Learning.  
 Sq. ft.—Square foot, or square feet.  
 Sq. in.—Square inch, or inches.  
 Sq. m.—Square mile, or miles.  
 Sq. yd.—Square yard.  
 Sr.—Senior.  
 S. R. I.—*Sacrum Romanum Imperium*, Holy Roman Empire.  
 S. R. S.—*Societatis Regiæ Socius*, Fellow of the Royal Society.  
 S. S.—Sunday-school.  
 SS.—Saints.  
 SS., or ss.—*Scilicet*, to wit.  
 Ss.—*Scmis*, half; Sessions.  
 S.-S.-E.—South-south-east.  
 S.-S.-W.—South-south-west.  
 St.—Saint; Street; Strait.  
 Stat.—Statute.  
 S. T. B.—Bachelor of Sacred Theology.  
 S. T. D.—*Sacræ Theologiæ Doctor*, Doctor of Divinity.  
 Ster., or Stg.—Sterling.  
 S. T. P.—*Sacræ Theologiæ Professor*, Professor of Divinity.  
 Str.—Steamer.  
 Subj.—Subjunctive.  
 Subst.—Substantive.  
 Su.-Goth.—Suo-Gothic.  
 Sun., or Sund.—Sunday.  
 Sup.—Supreme.  
 Sup.—Supplement; Superfine.  
 Supt.—Superintendent.  
 Surg.—Surgeon; Surgery.  
 Surg.-Gen.—Surgeon-General.  
 Surv.—Surveyor.  
 Surv.-Gen.—Surveyor-General.  
 S. v.—*Sub verbo*, under the word or title.  
 S.-W.—South-west.  
 Sw.—Swiss.  
 Swe.—Sweden; Swedish; Swedenborg; Swedenborgian.  
 Switz.—Switzerland.  
 Syn.—Synonym; Synonymous.  
 Syr.—Syriac.

## Abbreviations

T., or tom.—Tome, volume.  
 Tab.—Table; Tabular.  
 Tau.—Tangent.  
 T. E.—Topographical Engineers.  
 Tenn.—Tennessee.  
 Ter.—Territory.  
 Tex.—Texas.  
 Text. Rec.—*Textus Receptus*, Received Text.  
 Tf.—Till forbid.  
 Th., or Thurs.—Thursday.  
 Theo.—Theodore.  
 Theol.—Theology; Theological.  
 Theoph.—Theophilus.  
 Thess.—Thessalonians.  
 Tho'.—Though.  
 Thos.—Thomas.  
 Thro'.—Through.  
 Tim.—Timothy.  
 Tit.—Titus.  
 T. O.—Turn over.  
 Tob.—Tobit.  
 Topog.—Topography; Topographical.  
 Tp.—Township.  
 Tr.—Transpose; Translator; Translation; Trustee.  
 Trans.—Translator; Translation; Transactions; Transpose.  
 Treas.—Treasurer.  
 Triu.—Trinity.  
 Tues., or Tu.—Tuesday.  
 T. S.—Twin screw.  
 Tr. S.—Triple screw.  
 Tur.—Turkey.  
 Typ.—Typographer.  
 U.—Union.  
 U. B.—United Brethren.  
 U. C.—Upper Canada.  
 U. C.—*Urbe condita*, year of Rome.  
 U. J. C.—*Utriusque Juris Doctor*, Doctor of both Laws.  
 U. K.—United Kingdom.  
 U. K. A.—Ulster King-at-Arms.  
 Ult.—*Ultimo*, last; of the last month.  
 Unit.—Unitarian.  
 Univ.—University.  
 Univt.—Universalist.  
 U. P.—United Presbyterian.  
 U. S.—United States.  
 U. s.—*Ut supra*, or *uti supra*, as above.  
 U. S. A.—United States Army.  
 U. S. A.—United States of America.  
 U. S. M.—United States Mail.  
 U. S. M.—United States Marines.  
 U. S. M. A.—United States Military Acad.  
 U. S. M. C.—United States Marine Corps.  
 U. S. M. H. S.—United States Marine Hospital Service.  
 U. S. N.—United States Navy.  
 U. S. N. A.—United States Naval Acad.  
 U. S. S.—United States Senate.  
 Ut.—Utah.  
 V.—Village.  
 V.—Violin. VV.—Violins.  
 V., or vid.—*Vide*, see.  
 Vt.—Vermont.

## Abbreviations

V., or vs.—*Versus*, against; *Versiculo*, in such a verse.  
 Va.—Virginia.  
 Val.—Value.  
 Vat.—Vatican.  
 V. C.—Victoria Cross; Vice-Chairman; Vice-Chancellor.  
 V. D. L.—Van Diemen's Land.  
 V. D. M.—*Verbi Dei Minister*, Minister of God's word.  
 Ven.—Venerable.  
 Ver.—Verse.  
 V. G.—Vicar General.  
 V. g.—*Verbi gratia*, as for example.  
 Vice-Pres., or V. P.—Vice-President.  
 Visc.—Viscount.  
 Viz., or vl.—*Videlicet*, to wit; namely; that is to say.  
 Vo.—*Verso*, left-hand page.  
 Vol.—Volume.  
 V. R.—*Victoria Regina*, Queen Victoria.  
 V. S.—Veterinary Surgeon.  
 Vul.—Vulgate (Version).  
 W.—West.  
 Wash.—Washington.  
 W. B. M.—Woman's Board of Missions.  
 W. C. A.—Woman's Christian Association.  
 W. C. T. U.—Women's Christian Temperance Union.  
 Wed.—Wednesday.  
 Wf.—Wrong font.  
 W. F. M. S.—Woman's Foreign Missionary Society.  
 W. H. M. A.—Woman's Home Missionary Association.  
 W. I.—West Indies.  
 Wis.—Wisconsin.  
 Wisd.—Wisdom (Book of).  
 Wk.—Week.  
 W. M.—Worshipful Master.  
 Wm.—William.  
 W. M. S.—Wesleyan Missionary Society.  
 W. N. C. T. U.—Woman's National Christian Temperance Union.  
 W.-N.-W.—West-north-west.  
 W. S.—Writer to the Signet.  
 W.-S.-W.—West-south-west.  
 Wt.—Weight.  
 Wyo.—Wyoming.  
 W. Va.—West Virginia.  
 X., or Xt.—Christ.  
 Xmas., or Xm.—Christmas.  
 Xn., or Xtian.—Christian.  
 Xnty., or Xty.—Christianity.  
 Xper., or Xr.—Christopher.  
 Yd.—Yard.  
 Ye.—The; Thee.  
 Ym.—Them.  
 Y. M. C. A.—Young Men's Christian Association.  
 Y. M. C. U.—Young Men's Christian Union.  
 Yn.—Then.  
 Yr.—Their; Your.  
 Yr.—Year.  
 Yrs.—Years; Yours.  
 Ys.—This.

## Abdallah Ben-Yassim

Yt.—That.  
 Y. W. C. A.—Young Women's Christian Association.  
 Zach.—Zachary.  
 Zech.—Zechariah.  
 Zeph.—Zephaniah.  
 Zool.—Zoölogy.  
 &.—And.

NOTE.—In the list of ATOMIC WEIGHTS several additional abbreviations will be found.

**Abbt, Thomas** (äpt), a German essayist, born at Ulm, in 1738. Fired with admiration for Frederick the Great and his generals, he wrote his best known work, "On Death for One's Fatherland" (1761). In 1762 he became associated in Berlin with Nicolai and Moses Mendelssohn in the publication of the "Literary Letters," from which Lessing had just retired. After a tour through Southern Germany, Switzerland, and France, he wrote the work which securely established his fame, "Of Merit" (1765). He died in 1766.

**Abchasia** (äb-gäs'yä), **Abasia**, **Abkhasia**, a province of Asiatic Russia. The high mountains of the Caucasus divide it from Circassia on the N.; on the S. E. it is bounded by Mingrelia; and on the S. and W. by the Black Sea. The country is generally mountainous, the climate mild, and the land fertile. In later times this country was subject to Colchis, until subdued by the Emperor Justinian, who introduced civilization and Christianity. Afterward the Persians, Georgians, Mongolians, and more recently the Turks, in turn ruled over the country. By the treaties of Akerman in 1826, and of Adrianople in 1829, it was ceded to Russia, but, except the possession of a few commanding fortresses on the coast, Russia has very little authority over the people, and the chiefs have almost unlimited power. Mohammedanism is the religion of the higher classes, but the people generally are buried in idolatry.

**Abdal**, one of a class of religious devotees in Persia, corresponding to a dervish in Turkey.

**Abdallah**, son of Abd-el-Malek-ben-Omar, A. D. 785, a successful leader of the Spanish Moors in their irruption into Southern France. He laid siege to and captured the towns of Gironne and Narbonne.

**Abdallah, Ben-Abd-el-Mottalib**, father of Mohammed, born at Mecca, A. D. 545; died 570. The paternity of the Prophet is Abdallah's sole claim to distinction.

**Abdallah Ben-Yassim**, founder of the warlike tribe of Almoravides in Barbary, A. D. 1050, which were afterward conspicuous for the subjugation of part of Spain, and the founding of a dynasty in the Moorish kingdom.



**Abdallah Ben Zobair**, Sultan of Mecca, born about 622. He was the son of Zobair, a companion of Mohammed, and of Asma, the sister of Ayesha, the Prophet's favorite wife. On the death of the Prophet, the assassination of Ali, Mohammed's successor, and the defeat of Yezid, successor of Ali, Abdallah was acknowledged Sultan and Caliph of Mecca, A. D. 685. Vanquished in his turn by Abd-el-Malek, Caliph of Damascus, he retired to the Kaaba, where he was killed by a blow on the head from a tile, A. D. 692.

**Abdallatif**, or **Abdallatiph**, a celebrated physician and traveler, and one of the most voluminous writers of the East, was born at Bagdad in 1179. Of his numerous works, one only has found its way into Europe; nor do any of the others appear to be known at this day in the East. The work here alluded to is an "Account of Egypt;" it presents us with a detailed and authentic view of the state of Egypt during the Middle Ages. He died in 1231.

**Abdal-Malek**. See ABD-EL-MALEK.

**Abdal-Malek**. See AVENZOAR.

**Abdal-Malek**, a theologian and historian of the Mohammedan faith; born in Cordova, Spain, in 801; died therein 853.

**Abdal-Malek**, an Asiatic Turkish physician; born in Basra about 740; was noted for his extraordinary memory, as the instructor of Harun-al-Rashid, and as the reputed author of the romance "Antar," named from Antar, the Arab warrior.

**Abd-el-Kader** (-kă'der), very renowned by the persevering courage with which he opposed the aggressions of the French against his country, was the third son of a marabout of the Arab tribe of Hashem, who had risen to influence through his rank, coupled with a great sanctity of demeanor. Born in Oran in 1807, the early days of Abd-el-Kader are lost in obscurity, but by 1828 he had not only acquired the reputation of a scholar, but that of a saint, from his having twice made a pilgrimage to Mecca, the birthplace of the Prophet. Accompanied by his father, he preached a holy war against the French occupation of Algiers, and called upon the faithful to rise and expel the infidels. In 1832, he found himself at the head of 10,000 warriors, with whom he attacked Oran, but was several times repulsed with great slaughter. In 1834, he entered into a treaty with the French, in which he was recognized as Emir of Mascara, with the sovereignty of Oran. His success, however, excited the jealousy of some of his brothers in arms, who rose against his authority, but whom he was soon enabled to subdue. For a period of 15 years he contrived to defend his country, and fight against the encroachments of

France; but in 1847 he was compelled to surrender himself a prisoner to General Lamoricière, on condition of being sent to Alexandria or St. Jean d'Acre. The French Government, however, refused to ratify the terms of the treaty, and it was not till after four years passed in France, that, in 1852, Louis Napoleon restored him to freedom on condition that he would not return to Algiers, or conspire against the French. The brave but fallen Arab consented, and Brussa, in Asia Minor, was assigned him for his future residence; but he was afterward permitted to remove to Constantinople. He died in Damascus, May 26, 1883.

**Abd-el-Malek Ben Merwan**, fifth Caliph of Damascus, of the family of the Ommiades, surnamed the Flint-skinner on account of his avarice; known by his successful wars against the Greek Emperor Justinian II.

**Abd-el-Malek Ben Omar**, one of the viziers of Caliph Abderrahman, in the 8th century. He is the King Marsilius of Ariosto, and of the ancient romances of chivalry. He was Governor of Saragossa at the time of Charlemagne's invasion of Spain.

**Abd-er-Rahman I.**, a Caliph of Cordova, born in Damascus in 731. He founded a Moorish dynasty in Spain, made Cordova his capital and became an independent sovereign. Notwithstanding many rebellions and an expedition sent against him by Charlemagne he maintained his power. The mosque at Cordova (now used as a cathedral), ornamented with rows of cupolas, supported by 850 pillars of jasper, was built by him. He died in 787.

**Abd-er-Rahman III.**, a Caliph of Cordova, born in 891. From his earliest youth his ambition was to aggrandize the Saracen power in Spain, a purpose he carried out with a success so brilliant as to win for him the title of "the Great." He ascended the throne in 912 and set himself the task of reviving learning, fostering trade and beautifying his capital. His long reign of 42 years is pronounced the glorious epoch of Moorish sway in Spain. He died in 961.

**Abdication**, the resignation of an office or dignity, especially that of sovereign power. The most famous of voluntary royal abdications were those of the Emperors Diocletian and Maximian in 305; Emperor Charles V. in 1556; Christina, Queen of Sweden, in 1654; Louis Bonaparte of Holland in 1810; Louis of Bavaria in 1848; Ferdinand of Austria in 1848; Isabella of Spain in 1870; and Amadeus of Spain in 1873. Among involuntary abdications were those of Napoleon in 1814 and 1815; Charles X. of France in 1830; and Louis Philippe in 1848. More recently have occurred the abdications of Prince Alexander of Battenberg, Prince of Bulgaria, in 1886, and King Milan of Servia in 1889.



**Abdomen**, a Latin term of doubtful etymology, by some derived from *abdo*, I hide. It means (1), in human anatomy, the belly or lower cavity of the trunk, separated from the upper cavity or thorax, by the diaphragm or midriff, and bounded below by the bones of the pelvis. The whole cavity, though alternately enlarged and contracted by the action of the diaphragm, is occupied by the viscera belonging to the digestive and urinary systems; the pelvic cavity, containing the urinary bladder and reproductive organs, being regarded usually as distinct from the abdominal cavity proper. Anatomists have divided the abdomen into various regions by imaginary lines. Two of these lines drawn transversely, the one between the seventh ribs, and the other between the projecting bones of the pelvis, form three regions — an upper or epigastric, a central or umbilical, and a lower or hypogastric. In like manner, two longitudinal lines are drawn, the one on the right and the other on the left side, between and nearly at right angles to the former. The central parts of the divisions thus formed, retain as before the names of epigastric, umbilical, and hypogastric, but the external parts form six new regions, two above, called right and left hypochondriac, two central, called right and left lumbar, and two below, called right and left iliae. (2) In entomology, the whole body of an insect behind the thorax. It usually consists of rings or short hollow cylinders, which are united by a joint or membrane, and in some cases, as in the grub of the chameleon fly, slide upon one another like the tubes of a telescope. Sometimes it bears a sting or an ovipositor, though in the perfect insect no appendages are found.

An abdominal ring is one of two oblong tendinous openings or "rings" existing in either groin. Through these rings pass the spermatie cord in the one sex, and the circular ligament of the uterus in the other.

**Abdominals**, an order of malacopterygious fishes, having the ventral fins under the abdomen behind the pectorals, as the trout. They comprehend the greater part of fresh water fishes, and constitute the fourth order of the fourth class of animals in the Linnæan system.

**Abduction**, the act of abducting or abducting; a taking or drawing away, and specifically an unlawful taking.

In law, the forcible and fraudulent taking away of women or girls. This criminal offense is of three kinds: (1) If any person shall maliciously, either by force or fraud, lead, or take away, or detain, any child under the age of 10 years, with intent to deprive the parents, or other persons having the lawful charge of such child, or with

intent to steal any article on its person; or shall receive or harbor such child, knowing the same to have been so stolen or enticed — every such offender shall be guilty of felony, and shall be liable to penal servitude for not more than seven, or less than three years, or imprisoned, with or without hard labor, for any term not more than two years.

(2) If the girl is under the age of 16 years, the offender shall be guilty of misdemeanor, and, being convicted thereof, shall be liable to suffer such punishment, by fine or imprisonment, or both, as the court shall award. (3) If any person shall, from motives of luere, take away or detain against her will, any woman having any interest, present or future, in any real or personal estate, with intent to marry or defile her, or to cause her to be married or defiled by any other person, every such offender, and every person counseling, aiding, or abetting such offender, shall be guilty of felony, and liable to penal servitude for life, or for any time not less than three years, or to be imprisoned, with or without hard labor, for any term not exceeding five years. If the woman first consent to be taken away, and afterward refuse to continue with the offender, and he forcibly detain her; or if she be forcibly taken away, and she afterward consent to her marriage or defilement; or if she be taken away with her own consent, obtained by fraud or imposition, the offense is the same. But if a man, without fraud, deceit, or violence, marries a woman under age, without the consent of her father or guardian, that act is not indictable at common law.

In logic, is a form of reasoning in which the greater extreme is contained in the medium; but the medium is not so evidently in the lesser extreme. Example: "Whatever God has revealed is certainly true; now God has revealed a future retribution; therefore, a future retribution is certainly true." In the use of this kind of reasoning, the minor proposition must be proved to be contained in the major.

**Abductor**, a muscle, the office of which is to pull back or draw the member to which it is affixed from some other. The antagonist is called adductor.

In law, a person guilty of abduction.

**Abd-ul-Akhd-Khan**, Ameer of Bokhara, born in 1852. He succeeded his father Mozaffar, Nov. 12, 1885, and, without trying to escape from the suzerainty of Russia, he abolished slavery, did away with subterranean prisons, reduced the army, regulated taxes, and proved himself an able and progressive ruler.

**Abd-ul-Aziz**, the 32d Sultan of the Ottoman Turks, was born Feb. 9, 1830, and succeeded his brother, Abd-ul-Medjid, in 1861. At first he showed himself liberal-minded and open to western ideas. But



the promise of economy and reform was illusory, and ere long the Sultan began to spend vast sums on his army, the embellishment of his capital, on hunting, and on costly journeys. Spite of this, reforms were long hoped for, especially after his visit to Western Europe in 1867. His government had great difficulties to contend with in the Cretan insurrection, the struggle of Rumania and Servia for full autonomy, and finally the outbreak of Mohammedan fanaticism. In 1871, the Sultan strove to get the succession settled upon his son, instead of his nephew Murad, in accordance with Turkish custom. He next entered into intrigues with Russia, and plunged ever into deeper financial difficulties, while his stupid misgovernment alienated the provinces, and led, in 1875, to risings in Bosnia, Herzegovina, and Bulgaria. At last a conspiracy forced him to dismiss his minister, and next to abdicate the throne, May 30, 1876. Four days later, the unhappy Sultan was found dead, it is almost certain by foul play.

**Abdul-Hamid**, a Sultan of Turkey, was born in 1730, succeeding his brother in 1774. He was unsuccessful in two campaigns against Russia, dying in 1789. His nephew, Selim III., succeeded him.

**Abdul-Hamid II.**, 34th Sultan of Turkey, born Sept. 22, 1842, the second son of Sultan Abdul-ul-Medjid; succeeded to the throne in 1876, on the deposition of his brother, Murad V. Defeated in the war of 1877-1878 with Russia, he was compelled by the Treaty of Berlin to surrender a small portion of territory in Europe and Asia, to recognize the independence of the suzerain States in Europe, and to acknowledge Bulgaria as a tributary principality. In 1895-1896, during the massacres of the Armenians, he took an active part in the negotiations with the European powers, and communicated personally with Lord Salisbury, protesting his intention to grant an investigation and the reforms urged by the powers. In 1897 Greece forced war on Turkey in behalf of the Cretans, and in 1898, after another uprising in Crete, Great Britain and Russia forced Turkey to evacuate the island. In 1908 Abdul-Hamid, under pressure of the Young Turk party, restored the constitution of 1876, and in 1909 was deposed.

**Abd-ul-Latif**, a celebrated Arabian writer, was born at Bagdad in 1162. By way of education, he committed to memory the Koran, the chief poets, and not a few grammatical treatises. To complete his culture he betook himself to Damascus, where the famous Saladin had gathered round him the most learned men of the time. He then settled in Egypt for some years, and taught medicine and philosophy at Cairo;

he afterward lectured at Damascus. His numerous works were mainly on medicine, but his best-known book is a valuable descriptive work on "Egypt," translated into Latin by White (Oxford, 1800), and into French by De Sacy (1810). He died at Bagdad in 1231, on his way to Mecca.

**Abdul Medjid**, a Sultan of Turkey, born April 23, 1822; succeeded to the throne July 1, 1839, at the early age of 17, eight days after the battle of Nezib, in which the troops of the Sultan Mahmoud II. were defeated by Ibrahim-Pasha, son of Mchemet Ali, Pasha of Egypt, the most powerful vassal of the Turkish empire. The interference of the allied powers alone prevented the empire from dismemberment at this juncture. The Servian question; the insurrection in Albania; the war in Kurdistan; the Turco-Greek and Wallachian revolution of 1848-1849; his noble refusal to surrender the Hungarian and Polish refugees to Austria and Russia in 1850; the question of the holy places, which led to the Crimean War; the attempt to assassinate him in 1859, and the Syrian massacres of 1860, were all so many obstacles to his progress. The great event of his reign was the Crimean War, in which France and England allied themselves with Turkey against the encroachments of Russia, and which was terminated by the fall of Sebastopol after a long siege, in 1856. He was succeeded by his brother, Abdul Aziz Khan. He died June 25, 1861.

**Abd-ur-Rahman**, Sultan of Fez and Morocco, born 1778; succeeded his uncle in 1823. His first four years' of rule were occupied in quelling insurrections. Next, some danger to the State of Morocco was threatened by the refusal of Austria to pay the tribute for safety against pirates, but the Sultan wisely adjusted the dispute by relinquishing this sort of blackmail, formerly levied by Morocco on European ships in the Mediterranean. The religious war, under Abd-el-Kader against the French in Algeria, involved the Sultan in its movements. The piratical habits of his subjects brought him to the brink of war with more than one European State. He died in 1859. The same name, also spelled Abd-al-Rahman and Abderrahman, is the name of the leader of the Saracens defeated at Tours in 732 by Charles Martel, and of the first Omniad caliph of Cordova (755-788).

**Abdurrahman Khan**, Ameer of Afghanistan; born in Kabul in 1844; was the eldest son of Ufzul Khan, and nephew of the Ameer Shere Ali. During the civil war, in 1864, in Afghanistan, he played a leading part on the side of his father against his uncle, and gained several battles. The great victories of Shaikhabad and



Khelat-i-Ghilzai were mainly due to his ability. He was intrusted with the governorship of Balkh, where he made himself popular by his moderation and by marrying the daughter of the chief of Badakshan. In 1868, however, he was unable to offer a successful resistance to his cousin, Yakoub Khan, son of Shere Ali, who defeated him at Bajgah, near Bamain, and also finally at Tinah Khan. Abdurrahman then fled from the country, ultimately reaching Russian territory. The Russian General Kaufmann permitted him to reside at Samarcand and allowed him a pension of 25,000 rubles a year. Here he remained until 1879, when he slowly made his way through Balkh to the Kabul frontier, and in July of 1880 he was formally chosen by the leading men of Kabul and acknowledged by the British Indian Government as Ameer of Afghanistan. From the British Indian government he received a subsidy of \$800,000 a year, with large gifts of artillery, rifles, and ammunition to improve his military force. In March, 1900, he declared his sympathy with England. He died in Kabul, Oct. 3, 1901.

**Abecedarians**, a small sect among the Anabaptists in Germany in the 16th century, noted for their dislike to learning. They thought it best not even to learn to read, as a knowledge of the Scriptures was all that was necessary, and this was communicated by the Holy Spirit direct to the believer without the medium of the written word.

**A Becket, Thomas.** See BECKET.

**A'Beckett, Arthur William**, an English dramatist, born at Hammersmith, Oct. 25, 1844. Son of Gilbert Abbott A' Beckett, and, since 1891, editor of the London "Sunday Times;" he has written several comedies, including "About Town" and "Long Ago." His "Papers from Pump-handle Court" were a feature in "Punch," whose staff he joined. He died Jan. 14, 1909.

**A'Beckett, Gilbert Abbott**, an English humorist (1811-1856). An original founder of "Punch" (1841), and author of the "Comic Blackstone," one of the cleverest burlesques in the language (London, 1845); he also published a "Comic History of England" (1848); "Quizziology of the British Drama" (1846), and more than 50 plays, some of which still keep the stage.

**Abel**, the second son of Adam and brother of Cain. The latter was a tiller of the ground; Abel, a shepherd. Both brought their offerings before the Lord; Cain, the first-fruits of the ground; Abel, the firstlings of the flock. God accepted the offering of Abel; the offering of Cain he rejected. The latter, instigated by envy, murdered his brother in the field.

**Abel**, King of Denmark, the son of Vladimir II. He assassinated his brother Eric in 1250, and took possession of his throne. He was put to death by the Frisons, who revolted against him on account of the heavy taxes imposed upon them.

**Abel, Sir Frederick Augustus**, an English chemist, born in London in 1827; author of "Gun-Cotton" (1866), "Electricity Applied to Explosive Purposes" (1884), and other works of a similar nature. He was a member of the Royal Commission on Accidents and Mines; chemist to the War Department and Ordnance Committees, and was made C. B. (1877), K. C. B. and D. C. L. (1883), and a baronet (1893). He became secretary to the Imperial Institute in 1887, and was president of the British Association in 1890. He died Sept. 8, 1902.

**Abel, Niels Henrik**, a Norwegian mathematician, born at Findö, Aug. 5, 1802. He became a lecturer at the University of Christiania, and the school of engineering there. His works deal mainly with the theory of elliptical functions, which his discoveries greatly enriched. He died young, April 6, 1829.

**Abelard (or Abailard), Pierre**, a monk of the order of St. Benedict, equally famous for his learning and his passion for Heloise; born in 1079, near Nantes, in the little village of Pallet, which was the property of his father Berenger. His inclination led him to prefer a literary life; and in order to devote himself fully to philosophy he ceded his patrimony to his brothers. He studied poetry, rhetoric, philosophy, jurisprudence, and theology, the Greek, Hebrew, and Latin languages; but scholastic philosophy chiefly engaged his attention. Having learned all that Brittany could teach him, he went to Paris, the university of which attracted students from all parts of Europe. Guillaume de Champeaux, a follower of Anselm and an extreme Realist, was the most skillful disputant of his time, and Abelard, profiting by his instructions, was often victorious over his master in contests of wit and logical acumen. The friendship of Champeaux was soon succeeded by enmity; and Abelard, who had not yet completed his 22d year, removed to Melun, whither he was soon followed by a multitude of young men, attracted from Paris by his great reputation. Hostility still pursued him, but he left Melun for Corbeil, nearer the capital, where he was still more admired and persecuted. Soon after he ceased teaching to recruit his strength; and after two years returned to Paris, and found that his former teacher had removed to a monastery outside the city.

He again joined issue with him and gained so complete a triumph that he opened in Paris a school of rhetoric, the fame of which soon deprived all the others of their



pupils. Shortly afterward he was appointed to his rival's chair in the cathedral school of Notre Dame, where he educated many distinguished scholars, among whom were the future Pope Celestin II., Peter of Lombardy, Bishop of Paris, Berenger, Bishop of Poitiers, and St. Bernard.

At this time there resided close to Notre Dame a young lady, by name Heloise, niece to the canon Fulbert, then of the age of 17, and remarkable for her beauty, genius, and varied accomplishments. Abelard became inspired with such violent love for Heloise as to forget his duty, his lectures, and his fame. Heloise was no less susceptible. Under the pretext of finishing her education, he obtained Fulbert's permission to visit her, and finally became a resident in his house. His conduct in abusing the confidence which had been placed in him opened the eyes of Fulbert. He separated the lovers, but too late. Abelard fled with her to Brittany, where she was delivered of a son, who died early. Abelard now resolved to marry her secretly. Fulbert gave his consent, the marriage was performed, and in order to keep it secret Heloise remained with her uncle, while Abelard retained his former lodgings, and continued his lectures. Abelard, however, carried her off a second time, and placed her in the convent of Argenteuil.

Fulbert erroneously believed it was intended to force her to take the veil, and under the influence of rage subjected Abelard to mutilation. He became, in consequence, a monk in the abbey of St. Denis, and Heloise took the veil at Argenteuil. After time had somewhat moderated his grief he resumed teaching. At the Council of Soissons (1121), no defense being permitted him, his "Essay on the Trinity" was declared heretical, and he was condemned to burn it with his own hands. Continued persecutions obliged him at last to leave the abbey of St. Denis and to retire to a place near Nogent-sur-Seine, where he built a rude hut in which he determined to live a hermit's life. Even here, however, students flocked to him, and they built him an oratory, which he dedicated to the Holy Ghost and hence called Paraclete. Being subsequently appointed abbot of St. Gildas de Ruys, in Brittany, he invited Heloise and her religious sisterhood, on the dissolution of their monastery at Argenteuil, to reside at the above oratory, and received them there. He lived for some 10 years at St. Gildas. Ultimately, however, he fled from it and lived for a time in other parts of Brittany.

St. Bernard of Clairvaux, the leading opponent of the rationalistic school of Abelard, laid his doctrines before the Council of Sens, in 1140, had them condemned by the Pope, and obtained an order for his imprisonment. Abelard appealed to the Pope,

published his defense, and went to Rome. Passing through Cluny, he visited Peter the Venerable, who was abbot there. This humane and enlightened divine effected a reconciliation between him and his enemies, but Abelard resolved to end his days in retirement. The severe penances which he imposed upon himself, together with the grief which never left his heart, gradually consumed his strength, and he died, a pattern of monastic discipline, in 1142, at the abbey of St. Marcel, near Châlon-sur-Saône. Heloise begged his body, and had him buried in the Paraclete, of which she was at that time the abbess, with the view of reposing in death by his side. In 1800 the ashes of both were carried to the Museum of French Monuments at Paris, and in November, 1817, were deposited under a chapel within the precincts of the church of Monamy. The small chapel, in the form of a beautiful marble monument, in which the figures of the ill-fated pair are seen reposing side by side, is now one of the most interesting objects in the Parisian cemetery of Père la Chaise.

Abelard was distinguished as a grammarian, orator, logician, poet, musician, philosopher, theologian, and mathematician. As a philosopher he founded an eclectic system commonly, but erroneously, termed Conceptualism, which lay midway between the prevalent Realism, represented in its most advanced form by William of Champeaux, and extreme Nominalism, represented in the teaching of his other master Roscellin, and largely approached the Aristotelian philosophy. In ethics Abelard placed much emphasis on the subjective intention, which he held to determine the moral value as well as the moral character of man's action. Along this line his work is notable, owing to the fact that his successors did little in connection with morals, for they did not regard the rules of human conduct as within the field of philosophic discussion. His love and his misfortunes have secured his name from oblivion; and the man whom his own century admired as a profound dialectician is now celebrated as the martyr of love. The letters of Abelard and Heloise have been often published in the original and in translations. Pope's poetical epistle "Eloisa to Abelard" is founded on them. Abelard's autobiography, entitled "Historia Calamitatum," is still extant. The chief work on the life of Abelard is Remusat's "Abelard" (two vols. Paris, 1845). See also Compayré's "Abelard and the Origin and Early History of Universities" (1893; series of "Great Educators"). A complete edition of his work was published by Cousin (two vols. Paris, 1849-1859).

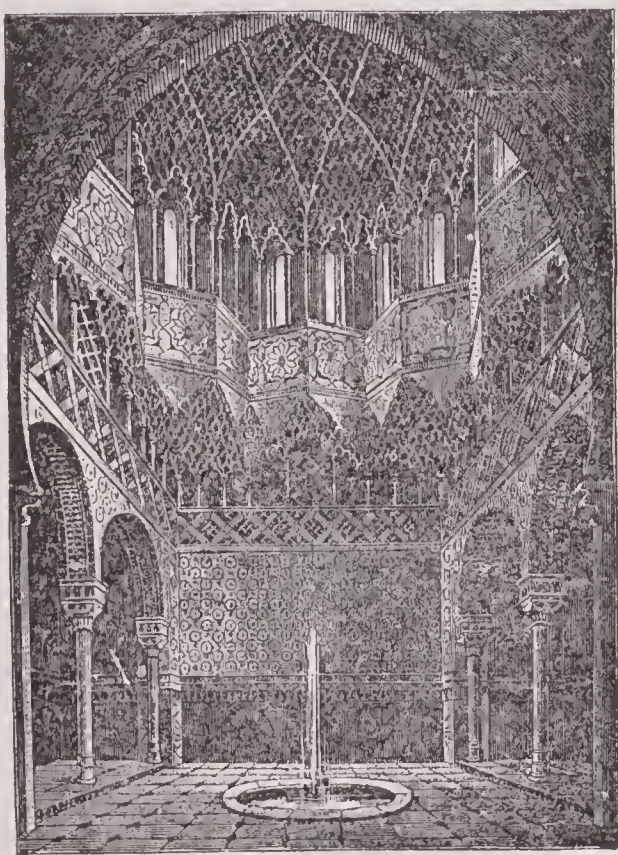
**Abelites, Abelians, Abelonians, or Abelonites**, a sect of Christians who ap-



## Abencerages

peared in the 4th century and denounced matrimony as a service of Satan, maintaining that thereby criminal sin was perpetuated. As Abel had not been married, they took their name from him. The name of Abelites was also taken in the 10th century by the members of a secret society, whose professed object was to cultivate the honesty and candor of Abel.

**Abencerages** (äb-ân-sā-räzh'), the name given by Spanish chroniclers to a noble fam-



COURT OF ABENCERAGES IN THE ALHAMBRA.

ily in the Moorish kingdom of Granada, several of whom distinguished themselves immediately before the fall of the Mahommedan empire in Spain. Their struggles with the family of the Zegrís, and tragical destruction in the royal palace of the Alhambra, in Granada (1466-1484), seem to be destitute of historical foundation. On these events, Chateaubriand has written a charming work of fiction, "Les Aventures du dernier Abencerage."

**Abenezra, Abraham**, a celebrated rabbi, born about 1093, at Toledo, in Spain, called by the Jews "The wise, great, and admirable Doctor," was a very able interpreter of the Holy Scriptures, and was well skilled in grammar, poetry, philosophy, astronomy and medicine. His principal work, "Commentaries on the Old Testament," is printed in Bomberg and Buxtorf's Hebrew Bible, and is much esteemed. He died in 1168.

**Abensberg**, a small city in the circle of Regen, in Bavaria. Population, 1,200. It was formerly the seat of the Counts Abensberg. Here Napoleon defeated the Austrians in a great battle on the 20th of April, 1809.

## Aberdeen

**Abercrombie, John**, in his day the most eminent of Scottish physicians, was born in 1780, at Aberdeen, where his father was a parish minister. He studied medicine in Edinburgh, taking his degree in 1803, and thenceforth devoted himself to the practice of his profession in the Scottish capital. At a comparatively early age, he attained a high reputation. His principal professional writings were treatises on the pathology of the brain and on diseases of the stomach. But he is best known by his works on "The Intellectual Powers" (1830), and "The Moral Feelings" (1833). These works have no pretensions to originality or depth of thought, but immediately acquired a remarkable popularity, and attained respectively an 18th and 14th edition. Dr. Abercrombie died suddenly, Nov. 14, 1844.

**Abercrombie, Sir Ralph**, a British general, born in 1738. He was commander-in-chief in the West Indies, in 1795; in the attempt against Holland, in 1799, and in the expedition to Egypt. Mortally wounded in the beginning of the battle of Alexandria



GENERAL ABERCROMBIE.

(March 21, 1801), the general kept the field during the day, and died some days after his victory.

**Aberdeen**, the chief city and seaport in the North of Scotland, lies in the S. E. angle of the county, at the mouth and on the N. side of the river Dee, 111 miles N. of Edinburgh. William the Lion confirmed its privileges in 1179; the English burned it in 1336, but it was soon rebuilt, and called New Aberdeen. Old Aberdeen, within the same parliamentary boundary, is a small town a mile to the N., near the mouth of the Don, and is the seat of St. Machar's Cathedral (1357-1527), now represented by the granite nave, which, as restored since 1869, is used as a parish church. King's College and University, founded by Bishop Elphinstone in Old Aberdeen in 1494, and



## Aberdeen

Marischal College and University, founded by the Earl Marischal in New Aberdeen in 1593, were in 1860 united into one institution, the University of Aberdeen. It has 23 professors, and from 800 to 900 students in its four faculties of arts, divinity, law, and medicine; with Glasgow University, it sends one member to Parliament. Marischal College was rebuilt in 1841, while King's College is a stately fabric, dating from 1500, its chapel adorned with exquisite wood-carvings. In the 17th century, Aberdeen had become an important place, but it suffered much from both parties in the civil wars. It has a flourishing trade and thriving manufactures, and, having been largely rebuilt and extended since the formation of Union street in 1800, the "Granite City" now offers a handsome and regular aspect. Among the chief public edifices are the county buildings, the post-office, the Market Hall, the Trades Hall, the Royal Infirmary, the lunatic asylum, the grammar school, the art gallery and art school, and Gordon's College. The last has been much extended as a technical school, the foundationers being no longer resident; while the infirmary was reconstructed and modernized to celebrate the Queen's Jubilee (1887). Of more than 60 places of worship, the only one of much interest is the ancient church of St. Nicholas, now divided into the East and West churches, and having an imposing spire 190 feet high. A fine *carillon* of 37 bells was placed here in 1887. One may also notice the market-cross (1686), the Wallace, Gordon Pasha, and three other statues, and the Duthie public park of 47 acres. The trade of the port has largely increased since 1850, and the aggregate tonnage of vessels entering in good years exceeds 600,000 tons. Railway communication has also been fully established. The chief exports are woolens, linens, cotton-yarns, paper, combs, granite (hewn and polished), cattle, grain, preserved provisions, and fish. Aberdeen has the largest comb and granite-polishing works in the kingdom. There are also several large paper works within a short distance of the town. Wooden shipbuilding was formerly a prosperous industry, the Aberdeen clipper-bow ships being celebrated as fast sailers; but since 1860 they have been gradually superseded by iron or steel steamships; and, owing to Aberdeen's remoteness from coal and iron, its shipbuilding now is greatly contracted. Population of the parliamentary burgh (1891) 121,623; (1901) 153,108.

**Aberdeen**, city and county-seat of Brown Co., S. D.; on the Chicago and Northwestern, the Chicago, Milwaukee, and St. Paul, and the Great Northern railroads; 125 miles N. E. of Pierre. It is the farming and lumber trade center of the country; manu-

## Abernethy

factures boots and shoes, flour and feed, soap, plows, machinery, etc. Its factories are supplied with abundant water power furnished by artesian wells. It has a National bank, several daily, weekly, and monthly periodicals, a system of graded public schools, free library, and an assessed property valuation of about \$1,500,000. Pop. (1900), 4,087; (1910), 10,753.

**Aberdeen, George Hamilton Gordon, Earl of**, born in 1784. He took office as Secretary of State for Foreign Affairs in 1828, in the ministry formed under the Duke of Wellington, and in 1843 in the Peel ministry. Entering public life as a Tory, his policy was that of non-interference in the affairs of foreign states. In 1853, Earl Aberdeen was selected to head a new ministry, which for some time was extremely popular. He endeavored to prevent the country from entering upon the conflict with Russia, but all his efforts were unavailing. Failing to receive sufficient support to carry out his measures, he resigned in 1855. Died Dec. 14, 1860. As an author, the Earl is known by a work entitled "An Inquiry into the Principles of Beauty in Grecian Architecture."



EARL OF ABERDEEN.

**Aberdeen, Sir John Campbell Hamilton Gordon**, seventh Earl of, born in 1847. He served as Governor-General of Canada (1893-1898), and as Lord Lieutenant of Ireland in 1886 and after 1905. His wife, born in 1857, is a daughter of Lord Tweedmouth and a direct descendant of Robert Bruce. She is an accomplished orator, and organized the Irish Village at the Columbian Exposition in Chicago in 1893. For many years she has been conspicuous in plans for promoting the welfare of women.

**Aberdevine**, a singing bird, sometimes called siskin. It is the *carduelis spinus* of Cuvier, and resembles the green variety of the canary bird, with which it is often paired, to produce what are called mule birds. In its habits it is migratory, breeding in the North of Europe, and visiting Germany, France and Great Britain only in the autumn and winter.

**Abernethy**, a town in Perthshire, Scotland, near the junction of the Earn and the Tay. Here the first Culdee monastery



## Abernethy

was built, and here, it is said, the Pictish kings had their capital. A curious round tower, 73 feet high, still exists, resembling the famous round towers of Ireland.

**Abernethy, James**, a Scotch civil engineer, born in Aberdeen in 1815. As a boy he assisted his father on the extension of the London docks, and afterward designed and built the lock and dock at Aberdeen, the docks at Swansea, Newport, Cardiff and Hull, and the Cavour canal in Italy; designed the accepted plan for the improvement of the Danube at Vienna; reclaimed Lake Aboukir, in Egypt, and proposed the Manchester ship-canal. He was the first to apply hydraulic power for working lock-gates. He died March 8, 1896.

**Abernethy, John**, an eminent English surgeon, founder of the School of St. Bartholomew's; born in London, April 3, 1764, the grandson of the Rev. John Abernethy (1680-1740), an Irish Presbyterian clergyman and controversialist. He was educated at Wolverhampton grammar school, and in 1779 was apprenticed to the assistant surgeon at St. Bartholomew's Hospital. In 1787 he was himself elected assistant surgeon to St. Bartholomew's, and soon after began to lecture. At first, he manifested extraordinary diffidence, but his power soon developed itself, and his lectures at last attracted crowds. In 1813 he was appointed surgeon to Christ's Hospital, in 1814 Professor of Anatomy and Surgery to the College of Surgeons, and in 1815 full surgeon to St. Bartholomew's, a post which he resigned in 1829. His practice increased with his celebrity, which the eccentricity and rudeness of his manners contributed to heighten. Of his numerous medical works, the most important is "Surgical Observations on the Constitutional Origin and Treatment of Local Diseases," which, from his frequent references to it, became known as "My Book." He died at Enfield, April 28, 1831.

**Aberration**, a wandering from.

In optics, a spherical aberration is that wandering of the rays of light from the normal path which takes place when they are made to pass through curved lenses, or are reflected from curved mirrors, constituting portions of a sphere, instead of parts of a parabola. It arises from the unequal refraction by the lenses of the several rays of light, and its effect is to render the images formed in some degree undefined about the edges. Chromatic aberration is the fringing of images with the prismatic colors which takes place when light passes through curved lenses. It arises from the unequal refraction by the lenses of the several elementary colors. Both spherical and chromatic aberration may be corrected by the employment of a proper combination of lenses instead of one.

## Abgar

In astronomy, the aberration of light is that alteration in the apparent position of a star which is produced by the motion of the earth in its orbit during the time that the light is coming from the star to the eye. The effect of this aberration is to make each star appear annually to describe a minute circle of about 40 " diameter parallel to the earth's diameter. The aberration of light may be seen on the earth as well as in the heavens. If one walk rapidly forward in a shower, the raindrops seem as if they come at an angle to meet him; if he walk swiftly backward, they appear as if they come at an inclination from behind; if, finally, he stand still, their real motion becomes discernible; in other words, they appear to fall nearly or quite vertically.

In medicine, the passage of blood, or any other fluid of the body, from morbid causes, into vessels not designed to receive it. Mental aberration is that wandering from soundness of judgment which is so conspicuous in the insane.

**Abert, John James**, an American military engineer, born in Virginia in 1788; graduated at West Point (1811); served in the War of 1812; was made chief of United States topographical engineers in 1838; assisted in developing important canals and other works; member of the Geographical Society of France. He died in 1863.

**Abesta**, or **Avesta**, the name of one of the sacred books of the Persian magi, which they ascribe to their great founder Zoroaster. The "Abesta" is a commentary on two others of their religious books, called "Zend" and "Pazend;" the three together including the whole system of the Ignicolæ, or worshippers of fire.

**Abeyance**, in law, the expectancy of an estate. "In abeyance" is the term applied to a freehold or inheritance which is not for the time being vested in anyone, but which awaits the appointment or the competence of the person who is entitled to the possession. Thus, when a living is vacant, as it is between the death of one incumbent and the appointment of his successor, it is held as being in abeyance.

**Abgar**, or **Abgarus**, is the name or title of 28 princes of Edessa, in Mesopotamia. The most notable of these princes is the 14th of the name, a contemporary of Jesus, and was said to have written a letter to Jesus and to have received an answer from Him. These letters, translated into Greek from the Syriac by Eusebius of Cæsarea, were denounced as spurious by Pope Gelasius in 494, and soon lost all credit. The letter from Abgar contains a request that Jesus should visit him, and heal him of a certain disease. In the reply, Jesus is represented as promising to send a disciple to heal him



## Abgillus

after His ascension. What purported to be copies of this correspondence came to light in 1900. For other fables in this connection, see Lipsius' "Die Edessanische Abgarsage" (1880).

**Abgillus**, surnamed Prester John, a king of the Frisons. He attended Charlemagne to the Holy Land, and did not return with him, but made great conquests in Abyssinia, which was called, from him, the empire of Prester John. He lived in the 8th century.

**Abiad, Bahr-el**, a great river in the interior of Africa, which at Hailaia, below Sennaar, joins the Bahr-el-Azrek, or river of Abyssinia; and these unite at Khartum and form the true Nile.

**Abiathar** (the father of abundance), a high-priest of the Jews, son of Ahimelech, who had borne the same office, and received David in his house. This so enraged Saul that he put Ahimelech and 81 priests to death; Abiathar alone escaped the massacre. He afterward was high-priest, and often gave King David testimonies of his fidelity. But after this he conspired with Adonijah, in order to raise him to the throne of King David, his father, which so exasperated Solomon against him that he divested him of the priesthood, and banished him A. M. 3021 (B. C. 1014).

**Abib**, a name given by the Jews to the first month of their ecclesiastical year, afterward called Nisan. It answered to the latter part of March and beginning of April.

**Abies**, a genus of the tribe *abietinæ*, order *pinaceæ*, composed of evergreen trees of various sizes, important for the valuable timber and the resinous substance that are produced by many of the species. This genus, in the classification of Lindley, includes all the species known under the name fir.

**Abietic Acid**, a crystalline aromatic acid contained in colophony. It crystallizes in small, colorless, rhombic prisms, insoluble in water; soluble in hot alcohol and ether.

**Abietinæ**, the first subdivision of the coniferous order of gymnosperms. It is characterized by inverted ovules and oval-curved pollen. The most noteworthy genera are *pinus*, *abies*, and *araucaria*.

**Abigail**, the beautiful wife of Nabal, a wealthy owner of goats and sheep in Carmel. When David's messengers were slighted by Nabal, Abigail took the blame upon herself, and succeeded in appeasing the anger of David. Ten days after, Nabal died, and David sent for Abigail and made her his wife. (I Sam. xxv: 14, etc.)

**Abihu**, the second of Aaron's sons by Elisheba. He was consecrated to the priesthood. When the ceremonial worship of Israel was established, fire from heaven consumed the altar offerings, and this fire,

## Abisbal

according to divine command, was to be kept ever burning. Abihu and Nadab, his brother, being set to serve at the altar, suffered it to go out, and made in its place "strange" or common fire. For this sin they were struck dead by lightning and buried without the camp.

**Abijah**, the second King of Judah, son of Rehoboam, and Solomon's grandson; also sometimes called Abijam in Scripture; reigned three years, beginning 956 B. C. He attempted to reunite the divided kingdoms of Israel and Judah. The attempt failed, though he defeated Jeroboam and a superior force, and wrested from the King of Israel several cities. His speech to the opposing army before the battle is notable (II Chron. xiii: 4, ff.). He had 14 wives and 22 sons.

**Abila**, or **Abyla**, a mountain of Africa, opposite that which is called Calpe, on the coast of Spain, only 18 miles distant. These two mountains are named the Pillars of Hercules, and were supposed formerly to have been united, till the hero separated them, and thereby effected a communication between the Mediterranean and Atlantic seas.

**Abila**, a city of ancient Syria, the capital of the tetrarchy of Abilene. Its site is indicated by some ruins and inscriptions, near the village of Souk. From the tradition of this being the scene of Abel's murder, it is now called Nebi-Abel. It lies between Baalbee and Damascus.

**Abingdon**, town and county seat of Washington co., Va.; on the Norfolk and Western railroad; 315 miles S. W. of Richmond. It is the seat of Abingdon Academy, the Academy of the Visitation, Martha Washington College, and Stonewall Jackson Female Institute; has large tobacco and live-stock interests, and contains valuable deposits of iron, gypsum, and salt. Much of the salt used in the Southern States and the Confederate army during the Civil War was obtained here. Population (1890) 1,674; (1900) 1,306.

**Abiogenesis**, a scientific word invented by Professor Huxley to indicate the view that living matter can be produced from that which is not in itself living matter. It is opposed to biogenesis.

**Abisbal, Henry O'Donnell, Count of**, a celebrated Spanish general, born in Andalusia in 1770. On Napoleon's invasion of Spain, the part he took in the relief of Gerona (1807) led to his promotion to the command of Catalonia. Though defeated in the plains of Vich by General Souham, he a month afterward forced Augereau to abandon Lower Catalonia; and, at the village of Abisbal, he compelled the surrender of a



whole French column under General Schwartz. He died in France in 1834.

**Abishai**, son of David's sister Zeruah, and brother to Joab, was one of the celebrated warriors who flourished in the reign of David. He killed with his own hand 300 men, with no other weapon but his lance; and slew a Philistine giant, the iron of whose spear weighed 300 shekels. (I Sam. xxvi; II Sam. xxiii.)

**Abkhasia**, a region between the south slope of Caucasus and the Black Sea, having an area of about 3,000 square miles. The country is mountainous and like a wilderness; it has dense forests of oaks and walnuts. Maize, figs, wines and wheat are produced. Its chief town is Sukhum Kalé. Under the Byzantine emperors, it was an independent State, called Abassia. In 1154, the Russian Grand Prince Islayif Mstislavitch married an Abkhasian princess. In the 15th century it became subject to Turkey. After the peace of Adrianople in 1829, the region was annexed to Russia, but was not fully pacified until 1864. The inhabitants differ from the Cherkess in character and appearance. The complexion is dark, the features irregular; they are of medium height, lean, but muscular. Their principal occupations are agriculture, grazing, wine raising and bee-keeping. In ancient times they were known as Avagos, or Abasgi. In the time of Justinian, they were Christian; in the 11th century they were subject to Georgia (Gruzia). In the middle of the 15th century, they became Mohammedans. After the Turko-Russian War, many of them emigrated to Turkey. They number about 21,000.

**Abjuration**, the act of forswearing, abjuring, or renouncing upon oath; a denial upon oath; a renunciation upon oath. Chiefly a law term, and used in the following senses:

1. An abjuration of the realm: During the Middle Ages, the right of sanctuary was conceded to criminals. A person fleeing to a church or churchyard might permanently escape trial, if after confessing himself guilty before the coroner, he took an oath abjuring the kingdom, *i. e.*, promising forthwith to embark, at an assigned port, for a foreign land, and never to return unless by the king's permission. By this abjuration the blood of the criminal was attainted, and he forfeited all his goods and chattels.

2. Special: An abjuration or renunciation of all imagined allegiance to the Jacobite line of rulers, after the English nation had given its verdict in favor of William and Mary.

The oath of abjuration was fixed by 13 Wm. III., c. 16. By the 21 and 22 Vict., c. 48, one form of oath was substituted for the oaths of allegiance, supremacy, and ab-

jururation. For this form another was substituted by the Act 30 and 31 Vict., c. 75, s. 5. This has in turn been superseded by the Promissory Oaths Act, 31 and 32 Vict., c. 72, by which a new form of the oath of allegiance is provided.

3. An abjuration, renunciation, or retraction of real or imagined heresy or false doctrine. Thus the now abolished 25 Chas. II., c. 2, enacted that certain tenets of the Church of Rome were to be solemnly renounced. This is sometimes called an abjuration act, but the term is more appropriately confined to that mentioned under No. 2.

4. In a popular sense: A more or less formal giving up.

**Ablution**, literally, a washing away. A ceremony consisting in bathing the body, or a part of it, in water, which has been practiced more or less extensively by the disciples of almost every form of faith. Ablutions, or lustrations, as they are more commonly called, even constituted a part of the Mosiac ceremonial, and were practiced among the Jews on various occasions, both by the priests and by the people. They occupy an important place in the Brahminical and other religions of India, where the waters of the Ganges are considered as having so purifying a power that even if a votary, who cannot go to that river, shall call upon it to cleanse him, in prayer, while bathing in another stream, he will be freed from any sin or pollution he may have contracted. But the religion by which ablutions have been enjoined most punctiliously, and in the greatest number, is the Mohammedan. According to the precepts of the most rigid doctors of that faith, it may almost be said that scarcely the most ordinary or trifling action can be rightly performed without being either preceded or followed by an entire or partial lustration. The early Christians also appear to have been in the habit of undergoing ablution with water before partaking of the communion.

**Abner**, uncle of King Saul, upon whose death Abner maintained the cause of Ishbosheth, Saul's successor, against David. Being accused by Ishbosheth of royal aspirations, he deserted to David. He was slain by Joab, who feared Abner might supplant him. His tomb is still shown at Hebron.

**Abnoba**, now **Abenau**, a long range of mountains in Germany, extending from the Rhine to the Neckar, having different names in the different countries through which they stretch: the Oden, or Odenwald, about the river Main; the Spessart, between Hesse and Franconia; Baar, in Wurtemberg.

**Abo**, a city in the Russian Province of Finland, and chief town of the government of the same name. It is situated near the



**extremity of the promontory formed by the Gulfs of Bothnia and Finland, and is divided into two parts by the river Aurajoki. Previous to 1817, Abo was the capital of Finland. Vessels drawing 9 or 10 feet of water go up to the town, but those drawing more, anchor 3 miles S. W. of the river, where there is a good harbor, and thence the goods are sent by small craft to Abo. Pop. (1904), 42,639.**

**Abo, Archipelago of**, an extensive group of low, rocky islands in the Baltic Sea, spreading along the S. and W. coasts of Finland, opposite the city of Abo, rendering the navigation difficult and dangerous.

**Abo, Peace of**, a treaty concluded Aug. 17, 1743, between Russia and Sweden, by which Russia retained a part of Finland and restored to Sweden the remainder on condition that the latter power should elect the Prince of Holstein-Gottorp successor to the throne. On Aug. 30, 1812, the Emperor Alexander I., of Russia, and the Crown Prince Karl Johann, of Sweden, confirmed the second treaty between the two countries, already signed March 24th, containing a secret article of mutual protection. It treated of Napoleon and the subjugation of Norway.

**Abolitionists**, in United States history, those who advocated the abolition of African slavery in the Southern States. The anti-slavery agitation dates back even to colonial days, some of the wisest and ablest men of early American history having advocated abolition. Agitation became acute after the settlement of the war troubles of 1812-1815. In 1833, the formation of a National Anti-Slavery Society took place in Philadelphia, and in 1848 of the Free Soil Party. The abolition movement was powerfully promoted by William Lloyd Garrison, who issued a newspaper, "The Liberator," for the better dissemination of his views; and also by Wendell Phillips, Charles Sumner and others. The more extreme agitators among them denied the duty of obedience to the Constitution, since it contained the clause warranting the Fugitive Slave Law, and they denounced it as "a covenant with death and an agreement with hell." In practice they violated it by systematically assisting in the escape of runaway slaves. A line of stations known as the "Underground Railroad" was secretly arranged, along which the fugitives were passed from point to point, concealed from pursuers, and cared for until they reached safety in Canada. In Boston, Garrison was mobbed, and the abolition cause in the United States counted among its martyrs Elijah Lovejoy, shot in Alton, Ill., in 1837, and John Brown, hanged in Virginia in 1859. In 1840, the abolitionists divided on the question of the formation of a political anti-slavery party,

and the two wings remained active on separate lines to the end. It was largely due to the abolitionists that the Civil War, when it came, was regarded by the North chiefly as an anti-slavery conflict, and they looked upon the Emancipation Proclamation as a vindication of this view.

**Abolla**, among the ancient Greeks and Romans, a thick woolen mantle or cloak, worn principally by military men, and thus was opposed to the toga, which was especially the habiliment of peace. It was used by the Stoic philosophers, also, at Rome as a distinctive dress.

**Aboma**, a large and formidable American snake, called also the ringed boa. It is the *epicratis cenchrea*. Anciently it was worshipped by the Mexicans.

**Abomey**, the capital of Dahomey, Africa; a walled town, and the port of the kingdom, containing several royal palaces. It is mostly clay-built, and the walls are of mud; is of large area, much of which is under cultivation; carries on important trade with the interior in palm oil, ivory, and gold. It has often been the scene of human sacrifices, especially at the great festivals. The town was taken by the French, under General Dodds, Nov. 21, 1892. Pop., 50,000 or 60,000. See DAHOMEY.

**Aboo, Abu, Abuje, or Abughad.** See ABU.

**Aborigines.** (1) An old tribe inhabiting Latium. (2) The earliest known inhabitants of any other land. The aborigines of a country, as a subject of scientific investigation, have received great attention since the publication of Herbert Spencer's "Synthetic Philosophy." The greatest discussion has been occasioned by the theories of Morgan with reference to the aborigines of the United States. This branch of ethnological science, although yet in its infancy, promises to profoundly influence the thought of the 20th century.

**Abortion**, the immature product of an organ; any fruit or product that does not come to maturity, or anything which fails in its progress, before it is matured or perfect; as, "His attempt proved an abortion."

In midwifery, miscarriage, or the expulsion of the fœtus from the uterus, before the seventh month, after which it is called premature labor. It most commonly occurs between the eighth and eleventh weeks of pregnancy, but may happen at a later period. The principal causes of miscarriage are blows or falls; great exertion or fatigue; sudden frights and other violent emotions of the mind; the abuse of spirituous liquors; excessive bleeding, profuse diarrhœa or colic, etc. Abortion often happens without any obvious cause, from some defect in the uterus, or in the fœtus itself, which cannot be satisfactorily explained. The no-



## Aboukir

torious frequency of artificial abortion forms an odious feature in the manners of ancient times. Seneca makes it a ground of distinction for Helvia that she had never, like others of her country-women, destroyed the child in her womb in order to preserve her shape.

In law, when abortion is produced with a malicious design, it becomes a misdemeanor, and the party causing it may be indicted and punished. When, in consequence of the means used to produce abortion, the death of the woman ensues, the crime is murder.

**Aboukir**, a small village on the Egyptian coast, 10 miles E. of Alexandria. Aboukir bay is celebrated for the naval battle in which Nelson annihilated the French fleet on Aug. 1-2, 1798. The latter sailed on May 19, 1798, from the harbor of Toulon, to convey an army to Egypt under the command of Bonaparte. As soon as the English admiral, St. Vincent, who was cruising before Cadiz, received information of this, he dispatched Rear-Admiral Nelson, with 14 ships of the line, to the Mediterranean with orders to seek and attack the French fleet. On Aug. 1, Nelson caught a glimpse of the French ships in the road of Aboukir, and gave the signal of battle. Although the French fleet was anchored in a curved line, close inshore, Nelson ordered half of his force to sail in between the enemy's ships and the land so as to take them in the rear, while the other half approached their front and anchored within pistol shot; thus the French ships were attacked from all sides. At about 6:30 o'clock in the evening the battle began. At the end of an hour five French ships were dismasted and taken. The French admiral, Brueys, was killed by a cannon ball; his ship, "l'Orient," however, continued the battle with great spirit until she took fire. About 10 o'clock this splendid vessel of 120 guns—supposed to be equal to any two of the British ships—blew up. Of 1,000 men, but 70 or 80 were saved. Captain Casabianca was mortally wounded, and his son, a boy 12 years old, voluntarily remained in the burning ship and shared his fate. The other ships continued the cannonade till the morning, which witnessed the entire defeat of the French fleet. But two ships of the line and two frigates escaped to Malta and Corfu; nine ships of the line were taken, one blown up, and another, together with a frigate, burned by the French themselves; one frigate, however, was sunk. This decisive victory gained Nelson the title of Baron Nelson of the Nile; and the battle is often spoken of as the battle of the Nile. In 1801 an English expedition to Egypt, under command of Sir Ralph Abercromby, landed near here, in spite of the presence of and active opposition of a considerable force of French troops.

## Abrabanel

**Aboulfeda**, or **Abulfeda**, the hereditary prince of Hamah; the most celebrated of the Arabian writers on history and geography. Among his contemporaries he was also distinguished both as a ruler and a warrior. His descent was in a direct line from Ayoub, father to Saladin, and from whom the house of that conqueror received the appellation of Ayoubites. Born at Damascus in 1273, his valor and other eminent qualities soon recommended him to the favor of the Sultan Melik-el-Nassir. He took an active part in the victory of Damascus (1303), by which Syria was for the time delivered from the incursions of the Tartars. The rest of Aboulfeda's life was spent in splendor and tranquillity, devoted to the government of his territory, and to the pursuit of science. The two works by which Aboulfeda is known are his "Geography" and his "History."

**About**, **Edmond** (ä-bü'), a French novelist, born in Dieuze, Lorraine, Feb. 14, 1828. One of the few younger authors of note who adhered to the second empire, he enjoyed the special favor of Napoleon III., and in 1870 accompanied the army of Marshal MacMahon as reporter for "Le Soir." In that paper, after the war, and from 1875 as editor-in-chief of the "XIX. Siècle," he was the champion of the Moderate Republicans. He was elected a member of the Academy in 1884. Among his best works are: "Contemporaneous Greece" (1854); "Tolla Féraldi" (1855); "The King of the Mountains" (1856); "The Marriages of Paris" (6 tales, 1856); "The Man with the Broken Ear" (1861); "A Notary's Nose" (1862); "Madelon" (1863); "The Infamous One" (1866-1869); "Romance of a Good Man" (1880), directed against Zola and his school; "The Roman Question" (1859), a political treatise. He died in Paris, Jan. 17, 1885.

**Abra**, the name of a province and a river in the N. of the island of Luzon, Philippine Islands. The province contains numerous deposits of placer gold, and the gravel of the river is auriferous. Other minerals, such as coal, copper, lead, iron and sulphur, are believed to exist in paying quantities in the province, as Luzon Island is known to be rich in these, as well as other economic minerals. Pop. (1903), 51,860.

**Abrabanel**, **Abarbanel**, or **Avravanef**, **Isaac**, a celebrated rabbi, claiming descent from King David, was born at Lisbon, in 1437. He became counselor to Alphonso V., King of Portugal, and afterward to Ferdinand the Catholic, but in 1492 was obliged to leave Spain with the other Jews. He died at Venice, aged 71. He has left some works on interpretations and explanations of the Bible. Abrabanel passed for one of the most learned of the rabbis; and the



## Aboville

Jews gave him the names of "The Sage," "The Prince" and "The Great Politician."

**Aboville, François Maria** (ä-bö-vël'), a French general, born in 1730; was director of artillery at Yorktown, Va., during the American Revolution (1781), and later served under Napoleon. He died in 1819.

**Abracadabra**, a magical word among the ancients, recommended as an antidote against several diseases. It was to be written upon a piece of paper as many times as the word contains letters, omitting the last letter of the former every time, and suspended from the neck by a linen thread. It was the name of a god worshipped by the Syrians, the wearing of whose name was a sort of invocation of his aid.

A B R A C A D A B R A  
 A B R A C A D A B R  
 A B R A C A D A B  
 A B R A C A D A  
 A B R A C A D  
 A B R A C A  
 A B R A C  
 A B R A  
 A B R  
 A B  
 A

At present, the word is used chiefly in jest, to denote something without meaning.

**Abraham**, son of Terah, and brother of Nahor and Haran, the progenitor of the Hebrew nation and of several cognate tribes. In obedience to a call of God, Abraham, with his father Terah, his wife Sarah, and his nephew Lot, left his native Ur of the Chaldees, and dwelt for a time in Haran, where Terah died. After his father's death, Abraham, now 75 years old, pursued his course, with Sarah and Lot, to the land of Canaan, whither he was directed by the divine command (Genesis, xii: 5), when he received the general promise that he should become the founder of a great nation, and that all the families of the earth should be blessed in him. As the country was suffering with famine, Abraham journeyed southward to the rich cornlands of Egypt. Fearing that the great beauty of Sarah might tempt the powerful monarch of Egypt, and expose his own life to peril, he represented her as his sister, but the deception was discovered, and Pharaoh dismissed him from the country. Abraham left Egypt with great possessions, and, accompanied by Lot, returned to one of his former encampments between Bethel and Ai. As the soil was not fertile enough to support the two kinsmen, Abraham proposed that each should follow his own fortune. Lot, eager to quit the nomadic life, chose the fertile plain of the Jordan, and Abraham pitched his tent among the oak-groves of Mamre, close to Hebron, where the promise that his descendants should be-

## Abraham

come a mighty nation, and possess the land in which he was a stranger, was confirmed with all the solemnity of a religious ceremony. At the suggestion of Sarah, who despaired of having children of her own, he took as his concubine Hagar, her Egyptian maid, who bare him Ishmael, in the 86th year of his age. Thirteen years elapsed, during which revelation was made that a son of Sarah, and not Ishmael, should inherit both the temporal and spiritual blessings. The covenant was renewed, and the rite of circumcision established as its sign. At length, Isaac, the long-looked-for child, was born, and Ishmael was driven out, with his mother Hagar, as a satisfaction to Sarah's jealousy. Some 25 years after this event, Abraham received the strange command to take Isaac and offer him for a burnt-offering at an appointed place. He hesitated not to obey, but the sacrifice was stayed by the angel of Jehovah. Sarah died at Hebron, and was buried in the cave of Machpelah, which Abraham purchased of Ephron — the first instance on record of a legal conveyance of property. Abraham lived to see the gradual accomplishment of the promise in the birth of his grandchildren, Jacob and Esau, and, at the goodly age of 175, he was "gathered to his people," and laid beside Sarah, in the tomb of Machpelah, by his sons Isaac and Ishmael.

**Abraham a Sancta-Clara** (ä'brä-häm ä sänk'tä-klä'rä), a German pulpit orator and satirist, born at Krähenheinstetten, Baden, July 4, 1644. His family name was Megerle. He was appointed preacher to the imperial court in 1669, and thereafter was one of the celebrities of Vienna. His sermons were characterized by force, broad humor, and impartial denunciation of the follies of all classes, but especially of the courtiers. A good specimen of his manner, both in its elevation of thought and in its grotesqueness, is seen in his "Judas, the Arch-Knave" (1686-1695). He died in Vienna, Dec. 1, 1709.

**Abraham ben Meir ibn Ezra** (ä'bra-häm ben mä-ēr' b'n ez'rä), a Jewish-Arabic poet and scholar, born at Toledo, Spain, 1092; wrote 150 liturgical poems, which are still used in the Jewish worship, besides works on Hebrew grammar and philosophy, a treatise on chess, "Sefer Moznaim," a "Book of Weights," etc. He was one of the earliest Biblical critics. He died in 1167.

**Abraham-men**, in English history, Tom of Bedlam, or Bedlam Beggar, is equivalent to a sturdy beggar. The Abraham-men formerly roamed through England, begging and pilfering; they were well known in Shakespeare's time and on to the period of the civil wars.

**Abraham, Plains of and Heights of**, a table-land near Quebec, rising above the St. Lawrence, where the battle of Quebec



was fought between the British and French (1759).

**Abrantes, Marshal, Duke of** (ä-bränt'-üz or äb-ränt'). See JUNOT.

**Abrantes, Duchesse d'**, a French woman of considerable literary acquirements; born at Montpellier in 1784. By her mother, Paunonia Comnena, she was a descendant from the imperial Byzantine family of the Comneni; she married Marshal Junot after his return from Egypt. Her principal work, "Mémoires de la Duchesse d'Abrantes," is an authority on the court of Napoleon. She died in 1838.

**Abranyi, Kornel** (o'brän-yē), a Hungarian poet, novelist, and publicist; born in Budapest, Dec. 31, 1849. As a member of the Hungarian diet and as editor of the "Pesti Naplo," he is an important political figure in Hungary. His poems are mainly of a political tendency, and his novels deal with the problem of matrimony. "The Infallible," a comedy, and the fictions, "The Husband's Philosophy," "Who Is the Stronger?," "The Only Remedy against Deceit," are best known.

**Abraxas**, a genus of nocturnal *lepidoptera*, in which is included the common magpie moth. Its color is a yellowish white, elotted with black, and a band of pale orange marks the wings. It deposits its eggs on the leaves of the current and gooseberry in July or August, and the caterpillars are hatched in September. Its chrysalis is black.

**Abraxas**, or **Abrasas**, the supreme god of the Basilidian heretics. It is a mystic or cabalistic word, said to be composed of Greek letters,  $\alpha$ ,  $\beta$ ,  $\rho$ ,  $\alpha$ ,  $\xi$ ,  $\alpha$ ,  $\varsigma$ , which together, according to the Grecian mode of numeration, make up the number 365. For Basilides taught that there were 365 heavens between the earth and the empyrean; each of which heavens had its angel or intelligence, which created it; each of which angels, likewise, was created by the Supreme Being, or first Creator. The Basilidians used the word abraxas by way of charm or amulet.

**Abrogation**, is a term of canon law, which means the entire, as distinguished from the partial, change of an existing law; *e. g.*, the papal decretals as to clandestine marriage were abrogated by the Council of Trent. The term is used popularly as the equivalent of repeal, whether by statute or contrary usage; and in England technically for the annulling of an order issued by a subordinate legislative authority.

**Abruzzi** (äb-röts'ē), **Prince Luigi Amadeo, Duke of**, Italian explorer; born in Rome, Jan. 30, 1873; a nephew of King Humbert; in May, 1899, he started on an expedition, in the specially prepared steamer "Star of Italy," for Franz Josef Land, in-

tending, when frozen in, to use sledges in a search for the North Pole and the balloon explorer, Dr. Andrée. He returned to Norway in September, 1900, after having reached a point in latitude 86° 33' N., surpassing Nansen's furthest N. record.

**Abruzzi and Molise**, a political division of Italy, including the provinces of Aquila, Teramo, Chieti and Campobasso. The Abruzzi is wild and mountainous, the Apennines here reaching their loftiest heights, in Gran Sasso d'Italia nearly 10,000 feet, in the N., and Majella over 9,000, in the S. Cattle-raising is its chief industry. The Molise, comprising the province of Campobasso, yields considerable grain and fruit. Asphalt deposits occur there. The inhabitants are characterized by patriarchal simplicity and hospitality. Formerly many of them were bandits, but brigandage has been thoroughly eradicated by the government. The area is 6,380 square miles. Pop. (1901) 1,442,365.

**Absalom**, the third son of David, king of Israel, remarkable for his beauty and for his unnatural rebellion against his father. By his popular manners, he contrived to win the affections of the people, and then stirred up a formidable rebellion. A battle was fought in the forest of Ephraim, in which the rebels were defeated. In the flight, as Absalom was riding under a tree, he was caught (by his long hair, as is generally supposed, though not expressly stated in Scripture) in the branches, and was left suspended; in which position Joab, the commander of David's army, thrust him through, contrary to the king's express orders that he should be spared. The grief of David for his loss was excessive. See II Sam. xviii.

**Abscess**, a gathering of pus in any tissue or organ of the body. It is so called because there is an *abscissus* (= a going away or departure) of portions of the animal tissue from each other to make room for the suppurated matter lodged between them. It results from the softening of the natural tissues, and the exudations thus produced. Abscesses may occur in almost any portion of the body. They are of three types: the acute abscess, or phlegmon, arising from an inflammatory tendency in the part; the chronic abscess, connected with scrofulous or other weakness in the constitution; and the diffused abscess, due to contamination in the blood.

**Abscissa**, or **Absciss**, in conic sections, the abscissa of a parabola is the part of a diameter intercepted between its vertex and the point in which it is intersected by one of its own ordinates. The abscissa of the axis is the part of the axis intercepted between its vertex and the point in which it is intersected by one of its own ordinates.



In an ellipse, the abscissæ of any diameter are the segments into which that diameter is divided by one of its own ordinates.

The abscissæ of the axis are the segments into which the major axis is divided by one of its own ordinates.

In a hyperbola, the abscissæ of any diameter are the segments into which, when produced, it is divided by one of its own ordinates and its vertices.

**Absenteeism**, a term applied to the owners of estates in a country who habitually absent themselves from that country, and spend the income of their estates in it in another country; specifically applied to the Irish nobility whose fixed residence is outside of Ireland. Much of the poverty and many of the disturbances in Ireland have been charged directly to absenteeism, and the Irish people have protested against it since 1380.

**Absimar**, a soldier of fortune who raised, against the Byzantine Emperor Leontius, an army which proclaimed him emperor, A. D. 698. He slit the ears and nose of Leontius, and threw him into a convent. He was taken in 705 by Justinian II., who, after having used him as a footstool at the hippodrome, ordered him to be beheaded.

**Absinthe**, a liqueur made principally in Switzerland, and much used by the French; composed of volatile oil of wormwood, oil of anise and other ingredients mixed in alcohol. It is an intoxicant, more agreeable to the taste than usual alcoholic beverages, but its persistent use leads to extreme physical and mental disorders. See ARTEMISIA.

**Absolute**, opposed to relative; means that the thing is considered in itself and without reference to other things.

1. Absolute or non-connotative, according to Whately, is opposed to attributive or connotative. The former does not take note of an attribute connected with the object, which the latter does. Thus Rome and sky are absolute terms; but Rome, the capital of Italy, and our sky are attributive or connotative. (See Whately's "Logic," bk. ii, ch. v, §§ 1, 2-5.)

2. According to J. S. Mill, it is incorrect to regard non-connotative and absolute as synonymous terms. He considers absolute to mean non-relative, and to be opposed to relative. It implies that the object is to be considered as a whole, without reference to anything of which it is a part, or to any other object distinguished from it. Thus man is an absolute term, but father is not, for father implies the existence of sons, and is, therefore, relative. (J. S. Mill's "Logic," bk. i, ch. ii.)

In metaphysics, absolute means existing independently of any other cause.

A case absolute, in grammar, is one consisting essentially of a substantive and a participle, which form a clause not agreeing

with or governed by any word in the remainder of the sentence. In Greek, the absolute case is the genitive; in Latin, the ablative; in English, it is considered to be the nominative.

In Latin, the words *sole stante* in the expression, "*sole stante terra vertitur*" (the earth turns round, the sun standing still) — that is, while the sun is standing still — are in the ablative absolute.

In English, *thou leading*, in the following familiar quotation —

"I shall not lag behind, nor err  
The way, thou leading."

Milton.

is in the nominative absolute. So also is *I rapt* in the line —

"And, I all rapt in this, 'Come out,' he  
said."

Tennyson's "Princess," Prol. 50.

In law, personal rights are divided into absolute and relative — absolute, which pertain to man as individuals; and relative, which are incident to them as members of society, standing in various relations to each other. The three chief rights of an absolute kind are the right of personal security, the right of personal liberty, and the right of private property. (Blackstone's "Commentaries," bk. i, ch. i.) Similarly there are absolute and relative duties. Public sobriety is a relative duty, while sobriety, even when no human eye is looking on, is an absolute duty. (Ibid.) Property in a man's possession is described under two categories, absolute and qualified property. His chairs, tables, spoons, horses, cows, etc., are his absolute property; while the term "qualified property" is applied to the wild animals on his estate.

An absolute decision is one which can at once be enforced. It is opposed to a rule *nisi*, which cannot be acted on until cause be shown, unless, indeed, the opposite party fail to appear.

Absolute law: The true and proper law of nature.

Absolute warrandice (Scotch conveyancing): A warranting or assuring against all mankind.

Absolute, in natural philosophy, is generally opposed to relative. As this relativity may be of many kinds, various shades of meaning thus arise: thus:

1. Absolute or real expansion of a liquid, as opposed to its apparent expansion, the expansion which would arise when the liquid is heated, if the vessel containing it did not itself expand. (See Atkinson's "Ganot's Physics," bk. vi, ch. iii.)

2. Absolute gravity is the gravity of a body viewed apart from all modifying influences, as, for instance, of the atmosphere. To ascertain its amount, therefore, the body must be weighed *in vacuo*.



## Absolution

3. Absolute motion is the change of place on a body produced by the motion so designated, viewed apart from the modifying influence arising from disturbing elements of another kind.

4. Absolute space is space considered apart from the material bodies in it.

5. Absolute time is time viewed apart from events or any other subjects of mental conception with which it may be associated.

6. Absolute force of a center: Strength of a center.

In astronomy the absolute equation is the aggregate of the optic and eccentric equations.

In algebra, absolute numbers are those which stand in an equation without having any letters combined with them. Thus, in the following equation —

$$2x + 9 = 17,$$

9 and 17 are absolute numbers, but 2 is not so.

In chemistry, absolute alcohol is alcohol free from water.

Absolute zero, an imaginary temperature so low that there would be no heat left. It is determined by calculation as follows: When a perfect gas is cooled from the boiling point down to the freezing point, it contracts .268 of the bulk, while the temperature is lowered  $212 - 32 = 180^\circ$ ; therefore, for a fall of  $1^\circ$  it would be .268 divided by  $180 = .00149$  of its bulk. To ascertain the number that it must fall to reduce its bulk to zero, we have 1 divided by  $.00149 = 671.2^\circ$  below the boiling point, or  $671.2 - 212 = 459.2^\circ$  below zero. It is usually taken at  $-460^\circ$  Fahr., or  $-273^\circ$  C. The nearest approach to this temperature has been made by Prof. Dewar of London, who, by the evaporation of liquid hydrogen, has produced a cold within about 15 or  $20^\circ$  of the absolute zero. At the present time we cannot even conceive of any possible means of going lower than this, since hydrogen has the lowest boiling point of any element. The notions held by some, that at the absolute zero matter would cease to exist in the form in which we know it, are probably fanciful.

**Absolution**, in ecclesiastical usage, the freeing from sin or its penalties. In the early systems of the Christian Church, absolution was of five kinds, viz.: (1) Baptism, which was regarded as purging away sin, but with no specific relation to penitential discipline. (2) The eucharist, a general act of absolution to all who fitly partook of it. (3) The Word and doctrine, generally declarative, through the priest, of the terms of salvation. (4) Intercession and prayer, especially for penitents received into the church. (5) Restoration to the church for those who had fallen under excommunication or had lapsed into great sins. The Roman Catholic Church, since the fourth Lateran council in 1215 A. D., invests the

## Abstinence

priest with power in his priestly office to pronounce absolution, using the formula *Ego absolvo te* (I absolve thee), in place of the older form, *Deus or Christus absolvit te* (God, or Christ, absolves thee), basing this practice upon John xx: 23, and similar passages. In this Church, absolution is a sacrament, having its conditions of penitence and confession. In the case of persons supposed to be about to die, it is called extreme unction. There is also a form of absolution for the dead, including prayers and offerings accounted influential in shortening the period of, or delivering from, purgatory. In the Church of England, absolution is the declaring of God's remission of sins. There are three forms, one in the morning service; one for communion, in which absolution is prayed for; and one for the sick, which is nearer to the Roman Catholic form. In most other Churches, absolution is no more than a general or formal declaration that God will forgive the sins of penitents, with exhortation to seek such forgiveness.

**Absorption**, the act, operation, or process of absorbing, sucking in, or swallowing anything, or otherwise causing it to disappear in another body. Absorption by organized bodies is the taking up or imbibing, by means of their tissues, of material suitable for their nourishment, that it may ultimately be transmitted by the vascular channels to more distant parts.

In chemistry, absorption is the taking up of a gas by a liquid, or by a porous solid; and in natural philosophy it is the taking up rays of light and heat by certain bodies through which they are passing. Absorption of light is the retention of some rays and the reflection of others when they pass into an imperfectly transparent body. If all were absorbed, the body would be black; if none, it would be white; but when some rays are absorbed, and others reflected, the body is then of one of the bright and lively colors.

Absorption of heat is the retention and consequent disappearance of rays of heat in passing into or through a body colder than themselves.

Absorption of the earth is a term used by Kircher and others for the subsidence of tracts of land produced by earthquakes or other natural agencies.

In chemistry the co-efficient of absorption of a gas is the volume of the gas reduced to  $0^\circ$  Cent. and 760 m. m. pressure, which is absorbed by the unit of volume of any liquid.

**Absorption, Electrical.** See ELECTRICAL ABSORPTION.

**Abstinence**, the act or habit of refraining from something to which we have a propensity, or in which we find pleasure; but it is more particularly applied to the priva-



**tion or sparing use of food.** Abstinence has been enjoined and practiced for various ends, as sanitary, moral, or religious. Physicians relate wonderful cures effected by abstinence; moralists, as the Pythagoreans, Stoics, and others, recommend it as a means of bringing the animal part of our nature into greater subservience to the spiritual; and it is likewise enjoined by various religious sects. Abstinence of flesh on certain days is obligatory in the Roman Catholic Church.

**Total abstinence.**—The time during which life can be supported under total abstinence from food or drink, is usually stated to vary from eight to ten days; the period may, however, be greatly prolonged. Total abstinence, as a term, has also special reference to alcoholic drinks.

**Abstraction**, the act of dragging or drawing away or separating. In distillation, it is the operation of separating the volatile parts in distillation from those which do not pass into vapor at the temperature to which the vessel has been raised.

In mental philosophy, it is the act or process of separating from the numerous qualities inherent in any object the particular one which we wish to make the subject of observation and reflection. Or the act of withdrawing the consciousness from a number of objects with a view to concentrate it on some particular one. The negative act of which attention is the positive.

**Absyrtus** (ab-sér'tus), in Greek mythology son of Aietes (Æetes), King of Colchis and brother of Medea; slain by Medea or by Jason. According to the common myth, Medea killed and dismembered her brother, and scattered his limbs along the road to delay Aietes in his pursuit of the lovers. The scene of the murder was called Tomi. By another account Absyrtus, deceived by

a strategem, was slain by the Argonauts, and his body, having been cast into the sea, was thrown up on one of the islands, thence named Absyrtides.

**Abt, Franz**, (äpt), a German song writer; born in Eilenburg, Dec. 22, 1819. He studied theology at Leipsic, but abandoned it for music. In 1841

he became kapellmeister at the court theater at Bernburg; shortly afterward relinquishing the post for a similar one in Zurich, where he remained



FRANZ ABT.

till 1852. He was then called to Brunswick as chief conductor of the orchestra in the royal theater. In 1882 he retired to Wiesbaden. Many of his songs (for example, "When the Swallows Homeward Fly," "Good Night, Thou Child of My Heart," "O Ye Tears," etc.), have endeared themselves to the heart of the people all over the world. His part-songs are also popular favorites. Simplicity of melody, rather than great depth, characterizes his work. He visited the United States in 1872. He died in Wiesbaden, March 31, 1885.

**Abu**, a mountain, 5,650 feet, in the territory of Serohee, Rajputana, India, a detached granite mass rising like an island from the plain of Marwar, near the Aravalli ridge. It is a celebrated place of pilgrimage, especially for the Jains, who have five temples at Delwara, about the middle of the mountain, two of which are the most superb of all Jain temples. Both are built of white marble, finely carved, and date from 1031 and 1197 A. D. The mountain contains a beautiful lake 4,000 feet above the sea; and the region is a summer resort for Europeans.

**Abu-Bekr**, the father of Ayesha, wife of Mohammed, was a man of great influence in the Koreish tribe; and in 632, when Mohammed died, was made the first caliph or successor of the Prophet. After defeating his enemies in Arabia, and warring successfully against Babylonia, Syria, and the Byzantine emperor Heraclius, Abu-Bekr died 634 A. D., aged 63. He was surnamed "The Just." His charity was unbounded, while his manner of living was so strict that he possessed at his death only the one robe he wore, a camel, and an Ethiopian slave. His tomb is shown by the side of that of the Prophet at Mecca.

**Abu-Habba**, an Arabian village, 16 miles S. E. of Bagdad, the site of an ancient Babylonian city, probably Sippar (the Sepharvaim of the Scriptures), which was discovered during a series of excavations in 1881.

**Abu-Klea**, a place in Egypt, on the route across the country between Korti and Metammeh, both on the great bend of the Nile below Khartum; was the scene of a battle on Jan. 17, 1885, in which Sir Herbert Stewart defeated the Mahdi's forces.

**Abu-Nuvas** (äbö-nö'vas), an Arabic poet; died in 815. He flourished at the court of the caliphs of Bagdad, writing, in the style of Anacreon, some of the most notable songs of love and wine in all Arabic literature.

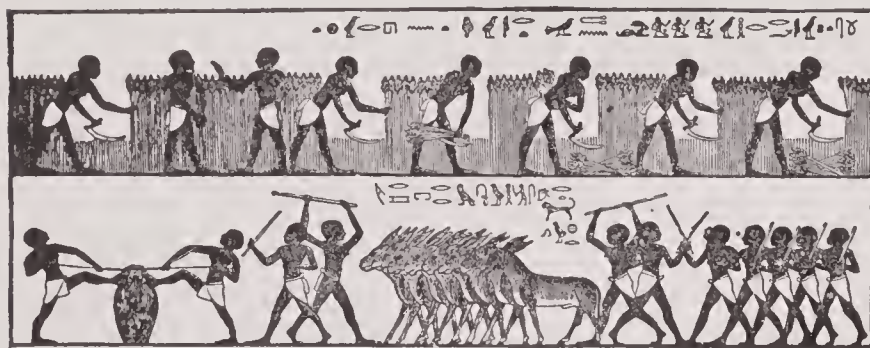
**Abul-Abbas, Abd-Allah**, the first of the Arabian dynasty of Abbassides; a caliph of incredible cruelty, on account of which he



was called "al Suffah" ("The Sanguinary"). On assurances of amnesty, he beguiled 90 members of the Ommiad family (the preceding dynasty) into a hall, where they were slain with whips and rods. He subdued various bloody revolts and divided the provinces among his favorites. He died in 754.

**Abulfaraj** (ä-böl-fä-rä'j) or **Abulfaragius** (ab'ul-fa-rä'ji-us), a Syriac and Arabic writer; born at Malatia, Armenia, in 1226. His full name was Gregory Abulfaraj ibn al Harun; his father was a Jew. Of numerous writings, the best now known are a universal history in Syriac from the time of Adam down to his own date, and an autobiography. He died at Maragha, Persia, in 1286.

**Abulfazl**, a vizier and historiographer of the Mogul Emperor Akbar. Under the



BAS-RELIEF.

From the rock graves at Abu-Simbel.

title of "Akbar Nameh," or "Book of Akbar," he wrote a history of that Emperor's reign, which included an account of the religious and political constitution of the Empire. He was assassinated in 1602.

**Abuna** (äb-ö'nä), the title given by the Ethiopian Christians to their metropolitan. He is the chief of the secular clergy. In the



ABUNDANTIA.

Abyssinian empire he is the virtual chief of orthodoxy, commissioned by the Patriarch of Alexandria. When, in the 4th century, Athanasius conferred orders on the Apostle Frumentius, who had just evangelized Abyssinia, he recommended that Alexandria be made the fountain of faith and the source of the Abyssinian bishopric. This tradition has been observed, and the abuna is always a Coptic monk taken from a monastery in Cairo. The national bishop is called Etcheguieh.

**Abundantia**, the goddess of superfluity among the ancient Romans, with-

out temple or altars, but often pictured on the Roman coins after the style of Demeter, usually scattering her gifts from the horn of plenty. She is allied to the Domina Abundia who is often mentioned in the poems of the Middle Ages as the beneficent being who brings plenty to human beings.

**Abu-Simbel**, the ancient Aboccis or Abuncis, a place of ruins in Upper Egypt, between the first and second cataract, having two temples built by Ramses the Great in 1388 and 1392, one for himself and one for the god Hathor. They lie a short distance apart, at the foot of a precipitous cliff close to the west bank of the Nile. No temple in Egypt produces so grand an effect as the rock temple of Ramses II., and by moonlight its effect is even finer. Its dignified sculptures and the gorgeous colored repre-

sentations in its interior repay the trouble of the ascent from Philæ. Admission tickets are necessary in order to enter the great temple of Abu-Simbel ("Father of the Ear of Corn"). This most stupendous work of ancient Egyptian architecture was the creation of Ramses II. It was excavated out of the solid rock and dedicated at first to the leading deities of Egypt proper, Ammon of Thebes and Re-Harmakhis, but other deities were worshipped there as well. In 1892

the façade, 119 feet broad and over 100 feet wide, was restored and two walls had to be built to protect it from the sand which blew into it from the west desert. The temple is approached through a forecourt, hewn out of the rock. Acting as guardians to the entrance of the temple are the four colossi of Ramses II, each about 66 feet high, and all in perfect condition excepting one. On a leg of the fractured colossus is an inscription, one of the most ancient specimens of Greek writing, recording that when Psammetichus came to Elephantine, the writers came to the spot by way of Kerkis. This inscription dates from B. C. 592.

**Abutilon**, a genus of plants belonging to the order *malvaceæ*, or mallow worts. The species are annual or shrubby plants, generally with handsome flowers, yellow or white, often veined with red. They have a five-carpelled fruit. *A. esculentum* is used in Brazil as a vegetable. Several species are wild in India. Two of them, *A. Indicum* and *A. polyandrum*, have fibres which may be twisted into ropes. Other varieties, *A. striatum*, *A. venosum*, *A. insigne*, etc., are ornamental garden or greenhouse plants.

**Abydos**, a town and castle of Natolia, on the Straits of Gallipoli. In its neighborhood



Xerxes, when he invaded Greece, crossed with his immense army the Hellespont, on a bridge of boats. Memorable also from being the scene of the loves of Hero and Leander, and from Byron having adopted its name in his "Bride of Abydos." Also an ancient city of Upper Egypt, supposed to have been the ancient This, and to have been second only to Thebes.

**Abydos, Tablet of**, an inscription found in the temple of Ramses II. by Mr. Banks in 1818, containing a double series of 26 shields (vertical bands) of the predecessors of Ramses the Great. This tablet is now in the British Museum. It gave Champollion the first clue to establish his list of the Theban dynasties of the new empire. The defects in this tablet were largely supplied by the discovery in 1865, by Mariette, of a second tablet in the temple of Seti I., bearing 76 shields, the genealogy beginning with the names that are missing in the Banks tablet.

**Abyssinia, or Habesh**, an ancient kingdom of Eastern Africa, now under a monarch who claims the title of emperor. Abyssinia may be said to extend between lat. 8° and 16° N., and lon. 35° and 41° E., having Nubia N. and W., the Sudan W., the Red Sea littoral (Erythræa, Danakil country, etc.), E., and to the S. the Galla country. The area within these limits is about 160,000 square miles, but the present ruler claims a much more extensive territory; and latterly Abyssinia has come to be surrounded by regions belonging to or influenced more or less by Italy, France, and Great Britain. The principal divisions of Abyssinia are the provinces or kingdoms of Shoa in the S., Amhara in the center, and Tigré in the N., to which may be added Lasta, Gojam, and other territories. Addis Abeba in Shoa is the present residence of the ruler, but the Abyssinian royal residences largely consist of houses very slightly built, and thus resemble more or less permanent camps rather than towns. Other towns are Gondar, Adua, Aksum, Antalo, and Ankober, none with a population exceeding 7,000.

**Topography.**—The more marked physical features of the country may be described generally as consisting of a vast series of table-lands of various and often of great elevations, and of numerous ranges of high and rugged mountains, some of them of very singular forms, dispersed over the surface in apparently the wildest confusion. From these mountains flow inexhaustible supplies of water, which, pouring down by the deep and tremendous ravines that everywhere intersect them, impart an extraordinary fertility to the plains and valleys below. The chasms or rents that occur in the plateaux are often of appalling depth, forming gloomy abysses or cañons whose edges are

frequently not more than 200 or 300 yards asunder. Notwithstanding, however, the wild and rugged appearance of the country generally, it contains numerous valleys and tracts of unequalled beauty and fertility, rich in all the most valued productions of the earth. The most extensive is the plain of Dembea, lying round the lake of that name, emphatically called the granary of the country, where there reigns a perpetual spring.

The most remarkable and loftiest mountain summits occur in the center of the N. part of the kingdom, immediately to the W. of the Tacazzé river. Among the highest of these (so far as known) is Ras Dashan, which has an elevation calculated at 15,167 feet, and is capped with perpetual snow. Abba Yared and Buahit are estimated to be even higher. Along the whole of the E. side of the country extends a mountain range or escarpment forming a natural rampart with a mean elevation of 7,000 or 8,000 feet for a distance of some 600 miles. No volcanoes are known to exist at present, but almost everywhere are numerous evidences of past volcanic action. Perhaps the principal river of Abyssinia is the Tacazzé, which has its rise in the mountains of Lasta, about lat. 12° N.; lon. 39° 20' E. It pursues a N. then a W. course, and after leaving the bounds of Abyssinia takes the name of Atbara, and finally joins the Nile. The chief of the other rivers — if not indeed the chief river of the country — is the Abay or Abai in the S. W., which, after entering and leaving Lake Dembea, flows S. and then N. W., and latterly takes the name of the Bahr-el-Azrek or Blue Nile, of which it really forms the upper portion. In the earlier part of their courses, while flowing over the level surface of the table-lands, the rivers of Abyssinia are little better than muddy brooks, which in the dry season nearly disappear, but during the rains overflow their banks and inundate the plains for miles. The principal lake is Lake Tana or Dembea, in the territory of Amhara, a large and beautiful sheet of water at a height of upward of 6,000 feet above the sea. It is about 46 miles in length, and about 33 in breadth at the widest part. Lake Haik, in the province of Amhara, on the N. confines of Shoa, is about 45 miles in circumference. Lake Ashangi, in Tigré, 8,200 feet above the level of the sea, is 4 miles long and 3 miles broad, bordered by a richly cultivated plain surrounded by mountains, and is a rare instance of a fresh-water lake without any apparent outlet.

**Productions.**—The chief mineral products of Abyssinia are iron, sulphur, coal, and salt. Coal beds appear to extend along the whole of the E. frontier of Shoa, but as a combustible coal is scarcely known in the country. Salt is obtained in various places, especially from a plain on the S. E. border



of Tigré. Gold is obtained from alluvial deposits, but not in great quantity. In some parts of the country iron is abundant, and it is manufactured into implements for various purposes. A few hot mineral springs are known and made use of. The climate of Abyssinia is as various as its surface. In the valleys it is delightful, but on the mountains often cold. The rains begin in June and continue till September (over a considerable portion of the country at least), during which period they are often so violent as to put a stop to agricultural labor and all other outdoor operations. The finest months of the year are those of December and January.

From the sea-level to a height of 3,000 feet the vegetation is of a tropical character; from 3,000 up to 6,000 feet a subtropical zone extends, in which grow lobelias, acacias, etc.; and from that to 9,000 feet the flora is of a temperate or even English character, the dog-rose, cowslips, violets, lavender, and wild thyme being quite common. The principal grains are millet, barley, wheat, maize, and teff. Teff, a very small seed, is a favorite with all Abyssinians. The bread made from it is soft and spongy, with a sourish taste, and is said to be unwholesome, though not unpleasant to the taste. Two crops are obtained yearly, the seed being sown in one field while the crop is being gathered in the next. In some places there are three harvests within the year. Large quantities of a kind of banana called *ensete* are raised, and produce an agreeable sort of bread. Among the other vegetable products of the land may be mentioned ebony, coffee, gum, balsam, incense, and various medicinal plants.

*Fauna.*—The domestic animals consist of horses, cattle, sheep, goats, camels, mules, and asses. Mules, camels, and asses are the usual beasts of burden, the horses being generally reserved for war and the chase. Vast herds of oxen are met with throughout the country. The wild animals are the lion (rare), elephant, hippopotamus, rhinoceros, crocodile, buffalo, hyena, leopard, boar, antelope, zebra, quagga, giraffe, gazelle, and civet. The hippopotamus abounds in Lake Tsana, and great numbers are killed annually for their flesh and hides. The rhinoceros, like the elephant, inhabits the low, moist grounds, and is numerous in certain districts. Crocodiles are found in various rivers, but the largest and most dreaded are those that inhabit the Tacazzé. The buffalo, a comparatively harmless animal in other countries, is here extremely ferocious. Serpents are numerous, among them being the boa, which often attains a length of 20 feet. Bees are numerous, honey being a general article of food; locusts often lay the land waste, and the saltsalya fly is destructive to cattle during the rainy season.

*Commerce.*—The foreign trade is chiefly carried on through Massowa, Berbera, Zeila, Jibuti, Obok and other (non-Abyssinian) ports on the Red Sea; but the external traffic has never been of great importance. The nature of the country is adverse to an extensive trade, and there are comparatively few commodities suited for export. The exports are chiefly coffee, civet, honey, wax, gum, hides, ostrich feathers, ivory, and rhinoceros horns; the imports, pepper, antimony, bottles, needles, silks, turkey-red cloths, tobacco, cotton, firearms, etc. Manufactures are unimportant. The Abyssinians are said to excel in tanning, and they make parchment from sheep and goat skins. They also make coarse woollen stuffs, arms and small iron implements, horn drinking vessels, coarse black pottery, and some other articles. Transportation is by means of mules and pack-horses. A railroad nearly 200 miles long is being constructed from Jibuti to Harrar.

*Peoples.*—Ethnographically Abyssinia is a land of confusion. The aboriginal elements of the population are best represented by the Agao, who inhabit Agaomedir, to the S. and W. of Lake Dembea, and also Lasta, around the Tacazzé river. They belong to the Ethiopian section of the Hamitic branch of the Caucasian stock, and some Egyptologists are of opinion that they are descended from a Nubian tribe which was driven S. in early times. Closely related to the Agao are certain other tribes still represented in various parts of the country. Among these are the Falashas, who profess a somewhat ancient form of Judaism, and occur in many parts of the plateau, and even farther S. They hold themselves apart, as a rule, from the rest of the population. Unlike most Jews they have an aversion to commerce, and are mainly occupied in agriculture and some of the industrial arts. The Kamants of Gondar and other parts resemble the Falashas in many ways, speaking the same language and having similar religious observances; the Bogos or Bilen of the N. are a small allied group of some interest; and among other more or less primitive Hamitic tribes are the Lakue, Dambelas, Habab, and the Vaitos. For long, however, these Hamite peoples have been under the domination of Himyaritic Semites from Yemen in Arabia. These Semitic peoples have mingled with the Hamites whom they subdued, and also with various Arab and Negro peoples, and owing to the fact that this commingling has been less pronounced in some portions of the country than in others, several well-marked Himyaritic groups can be distinguished. To the N. and E. are the Tigré, whose territory is roughly bounded on the S. by the Tacazzé river; and to the S. and W. are the Amharas. The Shoas of the S. E. differ but little from the Amharas.



Of these the Tigré best represent the original Himyaritic invaders, and their language (Tigrinya) is nearer to the original language, known as Geez, which is still used in religious ceremonies. The Amhara, however, are the preponderant section, and their language (Amharinya), besides being the literary language, is used in commerce and diplomacy. In the more S. parts of the country there are various Hamitic tribes known as Gallas, and to the W. and S. W. of Lake Dembea there are the negro Shankallas. The Danakil along the Red Sea coast, the Shoho S. W. of Massowa, and other groups are Mohammedan Arabs. The Ethiopians are characterized by good proportions. They are of medium height, with broad shoulders, a high forehead, a straight or sometimes aquiline nose, thick lips, a pointed chin, and a rather more protruding mouth than in Europeans. The hair is usually somewhat curly, and in color they vary from black to a very light brown. Some of them show negro characters. The national religion is a form of Christianity originally introduced from Alexandria in the 4th century. One of its characteristic tenets is the monophysite doctrine that denies the human nature of Christ. The head of their church is a priest called the *abuna*, who has for long been a foreigner. He is consecrated by the patriarch of Alexandria and has great power, but his influence is practically curtailed by the all but equal power of the national head of the church, or *echaghey*. The churches, which are usually small and poorly constructed, are arranged in a manner similar to that of a Jewish temple. The Virgin is highly revered, and there are a large number of saints, many of whom are regarded as worthy of almost as much honor as the Saviour.

In nearly all the provinces and districts marriages are performed with great simplicity, and are as easily dissolved. There is an old code of laws called the King's Guide, which is ascribed to the Emperor Constantine. It gives to the father the power of life and death over his children, and to the king the same power over his subjects. Blinding and death are the penalties for a son's revolt against his father, or a subject's rebellion against the king. Blasphemy and lying are punished by the loss of the tongue, thieving by that of the right hand. A murderer is handed over to the family of his victim to meet death in the same way as that victim, but if the murder was unintentional a money price only is exacted. The educational advantages are very slight; the clergy instruct a few children in grammar, Bible texts, and poetry.

*History.*—The Abyssinians were converted to Christianity in the time of the Emperor Constantine, by some missionaries sent from Alexandria. In the 6th century the power of the sovereigns of their king-

dom had attained its height; but before another had expired the Arabs had invaded the country, and obtained a footing in Adel, though they were unable to extend their conquests farther. For several centuries subsequently the kingdom continued in a distracted state, being now torn by internal commotions and now invaded by external enemies (Mohammedans and Gallas). To protect himself from the last the Emperor of Abyssinia applied, about the middle of the 16th century, to the King of Portugal for assistance, promising, at the same time, implicit submission to the Pope. The solicited aid was sent, and the empire saved. The Roman Catholic priests having now ingratiated themselves with the emperor and his family, endeavored to induce them to renounce the tenets and rites of the Coptic Church, and adopt those of Rome. This attempt, however, was resisted by the ecclesiastics and the people, and finally ended, after a long struggle, in the expulsion of the Roman Catholic priests about 1630. The kingdom, however, gradually fell into a state of anarchy, which, about the middle of the 18th century, was complete. The king, or negus as he was called, received no obedience from the provincial governors, who, besides, were at feud with one another, and severally assumed the royal title.

Abyssinia thus became divided into a number of petty independent states. A remarkable, but, as it proved, quite futile attempt to resuscitate the unity and power of the ancient kingdom was commenced about the middle of the 19th century by King Theodore, who aimed at the restoration of the ancient kingdom of Ethiopia, with himself for its sovereign. He introduced European artisans, and went to work wisely in many ways, but his cruelty and tyranny counteracted his politic measures. In consequence of a slight, real or fancied, which he had received at the hands of the British government, he threw Consul Cameron and a number of other British subjects into prison in 1863, and refused to give them up. To effect their release an army of nearly 12,000 men, under the command of Sir Robert Napier, was dispatched from Bombay in 1867. The force landed at Zoulla on the Red Sea in November, and marching up the country came within sight of Magdala, the capital of Theodore, in the beginning of April, 1868. After being defeated in a battle Theodore delivered up the captives and shut himself up in Magdala, which was taken by storm on April 13. Theodore was found among the slain, the general opinion being that he had fallen by his own hand.

After the withdrawal of the English fighting immediately began among the chiefs of the different provinces, the three most powerful, Kasa, Gobasie, and Menelek, struggling for the supremacy. This state of



## Abyssinian Church

matters continued for some time, but at last the country was divided between Kasa, who secured the N. and larger portion, and assumed the name of Johannes, and Menelek, who gained possession of Shoa. Latterly Johannes made himself supreme ruler, with the title of emperor, or king of kings (Negus Negusti). Taking advantage of the troubles in Abyssinia the Egyptians annexed Massowa and adjoining territory on the Red Sea; and hostilities were repeatedly carried on between them and Johannes. In 1885 the Egyptian forces were withdrawn, and Italy, with the consent of Great Britain, declared a protectorate over Massowa and the strip of territory along the coast of the Red Sea. In the following year the Italians pushed inward to Saati, a few miles W. of Massowa, an action which led to war with the Emperor Johannes. An Abyssinian force was sent in 1887 to recover Saati, but though a small Italian force was cut to pieces at Dogali, the Italians maintained their position.

On the death of the Emperor Johannes in 1889, while fighting against the Mahdists, Menelek, who had concluded an alliance with Italy, raised himself to the imperial throne. The result of this was the strengthening of the Italian hold on the country. The Italians regarded their treaty with Menelek as giving them a protectorate over Abyssinia, and by 1892 the whole of Ethiopia was generally recognized as within the Italian sphere. Proceeding to extend and strengthen their position the Italians in 1889 occupied Keren, capital of the Bogos country, situated some 60 miles W. of Massowa, and also fortified Asmara, to the S. W. of Massowa. Adua, the capital of Tigré, and the center of opposition to Menelek, was occupied in the following year. The Mahdists were also defeated, and Kassala in the Sudan was occupied by the Italians. Menelek, however, latterly repudiated the Italian protectorate, broke with his former allies, and in 1896 his troops inflicted on them such a defeat as gave a death-blow to their claim of a protectorate over all Abyssinia. The treaty concluded in that year between Menelek and the Italians practically abrogated the treaty of seven years before, but left Italy in possession of a strip along the Red Sea coast from the French colony of Obok on the S. to Ras Kasar on the N., known officially as Eritrea (Erythræa). A British mission in 1897 was favorably received by the emperor, and the boundaries between Abyssinia and the British Somali protectorate were arranged. Pop. 5,000,000.

**Abyssinian Church**, the name of a sect of the Christian Church established in Abyssinia. The forms and ritual of the Abyssinian Church are a strange compound of paganism, Judaism, and Christianity. It is governed by a bishop, who is styled abuna.

## Academics

**Acacia**, a genus of plants belonging to the *mimosæ*, one of the leading divisions of the great leguminous order of plants. They abound in Australia, in India, in Africa, tropical America, and generally in the hotter regions of the world. Nearly 300 species are known from Australia alone. They are easily cultivated in greenhouses, where they flower, for the most part, in winter or early spring. The type is perhaps the *Acacia Arabica*, or gum arabic tree, common in India and Arabia. It looks very beautiful with its graceful, doubly pinnate leaves and its heads of flowers like little velvety pellets, of bright gamboge hue. Other species than the

*A. Arabica* produce gum arabic. That of the shops is mostly derived from the *A. vera*, a stunted species growing in the Atlas mountains and other parts of Africa. *A. Verck* and *A. Adansonii* yield gum senegal. *A. catechu* furnishes catechu. Other species contain tannin, and are used in tanning. Others yield



ACACIA ARABICA.

excellent timber. The pods of *A. concinna* are used in India for washing the head, and its acid leaves are employed in cookery. The bark of *A. Arabica* is a powerful tonic; that of *A. ferruginea* and *A. leucophæa*, with jagghery water superadded, yields an intoxicating liquor. The fragrant flowers of *A. Farnesiana*, when distilled, produce a delicious perfume. In pharmacy, acacia is the inspissated juice of the unripe fruit of the *mimosa nilotica*. It is brought from Egypt in roundish masses wrapped up in thin bladders. The people of that country use it in spitting of blood, in quinsy, and in weakness of the eyes.

**Acacius, St.**, Bishop of Amida, in Mesopotamia. He sold the church plate to redeem 7,000 starving Persian slaves. Versanius, the king, was so affected by this noble action that he sought an interview with the bishop, which resulted in a peace between that prince and Theodosius I., A. D. 420.

**Academics**, a name given to a series of philosophers who taught in the Athenian Academy, the scene of Plato's discourses. They are commonly divided into three sects: (1) The Old Academy, of which Plato was the immediate founder, was represented successively by Speusippus, Xenocrates, and Polemon. (2) To them succeeded Arcesilaus, the founder of the Middle Academy. Under his hands, the Platonic method



assumed an almost exclusively polemical character. His main object was to refute the Stoics, who maintained a doctrine of perception identical with that promulgated by Dr. Reid in the 18th century. Socrates is said to have professed that all he knew was that he knew nothing. Arcesilaus denied that he knew even this. Wisdom he made to consist in absolute suspension of assent; virtue, in the probable estimate of consequences. He was succeeded by Lacydes, Telecles, Evander, and Hegesinus. (3) The New Academy claims Carneades as its founder. His system is a species of mitigated scepticism. He was succeeded by his disciple, Clitomachus. Charmides, the third and last of the new academicians, appears to have been little more than a teacher of rhetoric.

**Academie des Beaux Arts** (ä-kä-dem-ē dā bōz-ār'), founded in Paris, 1795, supplanted the Royal Academy of Painting and Sculpture and that of Architecture. It was reorganized in 1803 and again in 1816, and now has 40 members, of whom 14 are painters, 8 sculptors, 8 architects, 4 engravers, and 6 composers; 10 exempt members, 40 corresponding members, and 10 "free" corresponding members. Since 1858 it has been preparing a special dictionary, of which some volumes have appeared.

**Academy**, the gymnasium in the suburbs of Athens in which Plato taught, and so called after a hero, by name Academus, to whom it was said to have originally belonged. The word is also applied to a high school designed for the technical or other instruction of those who have already acquired the rudiments of knowledge; also a university.

Anciently, there were two public academies: one at Rome, founded by Adrian, in which all the sciences were taught, but especially jurisprudence; the other at Berytus, in Phœnicia, in which jurists were principally educated. Academy is the name, also, of a society or an association of artists, linked together for the promotion of art, or of scientific men, similarly united for the advancement of science, or of persons united for any more or less analogous object. Thus the French possess the celebrated Academy or Institute, established by Cardinal Richelieu in 1635, for fixing and polishing the French language. The use of the word "academy," different from the ancient one, is believed to have arisen first in Italy at the revival of letters in the 15th century. The nearest approach to these institutions in America is the Smithsonian Institution in Washington.

**Academy, French**, an institution founded in 1635 by Cardinal Richelieu for the purpose of refining the French language and style. It became in time the most influ-

ential of all literary societies in Europe. Together with the Academy of Inscriptions and Belles Lettres, the Academy of Moral and Political Sciences and the Academy of Sciences, it composes the National Institute of France. It published in 1694 the first edition of a dictionary. It has exercised a conservative influence on French literature, and favors taste rather than originality. It consists of 40 members, besides a director, a chancellor, and a secretary. In 1793 it was suppressed by the convention, but was re-established in 1816. The French Academy originated in a simple meeting of friends who met at the house of Conrart, one of their number. These reunions were held informally for many years. At last they attracted the attention of Richelieu, who, in 1634, proposed to form an Academy, and, from the 13th of March in that year, a record was kept of their transactions and a director or chancellor and a perpetual secretary were appointed. The Academy was definitely formed by letters patent of Louis XIII., in January, 1635; they were registered by Parliament July 10, 1637. At first the number was 30. The perpetual secretaries have been, since the foundation, 19, and the incumbent receives a salary of 6,000 francs and lodgings at the Institute. Ordinary members receive 1,500 francs a year. In 1880 the discussion of the qualifications of candidates which had been in vogue for more than 10 years was abolished, but restored in 1896. In 1671 the sessions of the Academy became public. The library of the Institute was founded by Louis XIV., who presented to it 660 volumes. The members of the Academy, often spoken of as "the forty immortals," were, in 1901, with the dates of their election: Ernest W. G. B. Legouvé, 1855; Duc de Broglie, 1862; Emile Ollivier, 1870; Alfred J. F. Mézières, 1874; Gaston Boissier, 1876; Victorien Sardou, 1877; Duc d'Audiffret-Pasquier, 1878; Aimé J. E. Rousse, 1880; René F. A. Sully-Prudhomme, 1881; Adolph L. A. Perraud, 1882; Édouard J. H. Pailleron, 1882; François E. J. Coppée, 1884; Joseph L. F. Bertrand, 1884; Ludovic Halévy, 1884; Vallery C. O. Gréard, 1886; Comte d'Haussonville, 1886; Jules A. A. Claretie, 1888; Vicomte de Vogüé, 1888; Charles L. de Freycinet, 1890; Julien Viaud, 1891; Ernest Lavisse, 1892; Vicomte de Bornier, 1893; Paul L. Thureau-Dangin, 1893; Ferdinand Brunetière, 1893; Albert Sorel, 1894; José M. de Heredia, 1894; Paul Bourget, 1894; Henri Houssaye, 1894; Jules Lemaitre, 1895; Anatole France, 1896; Marquis de Beauregard, 1896; Gaston Paris, 1896; André Theuriet, 1896; Comte Vandal, 1896; Comte de Mun, 1897; Gabriel Hanotaux, 1897; Claude J. B. Guillaume, 1898; Henri L. E. Lavêdan, 1899; Paul Deschanel, 1899; Marquis de Vogue and Edmond Rostand, 1901.



## Academy of Arts

**Academy of Arts, The Royal**, a British institution for the encouragement of painting, sculpture and designing; founded in 1768 by George III., with Sir Joshua Reynolds as president. It is composed of a president (P. R. A.), 40 academicians (R. A.), and 20 associates (A. R. A.), which include professors of painting, architecture, anatomy, and perspective. It holds an annual exhibition, open to all artists, at Burlington House, London, of paintings, sculpture and designs which reach a certain standard of merit.

**Academy of Design, National**, an American institution, in New York city, founded in 1826, conducting schools in various branches of the fine arts, and holding semi-annual exhibitions at which prizes are awarded. The membership consists of academicians, who are the corporate body and use the title N. A. (National Academician), and the associates, who use the title A. N. A. (Associate of the National Academy), all, of necessity, artists. Laymen may become fellows of the academy on payment of graded fees.

**Academy of Fine Arts, The**, a French institution, originally founded in 1648 at Paris under the name of the Academy of Painting and Sculpture. In 1795 it was joined to the Academy of Architecture, and has borne its present name since 1819. It publishes memoirs, proceedings, and a dictionary of the fine arts. It has 41 members, besides corresponding members, etc.

**Academy of France at Rome**, an institution for the advanced study of the fine arts in Rome, Italy, founded by Colbert in 1666, during the reign of Louis XIV. It was at first established in the ruined villa Mancini on the Corso, and, in 1803, at the villa Medici. The young artists, painters, sculptors, architects, engravers and musicians who secure the annual prizes of the Academy of Fine Arts in Paris spend four years there, with an annual pension of 3,500 francs and traveling expenses.

**Academy of Inscriptions and Belles Lettres**, an institution founded at Paris by Colbert in 1663, under the name of Petite Académie. It was composed originally of four members, chosen by the ministry to belong to the Académie Française. The first members, Chaplain, Charpentier, the Abbé de Bourzers, and the Abbé Cassagne, met in a salon of the Louvre or in Colbert's library and devoted themselves to composing the inscriptions for the monument erected by Louis XIV. and the medals struck in his honor; hence their popular name. They undertook a medallic history of the reign of the king. In 1701 the Academy assumed its definitive form; 40 academicians were named. In 1803 the Academy was reconstituted and became the third class of the

## Academy of Sciences

Institute. Comparative philology, Oriental, Greek, and Roman antiquities and epigraphy have received the attention of the Academy, which has published a series of invaluable records and works.

**Academy of Medicine**, a French institution, founded in Paris in 1820, for the purpose of keeping the government informed on all subjects appertaining to the public health. It has the sections of medicine, surgery, and pharmacy, and its publications are highly prized by sanitarians.

**Academy of Moral and Political Science**, founded at Paris in 1795, became the second class of the Institute. It was suppressed by Napoleon in 1803, but was re-established by Louis Philippe in 1832, and forms the fifth class of the Institute, and is composed of 30 members, divided into 5 sections, with 5 free academicians, 5 foreign associates, and 30 corresponding members.

**Academy of Natural Sciences of Philadelphia**, an institution founded in 1812. It has one of the best natural history collections in the world—especially rich in stuffed birds—and a valuable scientific library. It has published "Journals" since 1817, and "Proceedings" since 1841.

**Academy of Political and Social Science, American**, an institution organized at Philadelphia in 1889 and incorporated in 1891. It has a large number of members and publishes bi-monthly "Annals."

**Academy of Sciences**, an institution founded at Paris, in 1666, by Colbert and approved by Louis XIV. in 1699. It published about 130 volumes of memoirs from 1666 to 1793, when it was suppressed. It was re-established in 1816. It has now 66 members, in 11 sections, with two perpetual secretaries and 100 corresponding members.

**Academy of Sciences and Arts, American**, an academy established in Boston in 1780 by the Council and House of Representatives of Massachusetts; the successor of an institution founded by Franklin. It has published "Proceedings" since 1846, and "Memoirs" since 1785.

**Academy of Sciences, The Imperial**, a Russian institution, founded in St. Petersburg by Catherine I., in 1725, and largely endowed by Catherine II. It has 15 professors, a president and director, a fine library containing 300,000 volumes and many manuscripts, and a museum very rich in curiosities and objects of natural history. It has published "Transactions" since 1728, and at present it publishes two volumes annually, called "Acta Academiæ," including many memoirs on the higher mathematics and the astronomical observations at Pulkowa.



**Academy of Sciences, The National**, an American institution, founded in 1863, consisting of 100 members, elected from among the most distinguished scientific men of the United States; analogous to the Royal Society of London.

**Academy of Sciences, The Royal**, a Danish institution, established in Copenhagen by the King of Denmark in 1743. It has published transactions ("Skrifter") since its foundation, and memoirs ("Afhandlinger") since 1823.

**Academy of Sciences, The Royal**, a German institution, in Berlin, founded by Frederick I., in 1700; had Leibnitz as its first director, and held its first meetings in 1711. It is divided into four sections, devoted to mathematics, physics, philosophy, and history. It publishes memoirs and monthly reports.

**Academy of Sciences, The Royal**, a Swedish institution, known also as the Royal Swedish Academy, founded in Stockholm as a private society in 1739; incorporated under its second name in 1741; issues annual volumes of "Transactions," first published quarterly.

**Academy, The Royal Spanish**, an institution established at Madrid, in 1714, for the same purposes as the French Academy. The number of members is limited to 24.

**Acadia**, a former French colony in North America, including Nova Scotia and nearly all of New Brunswick, settled in 1604. It grew so slowly that it numbered only 900 inhabitants in 1684. When, by the peace of Utrecht (1713), it was given to the English, the inhabitants, having refused to take the oath of allegiance, were ordered to leave their homes, and 5,000 emigrated to Louisiana and Georgia, and 2,000 were transported and scattered over New England. The story of their sorrow is touchingly introduced into Longfellow's "Evangeline."

**Acalephæ**, the third class of the radiata, Cuvier's fourth sub-kingdom of animals. In English they are called sea-nettles. They were defined as zoophytes which swim in the sea, and in the organization of which some vessels are perceived which are most frequently only productions of the intestines, hollowed in the parenchyma of the body. They were divided into *A. simplices* and *A. hydrostaticæ*; the first contained the genera medusa, æquorea, etc.

**Acanthaceæ**, an order of monopetalous exogens, with two stamina; or, if there are four, then they are didynamous. The ovary is two-celled, with hard, often hooked, placentæ, and has from one or two to many seeds. There are often large, leafy bracts. The *acanthaceæ* are mostly tropical plants, many of them being Indian. They have both

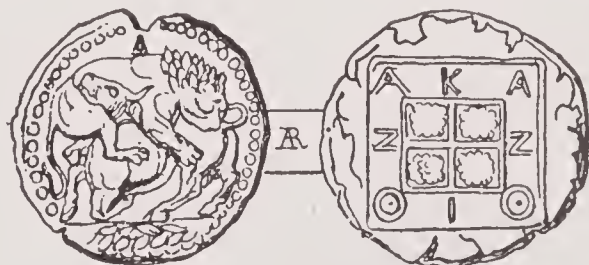
a resemblance and an affinity to the *Scrophulariaceæ* of this country, but are distinguishable at once by being prickly and spinous. In 1846 Lindley estimated the known species at 750, but it is believed that as many as 1,500 are now in herbariums. The acanthus, so well known in architectural sculpture, is the type of the order. The *acanthaceæ* are divided into the following sections, tribes, or families: (1) Thunbergiæ; (2) Nelsoniæ; (3) Hygrophilæ; (4) Ruelliciæ; (5) Barleriæ; (6) Acantheæ; (7) Aphelandræ; (8) Gendarusseæ; (9) Eranthemæ; (10) Dieleptereæ; and (11) Andrographideæ.

**Acanthite**, a mineral classed by Dana under his chalcocite group. Composition Ag<sub>2</sub>S. It has about 86.71 of silver and 12.70 of sulphur. It is orthorhombic; the crystals are generally prisms with slender points. Hardness, 2.5 or less. Sp. gr. 7.16 to 7.33. Luster, metallic. Color, iron-black. Sectile. Found at New Friburg, in Saxony.

**Acantholimon**, a genus of plants belonging to the order *plumbaginaceæ*, or leadworts. About 40 species are known from Persia, Asia Minor, and Greece. *Acantholimon glumaceum* is a pretty plant, with pink flowers and white calyx, occasionally cultivated in garden rockeries.

**Acanthurus**, a genus of fishes belonging to the family *scorpenidae*. The *A. chirurgus* of the West Indies is called the surgeon-fish, because it extracts blood from the hands of those who, in handling it, forget that it has a spine in its tail.

**Acanthus**, the name of three ancient cities: (1) in Egypt, (2) in Caria, and (3) in Macedonia. The latter city is noted for the construction, across the neck of the peninsula of Mount Athos, of the great canal through which sailed the fleet of Xerxes on its way to Greece. Later, when a tributary city of Athens, it revolted and joined the Spartans, who were at war with the Athenians. It is further noted as the city where the Acanthus coins were made as early as the 5th century B. C. These coins show the early efforts of barbarous tribes to use the



COIN OF ACANTHUS.

produce of their silver mines. At a later period the representations on some of these coins were of the highest artistic merit.

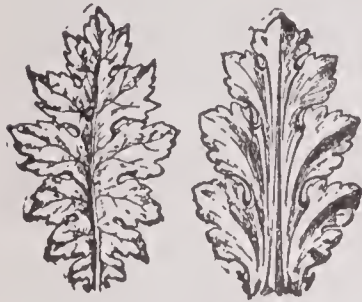
**Acanthus**, a genus of plants, the typical one of the order *acanthaceæ*, or acanthads.



## Acapulco

In English it is inelegantly termed bear's beech, or, more euphoniously, brank ursine. There are several species. Most have a single herbaceous stalk of some height, thick, great, pinnatifid leaves, and the flowers in terminal spikes.

In architecture, it is the imitation, in the capitals of the Corinthian and Composite orders, of the leaves of a species of acanthus, the *A. spinosus*, which is found in Greece. The acanthus first copied is supposed to have been growing around a flower pot; and the merit of adopting the suggestion thus



ACANTHUS.

afforded for the ornamentation of the capital of a pillar is attributed to Callimachus. Another species, the *A. mollis*, grows in Italy, Spain, and the South of France. Both are cultivated in Great Britain.

**Acapulco** (ak-a-pöl'kō), a seaport in Mexico on the Pacific Ocean; has a large and nearly land-locked harbor, but the climate is unwholesome. It exports to San Francisco hides, cedar timber and fruit. Nearly the whole city was destroyed by earthquakes in 1799, in 1837, and again in 1852. Population, 12,320.

**Acarides**, or **Acarina**, the second order of the trachearian subclass of spiders. It is also called monomerosomata. It contains the families *Linguatulidæ*, *Simoneidæ*, *Macrobiotidæ*, *Acaridæ*, *Ixodidæ*, *Hydrachnidæ*, *Oribatidæ*, *Bdellidæ* and *Trombidiidæ*. The young of most species have at first birth six legs, to which another pair is added on their first molting.

**Acarnania**, or **Akarnania**, a province of ancient Greece, forming the westernmost portion; named, according to tradition, from Acarnan, son of Alamæon, who settled the region. At the beginning of the Peloponnesian war the inhabitants were rude and piratical, and they always remained behind the other Greeks in civilization. They were good slingers and faithful and courageous soldiers. Under the Romans it was a province of Macedonia. It is now, with Ætolia, a province of the Grecian kingdom. Pop. (1896) 170,565; capital Missolonghi.

**Acarus**, the mite; a genus of insects of the tribe *acaridæ*, order *arachnida*. They are oviparous, have eight legs, two eyes, and two jointed tentacula, and are very prolific. All the species are extremely minute, or even microscopic, as the cheese-mite (*acarus domesticus*), and many of them parasitic; of the latter, the itch-insect (*sarcoptes scabiei*) is a remarkable example. It is a microscopic animal, found under the

## Acceleration

human skin, in the pustules of a well-known cutaneous disease. Many others infect the skin of different animals, and sometimes in considerable numbers. They are found attached to the creature upon which they live by means of a curiously constructed mouth that is so firmly implanted into the skin as to make it difficult to remove the acarus without tearing off its head, except with the assistance of a knife. It consists of four lancet blades, each furnished with sharp teeth, so arranged that, while the instrument freely pierces the skin, to draw it back again by force is out of the question; and, although the acarus can probably detach it by its own efforts, it is useless to employ foreign violence for that purpose. In the center, between these barbed lancets, is the passage to the stomach of the parasite. The mites are active insects, and possess great powers of life, resisting, for a time, the application of boiling water, and living long in alcohol.

**Acastus**, son of Pelias, King of Thessaly; married Astydamia or Hippolyte, who fell in love with Peleus, son of Æacus, when in banishment at her husband's court. Peleus, rejecting the addresses of Hippolyte, was accused before Acastus of attempts upon her virtue, and soon after, at a chase, exposed to wild beasts. Vulcan, by order of Jupiter, delivered Peleus, who returned to Thessaly, and put to death Acastus and his wife.

**Acca Laurentia**, the wife of Faustulus the shepherd, and the nurse of Remus and Romulus. Some say she was a courtesan, and have called her Lupa. The Romans made her a goddess, and devoted a holiday to her service.

**Accad**, one of the four cities which are said to have been the beginning of Nimrod's kingdom. (Gen. x: 10.) It is supposed that the ruins called Akkerkoof, in Sittacene, pertain to the ancient Accad. They are situated about 9 miles W. of the Tigris, at the point where it makes its nearest approach to the Euphrates.

**Accademia della Crusca**, an Italian institution, founded at Florence by Grazzini in 1582, with the object of purifying or sifting the Italian language. It published, in 1613, the first edition of a dictionary which established the Tuscan dialect as the standard of the Italian language. It was incorporated with the Florentine academy, but was revived again early in the 19th century.

**Acceleration**, in natural philosophy, the rate of increase of velocity of a moving body in a unit of time. If the acceleration is uniform, as in the case of a body falling or ascending under the action of gravity, the velocity is proportional to the time, and the space moved through varies as the square



of the time. The acceleration of gravity is the increasing rate of motion with which a falling body approaches the earth, and is reckoned as a little more than 32 feet a second. Minus, or negative, acceleration is the corresponding loss of motion. In astronomy, the secular acceleration of the moon's mean motion is an increase of about 11 seconds per century in the rapidity of the moon's mean motion. It was discovered by Halley and explained by Laplace. Acceleration of the fixed stars is the measure of time by which a fixed star daily gains on the sun on passing the meridian. A star passes the meridian 3 minutes 55.9 seconds earlier each day; not that the star's motion is really accelerated; it is that the sun's progress is retarded, as, in addition to his apparent diurnal motion through the heavens, he is also making way to the E. at the rate of 59 minutes 8.2 seconds a day.

**Accent**, that stress or emphasis given by the voice to a certain syllable or syllables of a word, or to certain notes in a bar of music; also, the peculiar intonation of one spoken language when compared with another. The term further denotes marks used in printing or writing to show the position of the stress. In a dissyllable there is but one accent, as a-back', but in a polysyllable there are more than one. In transubstantiation there are properly three — tran'-sub-stan'-ti-a'-tion. One of these, however — that on the fifth syllable, the *a* just before the *tion* — is greater than the rest, and is called the primary accent; the others are called secondary. There is a certain analogy between accent and emphasis, emphasis doing for whole words or clauses of sentences what accent does for single syllables. By a change of stress we often indicate the change of an adjective or a noun into a verb, as fre'quent (adj.), frequent' (verb); pro'ject (noun), project' (verb). In ancient Greek, accents marked the rise and fall in pitch of the voice, and were three in number, the acute (á), the grave (à), and the circumflex (ã or â). The same marks are now used in French, though they have mostly only historical or etymological interest, and do not indicate a difference in pronunciation. A mark similar to the acute accent is sometimes used to signify stress in English words, chiefly in poetry, and one like the grave is used to mark as a separate syllable letters otherwise not pronounced so, *e. g.*, learnèd, abhorrèd. Marks sometimes called accents are used in mathematics, *e. g.*,  $a' + b'$  (read *a* prime plus *b* prime). Accent in music is the greater intensity given to certain notes, as distinguished from their length in time and their quality or *timbre*. In geometry and trigonometry a circle at the right of a figure indicates degrees, one mark, minutes, two marks seconds of a degree, as  $13^{\circ} 4' 5''$ . In

mensuration and engineering, the mark denotes feet, inches and lines, as  $4' 6'' 10'''$ .

**Acceptance**, a bill of exchange drawn on one who agrees absolutely or conditionally to pay it, according to the tenor of the document itself. To render it so valid that, if the drawee fail to liquidate it, the drawer may be charged with costs, the promise of the drawer must be in writing under or upon the back of the bill.

**Accessory**, in law, one who is not the chief actor in an offense nor present at its commission, but still is connected with it in some other way. Accessories may become so before the fact or after the fact. Sir Matthew Hale defines an accessory before the fact as one who, being absent at the time of the crime committed, does yet procure, counsel, or command another to commit a crime. If the procurer be present when the evil deed is being done, he is not an accessory, but a principal. An accessory after the fact is one who, knowing a felony to have been committed, receives, relieves, comforts and assists the felon. In high treason of a pronounced character there are no accessories — all are principals. In petit treason, murder, and felonies, there may be accessories; except only in those offenses which, by judgment of law, are sudden and unpremeditated, as manslaughter and the like, which, therefore, cannot have any accessories before the fact. So, too, in petit larceny, and in all crimes under the degree of felony, there are no accessories either before or after the fact; but all persons concerned therein, if guilty at all, are principals. (Blackstone's "Commentaries," book iv, chap. iii.)

**Acciaoli, Renatus** (atch-yī-ō'lē), a Florentine, who conquered Athens, Corinth, and part of Bœotia. Lived in the beginning of the 15th century. He bequeathed Athens to the Venetians; Corinth to Theodosius Paleologus, who married his eldest daughter; and Bœotia, with Thebes, to his natural son Anthony, who also got Athens; but this was retaken in 1455 by Mohammed II.

**Accident**, an unforeseen occurrence, particularly if it be of a calamitous character. This is the most common use of the word.

In logic: (a) Whatever does not really constitute an essential part of a person or thing; as the clothes one wears, the saddle on a horse, etc. (b) The qualities or attributes of a person or thing, as opposed to the substance. Thus bitterness, hardness, etc., are attributes, and not part of the substance in which they inhere. (c) That which may be absent from anything, leaving its essence still unimpaired. Thus a rose might be white without its ceasing to be a rose, because color in the flowers of that genus is not essential to their character.

Accidents, in logic, are of two kinds



separable and inseparable. If walking be the accident of a particular man, it is a separable one, for he would not cease to be that man though he stood still; while, on the contrary, if Spaniard is the accident connected with him, it is an inseparable one, since he never can cease to be, ethnologically considered, what he was born. (Whately's "Logic," book ii, chap. v, § 4.)

In grammar, a property attached to a word which nevertheless does not enter into its essential definition. Each species of word has its accidents: thus those of the noun substantive are gender, declension, and number. Comparison in an adjective is also an accident.

In heraldry, an additional note or mark on a coat of armor, which may be omitted or retained without altering its essential character.

In medicine, a symptom of a disease.

**Accipiter**, a genus of raptorial birds belonging to the family *falconidæ*. It is from this genus that the whole order is frequently called accipiters. Formerly the genus accipiter contained, as among the ancient Romans, both the sparrow-hawk and the goshawk, but now only the former is retained in it, the goshawk receiving the name of *Astur palumbarius*. The word is also applied to a bandage applied over the nose; so called from its likeness to the claw of a hawk.

**Accipitrinæ**, sparrow hawks, a family of raptorial birds. Type, accipiter.

**Accius** or **Attius**, **Lucius**, a Latin tragic poet, born about 170 B. C. He took most of his themes from Grecian history and mythology, but in some instances he dramatized scenes from the history of Rome—for example, in his tragedy of "Brutus;" but only fragments of his works remain.

**Acclimatization**, the process of accustoming plants or animals to live and propagate in a climate different from that to which they are indigenous. The word acclimation has been used to signify the change which an organism undergoes on being subjected to a new climate, and acclimatation to signify the process through which the change is produced. Acclimatization is an acclimation so conducted as to adapt the organism permanently to its new home. These words have been found fault with on the ground that the influences to which an organism is subjected from change of locality are not wholly due to climate. But besides the influences which are wholly due to climate, there are others which are indirectly affected by it, such as food, and as climate may fairly be taken as representative of local influences, no great inaccuracy can result from using it in this sense. The word naturalization has been suggested instead of acclimatization, but it is more properly applied to the case of ani-

mals or plants taking readily to a new country with a climate and other circumstances similar to what they have left. European animals, such as horses and cattle, have been naturalized without difficulty in America, and the rat, rabbit, and pig, with several kinds of English birds, in various places, without any evidence of acclimatization. Similar instances occur among plants, as with thistles in New Zealand. Cultivated plants, on the other hand, are said to be acclimatized when they can be propagated without artificial protection, although they will not propagate themselves, and even if they are sown wild they will not spread in the country to which they have been introduced.

The possibility of acclimatization has been denied by some authorities, but this seems an extreme position, and can hardly be maintained except by denying to a large extent the need of acclimatization, on the hypothesis, that is to say, that as some plants and animals are much more widely spread than others, they have had originally a wider adaptation which the others are incapable of acquiring. To the extent that climatic influences develop qualities in plants and animals which cannot be maintained without these influences, this hypothesis may be true. The general character of the plants of the tropics, for example, differs widely from that of the plants of the temperate regions, and these again differ as widely from those of the polar regions, and no amount of acclimatization would transfer the distinctive characters of the vegetation of one of these regions to any of the others.

This principle implies a limit to the power of acclimatization which requires to be borne in mind and applied in cases of attempted acclimatization, otherwise much labor may be thrown away. The clothing of certain animals and the qualities of certain plants depend upon climate, and when it is attempted to transfer such animals or plants they at once begin to undergo modifications. The special qualities on which they were valued become feebler from the first, and gradually cease to distinguish them to an appreciable extent. If acclimatization is attempted for the sake of such qualities, the partial and temporary effect is all the gain that can be counted on from the mere naturalization of the foreign species. Continued attention and cultivation may, indeed, do something more toward retaining the exotic qualities, but in this case acclimatization cannot be considered as complete, and continued labor must be counted on as one of the conditions of success. If by acclimatization, however, we understand merely the successful introduction of a new race into a climate where it has not before been propagated, with such modifications of qualities as conduces to the success of its propaga-



tion, there seems no reason to doubt either the possibility of the process or the benefits which may be derived from well-directed efforts to promote it. The migrations of the human race afford the first instance of successful acclimatization. If we regard the whole of mankind as one family we find that by extensive modifications they have been enabled to extend over the whole world, living in regions the most opposed in respect to climatic influences. If we do not regard mankind as a single race there are historical instances of migrations less extensive, yet sufficient to prove both climatic influence and the power of adaptation to it. The Jews, who have preserved their purity of race with scrupulous care, may be taken as an example.

If any annals had been kept of the diffusion of plants and animals, even within historical times, many illustrations would no doubt have been afforded both of the natural mode and duration of the process and of the effects of acclimatization. But the records of this kind are comparatively few. Next to man domestic animals, such as the horse, the ox, the dog, the sheep, and the various species of poultry, afford the best illustrations of adaptation. The grain which is cultivated in almost every country is indigenous to very few, and the vine, the olive, and other fruit trees have, within historical times, been introduced into Europe from the East. In times which are comparatively recent the cultivation of the silk-worm has traveled from China to France.

The systematic study of acclimatization has only been entered upon in very recent times, and the little progress that has been made in it has been more in the direction of formulating anticipative, if not arbitrary hypotheses, than of actual discovery of the silent course of nature. The attention of experimenters has been directed, first, to the modifying effects of climate on individuals.

The theory of Herbert Spencer is that every organ and function of a living animal undergoes modification under new conditions, generally in the direction of adaptation to those conditions. But the observed modifying effects of climate on individuals in the direction of acclimatization are so slight that it is on this ground some observers have denied the existence of any such thing at all. If, however, there is any truth in the observations on which the possibility of acclimatization rest, there must be such effects, however slight. If the first individuals submitted to the effects of a hostile climate sustained no modification adapting them to it, it cannot be supposed that such an effect would be produced in the mere act of generation, and consequently the second race would be no better adapted to stand the climate, and would have no

more tendency to receive adaptive modifications than the first. Plants, which are commonly much more limited in their natural range than the higher animals, are also in some respects more amenable to acclimatization. By means of propagation by cuttings, etc., the life of the individual can be indefinitely prolonged, and Mr. Darwin believes that indications of adaptation to climate can be established in the case of plants propagated in this way. In regions where the same species of plants or animals are widely diffused, varieties, often seemingly arbitrary, are found to distinguish particular localities, and though the nature of the variation may seem to have no connection with soil or climate, each variety is usually found best adapted to its own situation. The existence of a power of adaptation would seem by such facts to be established, but whether as generally as is assumed by Mr. Spencer is altogether another question.

Assuming a positive modifying influence of climate and the accompanying circumstances of change of situation, there is an indirect way in which, when acclimatization is attempted on a large scale, climatic influences coöperate to promote it, namely, by killing off the individuals, whether of the original stock or the succeeding generations, least adapted by constitution to undergo the necessary adaptation. This is the principle of natural selection. The natural process of adaptation is, however, so slow and uncertain—that is to say, when it is applied arbitrarily, when the place from which the organisms to be acclimatized are to come and the place where they are to go are selected by human agents for their own ends—that various means have been tried to facilitate the process. The object of these means is, of course, to utilize all the agents which nature employs to the full extent of their capability, instead of leaving their utilization or non-utilization to the control of fortuitous circumstances.

The two most important means hitherto employed for facilitating acclimatization are the selection of favorable varieties and the interposition of intermediate acclimatization.

The selection of varieties is the means by which breeding or propagating is made subservient to acclimatization. The theory upon which the selection rests is that the offspring of two parents bear a general resemblance to their parents, with certain specific or individual differences, which differences, in their turn, as well as the general resemblance, are capable of being transmitted by generation. The breeder or propagator has no control over the differences thus naturally produced in generation. They may or may not be in the direction he wishes. But out of a given number of individual varieties which have a natural



tendency to diverge in all directions some will be more suitable for a specific purpose than others, or even than the parent which is held to occupy the central position. By selecting, then, the most favorable varieties for breeding, a succeeding race will be got having the desired qualities in a higher measure than their ancestors, and these again, it is said, will form the center of a new series, some of which will extend still further in the direction of the qualities it is desired to cultivate, and which may thus be further improved by each successive selection. Some naturalists hold the possibilities of the extension of breeding in this way in a given direction, that is, of the development in a successive series of organisms of particular qualities or organs in preferences to others, to be indefinitely great, or even absolutely unlimited; others hold them to be strictly limited by species. The numerous varieties which many species of plants and animals present are sufficient in any view to afford considerable scope for adaptation to climate, to which accordingly they may be made by judicious selection to contribute. See DARWINIAN THEORY.

**Accolade**, in heraldry, the ceremony by which in mediæval times one was dubbed a knight. On the question what this was, antiquaries are not agreed. It has been made an embrace round the neck, a kiss, or a slight blow upon the cheek or shoulder. In conferring knighthood, Queen Victoria struck the kneeling subject lightly on the shoulder with a sword and used the words "I bid thee rise, Sir Knight."

**Accolti, Bernardo** (äk-köl'tē), an Italian poet (1465-1535). Greatly admired by his contemporaries, especially for his brilliant gift as an improviser, he was styled "The Only (one) of Arezzo" (L'Unico Aretino). Leo X. esteemed him highly, and made him apostolic secretary, cardinal, and papal legate at Ancona. He drew up the papal bull against Luther (1520).

**Accommodation**, the process by which the mind is brought into adjustment with its surroundings; adaptation.

In physiology, the accommodation of the eye is that function of the eye by which objects, whether near or distant, may be seen distinctly. It is accomplished by the relaxing or contracting of the ciliary muscle.

In biology, the process by which an organism becomes adapted to its environment, or to the conditions by which it is surrounded.

In commerce, it usually denotes temporary financial assistance rendered by one merchant or bank to another.

**Accordion**, a well-known keyed instrument with metallic reeds. The sounds are produced by the vibration of the several metallic tongues, which are of different sizes,

air being meanwhile supplied by the movement of the opposite sides of the instrument, so as to constitute a bellows. The accordion was introduced into America from Germany about 1828. Improvements have been made on it in the flutina, the organ-accordion, and the concertina.

**Account**, in banking, commerce, law, and ordinary language, a registry of pecuniary transactions; such a record as is kept by merchants, by housewives, and by all prudent people, with the view of, day by day, ascertaining their financial position. A bill or paper sent in by tradespeople to those who do not pay for goods on delivery. In it is entered the name of the debtor, each item of his debt, and the sum of the whole.

To open an account is to begin pecuniary transactions with, so that one's name is entered for the first time in the books of the banker or merchant.

An open account, or an account current, is, commercially, one in which the balance has not been struck; in banking, it is one which may be added to or drawn upon at any time, as opposed to a deposit account, where notice is required for withdrawals. To keep an open account is to keep an account of the kind now stated running on, instead of closing it. A stated account is one which all parties have, either expressly or by implication, admitted to be correct.

**Accumulator, Electrical.** See ELECTRICAL ACCUMULATOR.

**Aceldama**, a field purchased by the Jewish chief priests and elders with the 30 pieces of silver returned by Judas. It was used as a place of interment for strangers. The traditionary site is on a small plateau half way up the southern slope of the valley of Hinnom, near the junction of the latter with the valley of Jehoshaphat. (See Matt. xxvii: 3-10; Acts i: 18, 19.)

**Acephala**, or **Acephalans**, the fourth class of Cuvier's great division or sub-kingdom of the animal creation, called mollusca. He included under it two orders—the *testacea*, or acephalans, with shells, generally bivalve, and the *nuda*, or naked acephalans, without shells. The class was a natural one, but the name was objectionable, inasmuch as the mollusks of the class brachiopoda are also without apparent heads. Hence, new names have been found for the acephala, viz., *conchifera* and *lamelli-branchia*.

**Acephali**, in civil history, certain levelers, in the reign of Henry I. of England, who acknowledged no head or emperor.

In Church history (a) the name applied to those who, on occasion of a dispute which arose in the Council of Ephesus, A. D. 431, refused to follow either John of Antioch or Cyril of Alexandria. (b) The name applied, in the 5th and 6th centuries, to a



large section of the followers of the Monophysite, Peter Mongus, who cast him off as their leader because of his accepting a peaceful formula, called the Henoticon. They soon afterward split into three parties, the Anthropomorphites, the Barsanuphites, and the Essianists, who again gave origin to other sects. (c) Bishops exempt from the jurisdiction and discipline of a patriarch.

**Acer**, a genus of arborescent or shrubby plants, order *acerineæ*, many of which are extremely valuable for the sake either of their timber, or of their ornamental appearance. The *acer rubrum*, or red maple, is a tree 50 feet in height, very common in low woods throughout the Atlantic States. Its trunk is covered with smooth bark, marked with large white spots, becoming dark with age. In spring its appearance is remarkable for the deep crimson flowers with which it is thickly clothed. The wood, particularly that of the variety called curled maple, is much used in cabinet work. The *acer saccharinum*, or sugar tree, is a tree 70 feet in height, 3 feet in diameter, found throughout the United States, and constituting the greater part of some of the forests of New England. The wood is hard and has a satin lustre, but it is readily attacked by insects, and is not of much value, except when its grain is accidentally waved, and then it is in request for the cabinet-makers. The branches become numerous and finely ramified in open situations, and in summer are clothed with a foliage of uncommon luxuriance and beauty. The flowers are very abundant, and, suspended on long, thread-like pedicels, are most delicately beautiful. The saccharine matter contained in its ascending sap, obtained by tapping the trunk in the spring, is perhaps the most delicious of all sweets; an ordinary tree yields from 5 to 10 pounds in a season. The *acer Pennsylvanicum*, or whistle-wood, is a small tree or shrub, 10 to 15 feet high, very common in the northern woods of the United States; prized in Europe in ornamental gardening. The bark is smooth, and beautifully striped lengthwise with green and black. Flowers large, yellowish-green, succeeded by long clusters of fruit, with pale-green wings.

**Aceraceæ, Acerineæ** (De Candolle), or **Acera** (Jussieu), a natural order of polypetalous exogenous plants, consisting of trees with simple leaves; flowers with eight stamens; a samaroid, two-celled fruit, and the inflorescence in axillary corymbs or racemes. In 1845 Lindley estimated the known species at 60. They are spread over the temperate parts of the northern hemisphere.

**Acestes**, or **Ægestus**, son of Criniseus and Ægesta, and king of the country near Drepanum, in Sicily. He assisted Priam in

the Trojan war, entertained Æneas during his voyage, and helped him to bury his father on Mount Eryx. In commemoration of this, Æneas built a city there, and called it Acesta.

**Acetic Acid**, the acid which imparts sourness to vinegar, vinegar being simply acetic acid diluted, tinged with color, and slightly mingled with other impurities. The formula of acetic acid is

$$\text{C}_2\text{H}_3\text{O}(\text{OH}), \text{ or } \begin{array}{c} \text{CH}_3 \\ | \\ \text{H} \cdot \text{O} \cdot \text{CO} \end{array} \left. \vphantom{\begin{array}{c} \text{CH}_3 \\ | \\ \text{H} \cdot \text{O} \cdot \text{CO} \end{array}} \right\}, \text{ or } \begin{array}{c} \text{C}_2\text{H}_3\text{O} \\ | \\ \text{H} \end{array} \left. \vphantom{\begin{array}{c} \text{C}_2\text{H}_3\text{O} \\ | \\ \text{H} \end{array}} \right\} \text{O}$$
  
 = methyl-formic acid. It is formed by the acetous fermentation of alcohol. Acetic acid is a monatomic monobasic acid. Its salts are called acetates. A molecule of acetic acid can also unite with normal acetates like water of crystallization. Its principal salts are those of potassium, sodium, and ammonium, a solution of which is called spiritus mindereri. The acetates of barium and calcium are very soluble. Aluminum acetate is used in dyeing. Lead acetate is called sugar of lead, from its sweet taste. It dissolves in  $1\frac{1}{2}$  parts of cold water; it also dissolves oxide of lead, forming a basic acetate of lead. Basic cupric acetate is called verdigris. Acetic acid below  $15.5^\circ$  forms colorless transparent crystals (glacial acetic acid), which melt into a thin, colorless, pungent, strongly acid liquid, soluble in alcohol, ether, and water. It boils at  $118^\circ$ . Its vapor is inflammable.

Pyroligneous acid is impure acetic acid, formed by the destructive distillation, at red heat, of dry hard wood, as oak and beech.

**Acetic Ethers** [example, ethyl acetate,



are formed by replacing the typical H in acetic acid by a radical of an alcohol, as ethyl, etc. Ethyl acetate is a fragrant liquid, sp. gr. 0.890, boils at  $74^\circ$ ; methyl acetate boils at  $56^\circ$ .

**Acetones, or Ketones**, are the aldehydes of secondary alcohols (see ALCOHOL). Thus secondary propyl alcohol, when oxidized, loses two atoms of hydrogen, and gives dimethyl ketone, ordinarily known as acetone.

Secondary Propyl Alcohol. Acetone.  
 $\text{CH}_3 - \text{CHOH} - \text{CH}_2 - \text{H}_2 = \text{CH}_3 - \text{CO} - \text{CH}_3.$

A series of such acetones is known, of which acetone is typical. It may be prepared by distilling acetate of calcium. It is a limpid liquid, having a taste like that of peppermint, and is readily soluble in alcohol, ether and water. Its sp. gr. is about .79, its boiling point being  $130^\circ \text{ F. } (56^\circ \text{ C.})$ . It has recently been used in America for the manufacture of chloroform, which is obtained from it by distillation with bleaching-powder. It is a solvent for gums and resins, as well as for gun-cotton.



## Acetylene

**Acetylene**, a hydrocarbon having the formula  $C_2H_2$ , also called ethine. The carbon atoms are united to each other by three bonds. It is produced by passing an electric current between carbon poles in an atmosphere of hydrogen, and also by the incomplete combustion of hydrocarbons. It is a colorless gas, specific gravity, 0.92, has a peculiar odor, and burns with a bright flame; it forms a red precipitate with ammoniacal cuprous chloride, which, by the action of nascent hydrogen, is converted into ethylene,  $C_2H_4$ .

**Acetylene Gas**, an illuminating gas formed by the action of water on CALCIUM CARBIDE (q. v.). This gas has come into general favor with cyclists for its brilliancy, safety and the persistence of its flame in all circumstances. Recent experiments made to produce cheaper calcium carbide, by a new process, resulted in demonstrating that it can be produced at a cost of from half a cent to three cents a pound, or one-fifth its original cost. This will bring acetylene gas within the reach of every one, and it will probably eventually supersede other gas and electric lights. One kilogram of calcium carbide produces about 300 litres of acetylene gas. Acetylene takes fire at  $480^\circ$  Cent.; at  $700^\circ$  it decomposes into carbonic acid and hydrogen. It explodes when it is mixed with from 35 to 97 per cent. of atmospheric air. In liquid form it is almost as dangerous as dynamite, and in many countries its transportation is forbidden. With copper, it forms explosive combinations. For use in motors, a mixture of 10 volumes of acetylene and 12 volumes of atmospheric air is most advantageous.

**Acetylene Lamp**, a lamp designed for utilizing acetylene as an illuminant. Acetylene lamps have come into general use among cyclists. In some of the lamps, cartridges filled with calcium carbide are used, and the dropping of the water into the cartridge is regulated by an adjustable valve. The acetylene flame is very brilliant, and much more difficult to extinguish by force of wind, or shock, than an oil flame. These properties render it very valuable as a bicycle illuminant.

**Achæa** (ak-ā'a, or ak-ī'a), a surname of Pallas, whose temple in Dauma was defended by dogs who fawned upon the Greeks, but fiercely attacked all other persons. A name applied to Ceres, and derived from *achos*, a word expressive of her grief for the loss of her daughter, Proserpine.

**Achæa**, a Greek province. See ACHAIA.

**Achæans**, a generic term employed by Homer to designate the whole Hellenic host before Troy, from their mythological ancestor, Achæus, grandson of Helen.

**Achæi** (ak-ā-ē, or ak-ī-ē), the descendants of Achæus, the son of Xuthus, and

## Achard

grandson of Helen. Achæus, having committed manslaughter, was compelled to take refuge in Laconia, where he died, and where his posterity remained under the name of Achæi, until they were expelled by the Heraclidæ. Upon this, they passed into the northern parts of Peloponnesus, and, under the command of Tisamenus, the son of Orestes, took possession of the country of the Ionians, and called it Achaia. The successors of Tisamenus ruled until the time of Gyges' tyranny, when Achaia was parceled into 12 small republics. Three of these — Patræ, Dymæ, and Pharæ — became famous as a confederacy, 284 years B. C., which continued formidable upward of 130 years, under the name of the Achæan League, and was most illustrious whilst supported by the splendid virtues and abilities of Aratus and Philopœmen. They directed their arms for three years against the Ætolians, and rose to be powerful by the accession of neighboring states, and freed their country from foreign slavery. At last, however, they were attacked by the Romans, and, after one year's hostilities, the Achæan League was totally destroyed, B. C. 147. From this period the Peloponnesus was reduced to the condition of a Roman province, bearing the name of Achaia. The name of Achæi is generally applied to all the Greeks indiscriminately by the poets.

**Achaia**, a small Greek district lying along the N. coast of the Peloponnesus. Achaia forms, along with Elis, a department in the modern kingdom, and its chief town is Patras. As the Achaians (Achæans) were the ruling people of the Peloponnesus in heroic times, Homer speaks of the Greeks generally as Achaioi. Their 12 little towns formed a confederacy, renewed in 281 B. C., and subsequently extended, under the name of the Achæan League, throughout Greece, until 146 B. C., when Greek liberty fell under the power of Rome.

**Achard, Franz Karl** (äch'art), a German chemist, born in Berlin in 1754. He devoted himself to the development of the beet-sugar manufacture, and, after six years of laborious endeavor, he discovered the true method of separating the sugar from the plant. He was appointed director of the class of physics in the Academy of Science, in Berlin, and died in 1821.

**Achard, Louis Amedee** (ä-shär'), a French novelist and publicist, born in 1814. Originally a merchant, he became a contributor to several papers in Paris in 1838. After the revolution of 1848 he was for a time active as a political writer in support of the royalist cause. From 1848 to 1872 the "Revue des Deux Mondes" brought out a new story from his pen almost every year. He depicts pre-eminently conflicts in family life and society. "Parisian Letters" (1838, under the pseudonym "Grimm") made his repu-



tation; his other works are "Belle Rose" (1847); "The Royal Chase" (1849-1850); "Castles in Spain" (1854), a collection of stories; "The Shirt of Nessus" (1855), etc. He died in 1875.

**Acharnæ**, a large town of Attica, where the Tyrans encamped when they marched against Trasybulus, and where the Lacedæmonians, under their king, Arehidamus, pitched their tents when they made an irruption into Attica at the beginning of the Peloponnesian war. Aristophanes, in the comedy which takes its title from this town, represents the inhabitants as charcoal-makers; and other comic writers stigmatize them as rough and boorish.

**Achates**, a friend of Æneas, whose fidelity was so exemplary that *fidus Achates* (the faithful Achates) became a proverb.

**Acheen**. See ATCHEEN.

**Achelous** (ak-el-ō'us or ak-el-ös'), the son of Oceanus and Terra, or Tethys, god of the river of the same name in Epirus. As one of the numerous suitors of Dejanira, daughter of Æneus, Achelous entered the lists against Hercules, and, being inferior, changed himself into a serpent, and afterward into an ox. Hercules broke off one of his horns, and Achelous, being defeated, retired into his bed of water. The broken horn was given to the goddess of plenty.

**Achenwoll, Gottfried**, a German scholar, born in Elbing, Prussia, Oct. 20, 1719; became professor at the University of Göttingen, first of philosophy and afterward of law; is regarded as the founder of the science of statistics. He died in Göttingen, May 1, 1772.

**Acheron**, the river of sorrow, which flowed round the infernal realms of Hades, according to the mythology of the ancients. There was a river of Thesprotia, in Epirus, of the same name, and also one in Italy, near which Alexander, king of the Molossi, was slain; both of which, from the unwholesome and foul nature of their waters, were supposed to communicate with the infernal stream.

**Acherusia**, a lake of Campania, near Capua. Diodorus mentions that, in Egypt, the bodies of the dead were conveyed over a lake called Acherusia, and received sentence according to the actions of their lives. The boat which carried them was called Baris, and the ferryman Charon. Hence arose the fable of Charon and the Styx, etc.

**Achillea** (ak-il-ē'a), a genus of plants belonging to the order *asteraceæ*. The achillea millefolium, commonly called the yarrow, or milfoil, is common in fields in the northern states. Its white or rose-colored flowers adorn many of our meadows, particularly those with siliceous soils, from June to September. From these flowers, which are oc-

asionally substituted for hops in brewing, an essential oil is obtained, and an infusion of the leaves and flowering heads is said to be a valuable stomachic. The pretty garden plant known as white bachelor's button is a cultivated variety of a species of achillea. The generic name is derived from Achilles, who is said to have discovered the medicinal properties of the milfoil while studying botany under Chiron, the fabulous centaur.

**Achilles** (ak-il'ēz), son of Peleus, king of the Myrmidons, in Thessaly, and of Thetis, daughter of Nereus. Fate had decreed that, if he fell before Troy, he should gain everlasting renown; if he returned home, he should enjoy a long, but inglorious, life. He chose the former alternative, and joined the Grecian army, in which he was pre-eminent in valor, strength, swiftness and beauty.

During the first nine years of the war we have no minute detail of his actions; in the tenth, a quarrel broke out between him and the general-in-chief, Agamemnon, which led him to withdraw entirely from the contest. In consequence, the Trojans, who before scarcely ventured without their walls, now waged battle in the plain with various issue, till they reduced the



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Greeks to extreme distress. The Greek council of war now sent its most influential members to soothe the anger of Achilles, and to induce him to return to arms, but without effect. Rage and grief, caused by the death of his friend Patroclus, slain by Hector, induced Achilles to return to battle. Thetis procured from Hephestus a fresh suit of armor for her son, who, at the close of a day of slaughter, killed Hector, and dragged him at his chariot wheels to the camp. Here ends the history of Achilles, so far as it is derived from Homer. By later authors, a variety of fable is mixed up with this simple narrative. Thetis is said to have dipped him, while an infant, in the Styx, which rendered him invulnerable except in the heel by which she held him, and he was killed at last by a wound in the heel.

**Achilles Tattus** (a-kil'ēz tā'shi-us), a Greek writer of romances; born at Alexandria; flourished in the 5th century of our era. He wrote "The Loves of Clitophon and Leucippe," an erotic story in florid



style, and without much regard to unity or consistency of plot. That the story was very popular in its day is proved by the number of copies of it that are still in MSS. An English translation by Anthony Hodges was published in 1638.

**Achillis Tendo**, a tendon, so called because, as fable reports, Thetis, the mother of Achilles, held him by that part when she dipped him in the river Styx to make him invulnerable. It is the strong and powerful tendon of the heel, which is formed by the junction of divers muscles, and which extends from the calf to the heel. When this tendon is unfortunately cut or ruptured, as it may be in consequence of a violent exertion or spasm of the muscles of which it is a continuation, the use of the leg is immediately lost; and, unless the part be afterward successfully united, the patient will remain a cripple for life. The indications are to bring the ends of the divided parts together, and to keep them so until they have become firmly united.

**Achmet I.** (äch'met), Emperor of the Turks, who succeeded his father, Mahomet III., in 1603. He was then only 15, and began his reign by endeavoring to suppress a rebellion, which lasted two years. He next engaged in a war with the Germans, in which he was assisted by the famous Bethlem Gabor. Peace was concluded in 1606, but he continued to be disturbed by insurrections, and the security of his throne was threatened by a pretender to his rightful inheritance. He indulged in sensual pleasures and in field sports; but, though proud and ambitious, was less sanguinary than his predecessors. He died in 1617.

**Achmet II.**, successor to his brother Solyman in 1691. He died in 1695.

**Achmet III.**, son of Mahomet IV.; ascended the imperial throne in 1703, on the deposition of his brother, Mustapha II. He sheltered Charles XII. of Sweden after the battle of Pultowa, and declared war against the Russians, but, soon after, concluded an advantageous peace. He likewise made war on the Venetians, and recovered from them the Morea: but in an attack on Hungary his army was defeated by Prince Eugene, in 1716, at the battle of Peterwardein. Achmet was dethroned in 1730. He died in prison in 1736.

**Achmet Pasha**, a Turkish general under Solyman the Magnificent. He compelled the Knights Hospitallers to evacuate Rhodes, after a desperate siege, in 1522. Sent to Egypt to suppress a rebellion, he assumed the insignia of royalty. His treason was promptly punished. He was stifled in a bath, and his head was sent to the Sultan.

**Achmet Tewfik Pasha**, a Turkish statesman, born in 1818, at Constantinople. His father was a Greek convert; his mother was

a Jewess. He was educated at Paris; returned to Constantinople and received a place in the bureau of translation. In 1847 he began to publish a statistical year-book concerning Turkey. He was appointed commander for the Porte, and displayed great diplomatic talent, and was sent, in 1851, as Ambassador to Persia. On his return he became a member of the State Council and of the military council. He was regarded as one of the leaders in the Turkish reform party. In 1857 he was minister of justice. In 1860 and 1861 he was Ambassador to Paris, where he won the dislike of the court on account of his earnest protest against the Assyrian expedition. In 1863 he was deposed from his new office in the ministry and devoted himself to learned studies. He translated Molière into Turkish, and wrote a geographical textbook for schools. In 1877 the Sultan appointed him President of the first Turkish Chamber of Deputies; then he became Governor-General of Adrianople, and showed himself a stern ruler in the war of 1877. In 1878 he was Premier and signed the Peace of Santo Stefano. He died in June, 1891.

**Achromatic**, in optics, colorless.

**Achromatic Telescope.**—The name given by Dr. Bevis to an improved form of the refracting telescope constructed by Dollond in 1761. When a single lens is used for the object glass of a telescope, the image of the object is fringed with color, and, hence, high magnifying powers cannot be used, unless the focal length of the lens is very considerable. Sir Isaac Newton, from experiments made on the refrangibility of light, had erroneously concluded that the size of the object glasses of refracting telescopes could not be enlarged beyond three or four inches. For this reason he turned his attention to reflected light, in which the image of the object is uncolored. Reflecting telescopes of the Gregorian form were from Newton's time generally used. In the middle of the 18th century, Dollond, a Spitalfields weaver, undertook a course of experiments with the object of ascertaining the correctness of Newton's statements. His researches were rewarded by the valuable discovery that by using two different kinds of glass, and giving to the surfaces of each lens a different curvature—the focal lengths of the two lenses being in a certain ratio—an image of the object could be obtained free from color; while, by a skillful arrangement of the radii of the surfaces of each glass, the errors arising from spherical aberration could be entirely removed. In the early telescopes made by Dollond and his son Peter, the object glass was usually a double concave lens of flint enclosed between two convex glasses of crown; but modern object glasses have only a concave lens of flint combined with a convex of crown or plate. A



century ago flint glass of a size suitable for large telescopes could not be obtained; but more recently the removal of the excise duty, and the success attained by Guinand and others in glass manufacture, has enabled English and foreign opticians to construct achromatic telescopes of considerable magnitude, with object glasses of 12, 15, and even 26 inches diameter, the area of aperture having the property of increasing in a considerable ratio the power of the telescope to penetrate into space and render visible the minutest objects. Achromatic telescopes, from their convenient size and comparative cheapness, have been, and still are, generally used by astronomers in Great Britain, Europe and America, and by their aid many modern discoveries have been made. So perfect is the image formed by a well-corrected achromatic object glass that almost any magnifying power can be applied; and thus a telescope of this form three or four feet in length is superior in its definition and surpasses in magnifying power one of the old unwieldy telescopes 100 feet long. The eyeglasses of the telescope also require to be free from color and aberration, and the correction of these defects is accomplished by an arrangement of the lenses forming the eye piece.

*Achromatic Microscope.*—In a compound microscope, an image of the object is first formed by the objective, and afterward enlarged by the lenses constituting the eyepiece. Till about the year 1830, the object-glasses of microscopes were mostly formed of single or combined lenses, the apertures of which, in order to obtain a distinct image of the object, were exceedingly small. The labors of modern opticians to adapt the achromatic principle to compound microscopes were rewarded by the construction of lenses in which the images of objects were rendered distinct in their minute details, even when high magnifying powers were applied. In a modern microscopic objective, not only is the color corrected and the image free from distortion, but, by an increase in the angle of aperture, the penetrating power of the objective is considerably increased, and less magnifying power is required from the eyepiece. With a good objective of one-eighth of an inch focus, magnifying powers ranging from 450 to 1,200 diameters can be obtained by using different eye pieces.

**Achsharumov, Nikolei Dmitriyevich** (äch-shä-rö'möf), a Russian novelist and critic, born in St. Petersburg, Dec. 15, 1819. Among his successful novels are "The Double" (1850), "The Gambler," "The False Name," "An Unusual Case," and "The Model." As a critic he attracted attention by his comments on the writings of Herbert Spencer, Tolstoi, Turgeniev, Dos-toievski, etc.

**Aci** (ä'chē), or **Aci Reale**, a seaport town in Sicily, province of Catania, well built with lava, having a castle and many fine edifices. It has manufactories of silks, linens, cutlery, and filigree work, in which an extensive trade is carried on. Here was the cave of Polyphemus and the grotto of Galatæa. It is celebrated for its mineral waters. Pop. 37,216.

**Acidimetry**, the process of determining the quantity of real acid in a sample of hydrated acid. This may be done by volumetric or by weight analysis. The former method is carried out by ascertaining the measured quantity of a standard alkaline solution required to saturate a given volume of the acid. That by weight analysis can be effected in more ways than one. A convenient one is to decompose a known weight of the acid with an excess of acid carbonate of sodium or potassium, and estimate by weight the quantity of carbonic anhydride evolved. When this is done, the quantity of real acid can, without difficulty, be ascertained.

**Acids**, in chemistry, a salt of hydrogen in which the hydrogen can be replaced by a metal, or can, with a basic metallic oxide, form a salt of that metal and water. Acid oxides of the same element are distinguished by the termination of *-ous* and *-ic*—as sulphurous and sulphuric—the latter containing the most oxygen; they are also called anhydrides. They unite with water and form acids having the same terminations. By replacement of the hydrogen by a metal they form salts distinguished by the terminations *-ite* and *-ate* respectively. These acids are called oxygen acids; formerly it was thought that all acids contained oxygen, this element being regarded as the acidifying principle (generating acid). But many acids are formed by direct union of hydrogen with an element, as hydrochloric acid (HCl), hydrosulphuric acid (H<sub>2</sub>S), or with an organic radical, as hydrocyanic acid, H(CN). Acids which are soluble in water redden blue litmus, and have a sour taste. Acids are said to be monobasic, dibasic, tribasic, etc., according as one, two, or three atoms of hydrogen can be replaced by a metal. Organic acids can be produced by the oxidation of an alcohol or aldehyde. They contain the monad radical (HO·OC), once if they are monobasic, twice if dibasic, etc. They are also classed as monatomic, diatomic, etc., according as they are derived from a monatomic or diatomic alcohol, etc. Acids derived from a diatomic alcohol can be alcohol acids or aldehyde acids. Many organic acids occur in the juices of vegetables, some in animals, as formic acid in ants.

*In Mineralogy.*—In W. Phillips' arrangement of minerals, his third class. He ar-



## Acland

ranges under it sulphuric acid and boracic acid, both of which occur native.

**Acland, Lady Christian Henrietta Caroline**, commonly called "Lady Harriet," an English woman of rank, born in 1750; daughter of the first Earl of Ilchester; went through Burgoyne's campaign, in 1777, with



LADY HARRIET ACLAND.

her husband, Maj. John Dyke Acland, during the war of the Revolution, meeting with many strange adventures, the narrative of which has been printed both in England and America. She died in 1815.

**Acland, Sir Henry Wentworth Dyke**, an English sanitarian, born in 1815. He was long an expert on cholera and the various forms of plague. From 1857 to 1894 he was Professor of Medicine at Oxford, besides serving on various sanitary bodies. He was author of "Memoirs of the Cholera," etc. He died Oct. 16, 1900.

**Acilius Glabrio**, a Roman consul, of plebeian origin, B. C. 191. Sent against Antiochus, King of Syria, he was victorious, and on his return he had a triumph. He was the first to whom a statue of gold was erected in Italy. Accused by the patricians of keeping back the public spoils, he succeeded in escaping condemnation. His "Annals of Rome," written in Greek, are full of fables. Another Acilius Glabrio, consul in the reign of Domitian, and put to death, on a charge of conspiracy, was remarkable only by his strength, having fought and killed a lion in the circus without receiving a wound.

**Acipenser** a genus of fishes in the Linnean system, the distinguishing characteristics of which are that the mouth is retractile and destitute of teeth, and the gills have only one aperture on each side. The genus *acipenser* is separated by Agassiz from the other cartilaginous fishes. It forms a link between the osseous and carti-

## Aconcagua

laginous fishes, having its gills protected by an operculum, and only a single issue, or gill-opening, on each side of the respiratory currents; but at the same time having no rays to the branchiostegal membrane, and having the whole of its true internal skeleton in a cartilaginous state. By Cuvier, therefore, the genus *acipenser* is placed in the cartilaginous division of fishes, but separated from the rays, sharks, and lampreys, which have five or more gill-openings on each side, to form, along with the genera *spatularia* and *chimæra*, the order *eleutherobranchiata*, or those which have the branchiæ free at their outer circumference. In the system of Agassiz the sturgeons are joined with the sauroid fishes, *siluri*, *polypterus*, and some other genera, to form the order *ganoides*.

**Acis** (ās'ēs), a shepherd of Sicily, with whom Galatæa fell in love; upon which his rival, Polyphemus, through jealousy, crushed him to death with the fragment of a rock. The gods changed Acis into a stream, which rises from Mount Ætna, and which is now called Jaci. He was the son of Faunus and the nymph Simæthis. This fable forms the subject of a beautiful modern opera.

**Acne**, a genus of skin diseases containing those characterized by pustules, which, after suppurating imperfectly, become small, hard, red, circumscribed tubercles on the skin, resolving themselves but slowly. Among the leading species of the genus are (1) the *A. simplex*, consisting of small *vari*, which break out on the face, the shoulders, and the upper part of the back; (2) *A. follicularis*, or maggot-pimple; (3) the *A. indurata*, or stone-pock; and (4) the *A. resaccæ*, or carbuncled face.

**Acolyte, Acolyth, and Acolothist**, in the Roman Catholic Church, one of the inferior orders of the clergy, whose office it is to attend upon the deacons and subdeacons in the ministry of the altar, to light and hold the candles, to bear the incense, to present the priest with wine and water, etc. In the primitive Church, the acolytes were in holy orders, and ranked next to the subdeacons; but, at the present time, the duties of the acolyte are very often performed by laymen and chorister boys.

**Aconcagua**, a province of the republic of Chile, bounded N. and W. by the Province of Quillota, E. by the Andes, and S. by Santiago. Area, 5,845 square miles. The mountain Aconcagua is the loftiest of the Andes, being 23,910 feet above the level of the sea. Productions are maize, wheat, beans, pumpkins, melons, and other garden produce; vineyards and orchards are plentiful, and in summer numerous flocks are pastured on the slopes of the Andes; figs, nectarines, peaches, etc., are sent to Santiago and Valparaiso. Gold is found and copper is worked in



## Aconite

mines. Pop. (1903), 132,670; chief town, San Felipe. On the S. side of the mountain Aconcagua rises a river of the same name, which flows S. W. and joins the Pacific 12 miles N. of Valparaiso.

**Aconite**, a plant of the genus *aconitum*, the *aconitum napellus*, familiarly known as the monk's-hood, or wolf's-bane. Its active principle, the aconitine, is a virulent poison. It is a native of Europe, and is cultivated as a garden plant for the sake of its handsome purple flowers.

**Aconitine**, or **Aconitia**, a powerful vegetable alkaloid, prepared from the root of the *aconitum napellus* (aconite). It is one of the most virulent of poisons, but, at the same time, a very valuable medicine. Externally applied, it produces on the skin a prickling sensation, which is followed by a peculiar numbness. An ointment containing aconitine is often used in cases of neuralgia, acute rheumatism, and diseases of the heart. The homœopathic physicians make a great use of it in fevers. Its narcotic action is so active that a fiftieth of a grain may endanger the life of an adult. The most effectual antidote in case of poisoning is warm water, administered till it produces vomiting, after which stimulant remedies should be applied internally and externally. The alkaloid consists of the elements carbon, hydrogen, nitrogen, and oxygen; its formula being  $C_{33}H_{42}N_{12}$ .

**Acontius**, a youth of the island of Cea, who went to Delos to see the sacred rites which were performed there by a crowd of virgins in the temple of Diana, and fell in love with Cydippe, a beautiful virgin. Not daring, however, to ask her in marriage, on account of the meanness of his birth, he presented her with an apple, on which were inscribed these words: "I swear by Diana, Acontius shall be my husband." Cydippe read the words, and, feeling herself compelled by the oath she had inadvertently taken, married Acontius.

**Acorn**, the well known fruit of the oak. In the early ages, acorns constituted a principal part of the food of man. (Ovid's "Metamorphosis," i, 106; Vergil's "Georgics," i, 8.) At present they are used for the feeding of pigs, etc.

**Acorn Shell**, the popular name for the *balanus* and other cirripeds, which inhabit a tubular shell whose base is usually formed of calcareous laminae. Its shell is composed of many pieces, and thus capable of enlargement to the wants of the enclosed animal, which performs its necessary functions by an aperture at the top. The tentacula from this animal being feathered, our credulous ancestors believed that it gave origin to a bird called the barnacle-geese. These curious, but common, shells are found in all seas. They are affixed to marine bodies, and their

## Acoustics

peduncle is sometimes found a foot long. Their growth must be exceedingly rapid. A ship going out with a perfectly clean bottom will often return, after a short voyage, covered with them.

**Acorus**, a genus of plants, order *oron-tiaceæ*. The *acorus calamus*, or sweet flag, a member of this genus, is the only native aromatic plant of northern climates; the root powdered might supply the place of foreign spices. It blossoms during the months of May and June. The thick, creeping stem or rhizome, commonly called the root, is the valuable part of the plant; it is somewhat spongy and powerfully aromatic, and has a bitterish taste. It is used by the rectifiers to improve the flavor of gin. Perfumers make use of it in the manufacture of hair-powder, and tanners in the preparation of peculiar sorts of leather. From the fresh rhizome a volatile oil is obtained by distillation, used in making aromatic vinegar and for scenting snuff. In medicine, the sweet flag is sometimes used as an aromatic stimulant and mild tonic, and many physicians speak highly of its beneficial effects in cases of ague. It grows in the United States, in Europe and Asia. It is supposed to be the *calamus* of the Song of Solomon; hence its botanical name, *acorus calamus*.

**Acosta, Joseph**, a Spanish Jesuit, who, from being a missionary in Peru, became provincial of his order; born at Medina del Campo in 1547; died at Salamanca in 1600. His "History of the West Indies," first printed in Spanish, is universally known and esteemed.

**Acotyledons**, those plants which are propagated by spores, and not by true seeds. Cotyledons are the rudiments of the first leafy organs which make their appearance in the development of plants springing from seeds, properly so called. These rudimentary organs do not exist in spores, which are accordingly said to be acotyledonous. The cryptogamous or flowerless plants of Linnaeus are identical with the acotyledons of later botanists. In the natural order they are divided into two classes, the thallogens and the acrogens.

**Acoustics**, the science of sound. We are sensible of sound when we are affected by certain vibrations in the air or other matter in contact with our organs of hearing. In ordinary cases of hearing the vibrating medium is air, but fishes hear under water, and all substances capable of vibrating may be employed to propagate and convey sound. When a bell is struck it alters in shape, and while it continues to sound it vibrates about its natural figure, to which, as the sound dies, it gradually returns. The vibrations of the bell are communicated to the particles of air surrounding it, and



from these to particles outside them, until they reach the ear of the listener. Let two box-shaped pipes of similar form, and whose linear dimensions are as 1 is to 2, be fixed on the wind-chest of an organ; it will be found that, on making them speak, the note of the small one will be what is called an octave higher than the note from the large one. The portion of air determined in size and shape by the interior of the small pipe on being disturbed passes through its initial condition twice for once that the air in the large pipe passes through its initial condition. When a pipe is long compared with the dimensions of its sectional area, the note is not affected sensibly by the sectional area. Suppose we take an ordinary flute, having all the holes stopped except the mouth; a player sounding the fundamental note sets the contained air vibrating in a way which we shall attempt to describe. The air at the mouth cannot differ much as to condensation and rarefaction from the atmosphere with which it is in contact; but as we move down the pipe from the mouth the contained air is in less free contact, and thus it may differ from the atmosphere as the rapidly-moving air at the mouth alternately gives what may be called an accumulated crush inward and then a rush outward. We have at the mouth a place of greatest motion, and of nearly invariable pressure; as we proceed inward the motion is less, but the variation of pressure becomes greater, till, at the middle of the length of the tube, the motion is a minimum and the variation of pressure is a maximum. This point is called a node. At the end of the pipe the air is again in the same state as to variation of pressure as at the mouth. The mouth and end of the pipe are called anti-nodes. If the player blows so as to give the first overtone of the pipe, it will develop two nodes and three anti-nodes; the second overtone will have three nodes and four anti-nodes, and so on. If the end of the flute is closed, then there must always be a node at the stoppage, and the pipe sounds a fundamental note the same as that of an open pipe twice as long. When the overtones of a closed pipe are sounded there must always be an odd number of nodes. The frequencies of vibration therefore for the fundamental note and overtones of open pipes are 1, 2, 3, 4, . . . and for the fundamental note and overtones of closed pipes they are 1, 3, 5, 7, . . .

Musical sounds are comparatively simple, and are combined to give pleasing sensations according to easy numerical relations. The loudness of a note depends on the degree to which it affects the ear; the pitch of a note depends on the number of vibrations to the second which produce the note; the timbre or character of a note depends on the body or bodies whose vibrations produce

the sound, and is due to the form of the paths of vibrating particles. The gamut is a series of eight notes, which are called by the names Do, Re, Mi, Fa, Sol, La, Si, Do<sub>2</sub>, and the numbers of vibrations which produce these notes are respectively proportional to 24, 27, 30, 32, 36, 40, 45, 48. The numerical value of the interval between any two notes is given by dividing one of the above numbers corresponding to the higher note by the numbers corresponding to the lower note. The intervals from Do to each of the others are called a second, a major third, a fourth, a fifth, a sixth, a seventh, and an octave respectively. The interval from La to Do<sub>2</sub> is a minor third. An interval of  $\frac{9}{8}$  is a major tone;  $\frac{10}{9}$  is a minor tone;  $\frac{16}{15}$  is called a limma.

Returning to the vibrating column of air inside a flute pipe, described above: Suppose the fundamental note is sounded, then the

pipe is half a wave length,  $\frac{l}{2}$ ; let  $n$  be the

number of vibrations per second producing the note, the velocity is  $nl$ . When other

gases than air are employed, the length  $\frac{l}{2}$

must be varied to produce a definite note of  $n$  vibrations to the second; thus we have a means of measuring the velocity of sound in different gases. In an analogous manner the longitudinal vibrations of rods of solid bodies may be employed to determine the velocity of sound in different substances. The determination of the velocity of sound in air by actual observation agrees with the number obtained in the manner indicated above. The velocity of sound in a gas is proportional to the square root of the absolute temperature. If we take 1,090 feet per second as the velocity of sound in air at 0° C.,  $1,090 \sqrt{1 + .00366 t^\circ}$  will be the velocity in feet per second at any other ordinary temperature  $t^\circ$ . Considering sound vibrations mathematically, we get  $v =$

$$\sqrt{\frac{E}{D}}, \quad \text{where } v \text{ is velocity, } E \text{ elasticity}$$

measured by the quotient of a small increase of pressure divided by the fractional decrease of volume, and  $D$  is the density. In the case of air and other gases  $E$  is equal to  $1.41P$ , 1.41 being the ratio of the specific heat of a gas at constant pressure to the specific heat at constant volume. For air and other gases, therefore, the formula is

$$v = \sqrt{1.41 \frac{P}{D}}. \quad \text{The pressure per square}$$

foot when the barometer stands at 30 inches is about 2,121 pounds, and the weight of a cubic foot of dry air at this pressure and 0° C. temperature is .0807 lb., taking 32.2 for gravity, the density will be  $\frac{.0807}{32.2}$



and the formula will stand

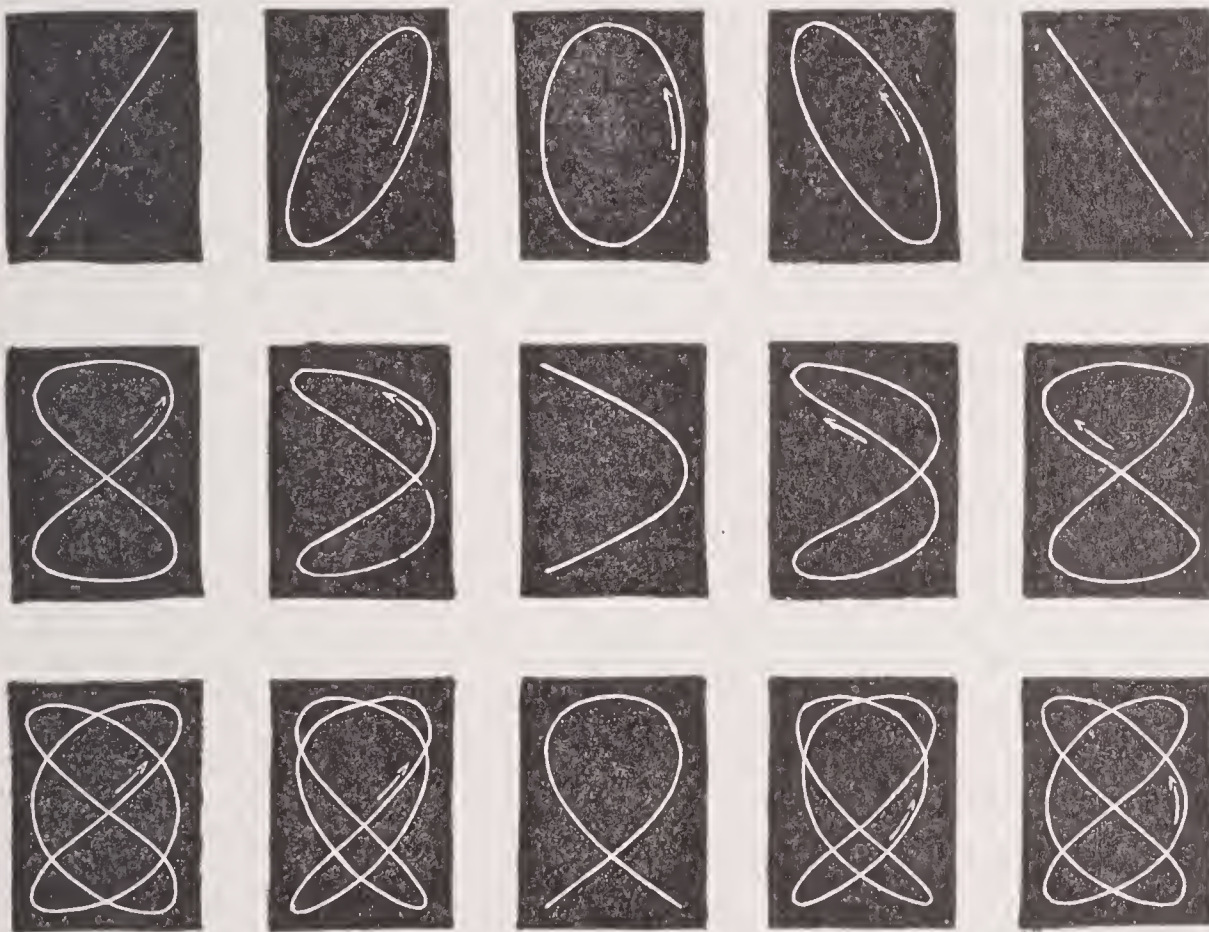
$$v = \sqrt{1.41 \frac{2,121 \times 32.2}{.0807}} = 1,092 \text{ feet per second.}$$

*Laws of the Transverse Vibrations of Strings.*—The pitch of the note given by a string (1) varies inversely as the length of the string; (2) varies as the square root of the tension; and (3) varies inversely as the square root of the weight of the string. (4) Strings of the same length and density, but of different thicknesses, will vibrate in the same time if they are stretched with forces proportional to their sectional areas. These laws are illustrated by an instrument called a sonometer, on which the length, tension, weight, etc., of a sounding string can be conveniently altered.

first five curves the curves and changes when the forks are in unison, the second row shows the curves when the forks differ by an octave, and the third when they differ by a fifth. These curves are similar to curves which may be obtained by setting up a piece of wire, which vibrates differently in two directions, in a vise, and twanging it. The curves are traced by the bright point of the wire. The curves of M. Lissajous may be conveniently used to test whether tuning forks are in unison, and they are found to be more to be depended on for this purpose than the ear.

Sound is reflected in a manner analogous to the reflection of light. When it is reflected from a plain surface the reflected sound comes as if it was propagated from a point beyond the surface at a distance

equal to the distance of the real point of propagation from the surface. Sounds produced in one focus of a hollow ellipsoid are reflected to the other focus. Whispering galleries are instances of the reflection of sound to a focus, or to form sound caustics. Echoes are familiar instances of reflection of sound. Lenses have been formed of collodion filled with different gases, and by means of these



LISSAJOUS' ACOUSTIC CURVES.

By M. Lissajous the vibrations of different tuning forks were combined into one optical effect by means of little mirrors attached to a vibrating end of the tuning forks. Light from a small hole is received on a mirror attached to a leg of the first tuning fork; the beam is reflected, having the vibrations of this fork, to a mirror on a second tuning fork, and it is reflected from this mirror into a telescope, when it has the resultant motion of the two vibrations. Owing to the retention of optical effects on the retina the eye, on looking through the telescope, perceives a continuous curve, which gradually passes through a series of phases, returning through these phases continuously. The illustration shows in the

sound has been refracted in a manner which is analogous to the refraction of light by glass lenses.

**Acquaviva, Andrea Matteo** (äk'wa-vē'va), Duke of Atri and Prince of Teramo, in the kingdom of Naples; born in 1456; died in 1528; seems to have been the first who conceived the idea of an "Encyclopedia," or "Universal Dictionary of Arts and Sciences." He published a work under that title in two volumes, folio, which, though scanty and defective, was found sufficient to give some hints for conducting a compilation of that kind.

**Acqui** (äk'wē), a district of North Italy, province of Alessandria, on the N. side of



Acre

the Ligurian Apennines. Area, 445 square miles. Productions, corn and fruit. Chestnut trees furnish the peasantry with an article of common food, and silk worms are reared as a branch of industry.

Acqui, its capital, is seated on the Bormida, 18 miles S. S. W. of Alessandria. Pop., about 12,000. It has commodious sulphur baths. Celebrated for its great antiquity, and for the remains of a Roman aqueduct. Acqui was taken by the Spaniards in 1745; retaken by the Piedmontese; and afterward dismantled by the French.

**Acres**, (1) Originally, any field, whatever its superficial area.

(2) From about the time of Edward I. the word became more definite, and its limits were prescribed by the Statutes 31 and 35 Edward I., and 24 Henry VIII. By the Act 5 George IV., the varying measures of the acre current in the kingdom were reduced to one uniform standard. The imperial acre contains 4,840 square yards, the Scottish one, 6,104.12789 square yards, and the Irish one, 7,840 square yards. The imperial acre is current in the United States. The old Roman *jugerum*, generally translated acre, was about five-eighths of the imperial acre.

NUMBER OF PLANTS FOR AN ACRE OF GROUND.

| Dist. apart. |        | Number of<br>plants. |
|--------------|--------|----------------------|
| Inches.      |        |                      |
| 3            | by 3   | 696,960              |
| 4            | by 4   | 392,040              |
| 6            | by 6   | 174,240              |
| 9            | by 9   | 77,440               |
| Feet.        |        |                      |
| 1            | by 1   | 43,560               |
| 1½           | by 1½  | 19,360               |
| 2            | by 1   | 21,780               |
| 2            | by 2   | 10,890               |
| 2½           | by 2½  | 6,960                |
| 3            | by 1   | 14,520               |
| 3            | by 2   | 7,260                |
| 3            | by 3   | 4,840                |
| 3½           | by 3½  | 3,555                |
| 4            | by 1   | 10,890               |
| 4            | by 2   | 5,445                |
| 4            | by 3   | 3,630                |
| 4            | by 4   | 2,722                |
| 4½           | by 4½  | 2,151                |
| 5            | by 1   | 8,712                |
| 5            | by 2   | 4,356                |
| 5            | by 3   | 2,904                |
| 5            | by 4   | 2,178                |
| 5            | by 5   | 1,742                |
| 5½           | by 5½  | 1,417                |
| 6            | by 6   | 1,210                |
| 6½           | by 6½  | 1,031                |
| 7            | by 7   | 881                  |
| 8            | by 8   | 680                  |
| 9            | by 9   | 537                  |
| 10           | by 10  | 435                  |
| 11           | by 11  | 360                  |
| 12           | by 12  | 302                  |
| 13           | by 13  | 257                  |
| 14           | by 14  | 222                  |
| 15           | by 15  | 193                  |
| 16           | by 16  | 170                  |
| 16½          | by 16½ | 160                  |
| 17           | by 17  | 150                  |
| 18           | by 18  | 134                  |
| 19           | by 19  | 120                  |
| 20           | by 20  | 108                  |
| 25           | by 25  | 69                   |

Acrogens

| Dist. apart. |             | Number of<br>plants. |
|--------------|-------------|----------------------|
| Feet.        |             |                      |
| 30           | by 30 ..... | 48                   |
| 33           | by 33 ..... | 40                   |
| 40           | by 40 ..... | 27                   |
| 50           | by 50 ..... | 17                   |
| 60           | by 60 ..... | 12                   |
| 66           | by 66 ..... | 10                   |

**Acres** (ä'kr), or **St. Jean d'Acres**, a seaport of Syria, formerly called Ptolemais; on a promontory at the foot of Mount Carmel. This town, capital of the pashalic of the same name, is famous for the memorable sieges it has sustained. It was taken by the first crusaders in 1104, retaken by the Saracens in 1187, recovered by the Christians under Richard Cœur de Lion, in 1191, and given to the Knights of St. John (in French, St. Jean), of Jerusalem, whence it received the name of St. Jean d'Acres. In 1291 it again fell into the hands of the Saracens. Bonaparte attempted to storm this place in 1799, but retreated after a siege of 61 days. It was taken by Ibrahim Pasha, in 1832, and again by the combined English and Austrian squadrons, in 1840. Acres has been celebrated from remote antiquity.

**Acroceraunium** (ak'ra-ker-â'nē-um), a promontory of Epirus, with mountains called Acroceraunia, which separated the Ionian and Adriatic Seas. They were remarkable for attracting storms, and hence dreaded by mariners. Its modern name is Chimara.

**Acrocorinthus**, a steep and lofty mountain, shaped as a truncated cone, overhanging the city of Corinth, 1,885 feet in height, on which was built a citadel. It was one of the horns on which Philip was advised to lay hold, in order to secure the Peloponnesus, figured in the heifer. It was also considered as one of the fetters of Greece, of which the others were Demetrias in Thessaly, and Chalcis, in Eubœa. Its position was naturally so strong that in the time of Aratus a force of 400 men defended it. It affords one of the most magnificent prospects in the world. Its ascent was not permitted to Christians as long as the country was in the possession of the Turks.

**Acrogens**, plants of which the growth takes place at the extremity of the axis. The word was formerly used in a wider sense than now.

1. Formerly it included all flowerless plants — Linnæus' *cryptogamia*. The term, however, referred not to the absence of flowers, or to the obscure character of the fructification, but to the growth of the stem. All plants were divided into exogens, or those growing around the circumference of the trunk, just within the bark; endogens, or those growing inside, that, is, along the central axis; and acrogens, or those increasing at the extremity of the stem. In Lind-



ley's "Natural System of Botany," second edition (1836), the acrogens, used in this extensive sense, constitute the fifth class of the vegetable kingdom, the other four being exogens, gymnosperms, endogens, and rhizanthus. They were made to contain five alliances: (1) *filicales* (ferns); (2) *lycopodales* (club mosses); (3) *muscales* (mosses); (4) *charales* (charas); and (5) *fungales* (mushrooms, lichens and algæ).

2. The meaning is now more restricted. In Lindley's "Vegetable Kingdom" (1846), the flowerless plants compose not one, but two classes: (1) thallogens, and (2) acrogens. The former are the lower in organization. The latter compose three alliances — *muscales*, *lycopodales*, and *filicales*. The arrangement, it will be observed, is now an ascending one, whereas, before, it was descending.

**Acrography**, the art of making blocks in relief, with the view of printing illustrations from them, in place of having recourse to wood engraving. M. Schonberg was its inventor.

**Acrolein**. When a candle is blown out a peculiar odor may be perceived before the wick has quite ceased to glow. This odor is due to the presence of a compound of carbon, called acrolein, which is produced during the slow combustion of the candle just before it is perfectly extinguished. This substance acrolein is a general product of the slow distillation of fatty bodies, such as wax, tallow, etc., but it may be more readily prepared by heating glycerine with acid sulphate of potassium in a retort, and purifying the distillate by appropriate means. Acrolein has the composition expressed by the formula  $C_3H_4O$ ; it is a colorless limpid liquid, lighter than water. It readily oxidizes in contact with air; it is soluble in water, and it is inflammable. Acrolein is distinguished by its intensely irritating odor; a few drops diffused throughout the air of a room render the atmosphere insupportable.

**Acrolepis**, a genus of ganoid fossil fishes founded by Agassiz. The species occur in the magnesian limestones and marlstones of Durham, England, which are of Permian age.

**Acrolithos**, in sculpture, a statue whose extremities are of stone, the body being made of wood. According to Vitruvius, there was a temple at Halicarnassus dedicated to Mars, and built by Mausolus, King of Caria, wherein was an acrolithan statue of the god; and from Trebellius Pollio it is learned that Calpurnia set up an acrolithan statue of Venus which was gilt.

**Acrology**, strictly the science of initials; popularly, a pastime in which names are given to letters beginning with the letters, or designations are given to objects in the form of signs composed of the first letter

or letters of the names of the object.

**Acronic**, in astronomy, pertaining to the rising of a star at the time when the sun is setting, or the setting of a star when the sun is rising. It is opposed to cosmical.

**Acronychia**, in botany, a genus of *Rutaceæ* or rueworts. *A. Cunninghami*, an evergreen shrub from Moreton bay, in Australia, has leaves with a resin smelling like turpentine, and flowers perfumed like those of the orange.

**Acropolis**, the high part of any ancient Greek city, usually an eminence overlooking the city, and frequently its citadel. Notable among such citadels were the Acropolis of Argos, that of Messene, of Thebes, and of Corinth, but pre-eminently the Acropolis of Athens, to which the name is now chiefly applied. The Acropolis of Athens was the original city of Athens, later the upper city, as distinguished from the lower, and was built upon a separate spur or butte of Hymettus. The hill rises out of the plain, a mass of rock about 260 feet high, with precipitous sides, save a narrow access at the western end, where there was a zigzag road for chariots. The summit of this rock forms an uneven plain 500 by 1,150 feet at the maximum breadth and length. Within this area were reared, chiefly in the days of Pericles, remarkable specimens of architectural art. The buildings were grouped around two principal temples, the Parthenon and the Erechtheum. Between these temples stood the statue of Athena Promachos (fighter in front), by Phidias, the helmet and spear of which were the first objects visible from the sea. About these center pieces, covering the rocky height and extending down the steep sides, were lesser temples, statues, theaters, fanes, and odea (music halls). Among the famous buildings on the sides of the Acropolis were the Dionysiac theater and the Odeum of Pericles, and the Odeum, built by Herodes Atticus in honor of his wife, Regilla. The ravages of accident and war and Athenian marble-merchants have largely destroyed and despoiled these classic works. Archæologists have secured many important remains of the Acropolis, which are preserved in the collections of various European capitals and in the new archæological museum at Athens.

**Acrostic**, a poetical composition, disposed in such a manner that the initial letters of each line, taken in order, form a person's name or other complete word or words. This kind of poetical triflings was very popular with the French poets from the time of Francis I. until Louis XIV. Among other English writers, Sir John Davies, who lived in the 16th century, amused himself in this way. He produced 26 pieces, called "Hymns to Astrea," each of them forming an acrostic



## Act

upon the words Elizabetha Regina. The following is an example:

Eternal virgin, goddess true,  
Let me presume to sing to you.  
I owe, e'en great Jove, hath leisure  
Sometimes to hear the vulgar crew,  
And heed them oft with pleasure.

Blessed Astrea! I in part  
Enjoy the blessings you impart,  
The peace, the milk and honey,  
Humanity and civil art,  
A richer dow'r than money.

Right glad am I that now I live,  
E'en in these days whereto you give  
Great happiness and glory;  
If after you I should be born,  
No doubt I should my birthday scorn,  
Admiring your sweet story.

In the Old Testament there are 12 psalms written according to this principle. Of these, the 119th Psalm is the most remarkable; it consists of 22 stanzas, each of which commences with a Hebrew letter, and is called by its name. Acrostic verse is no longer cultivated by the poets and has practically lost all vogue. Edgar Allan Poe, however, wrote some striking acrostics, varying the form with great ingenuity. One example, beginning with the first letter of the first line, the second of the second, and so on, forms a lady's name.

**Act**, in dramatic language, a portion of a play performed continuously, after which the representation is suspended for a little, and the actors have the opportunity of taking a brief rest. As early as the time of Horace there were five acts in a drama, and this number still remains without modification. Acts are divided into smaller portions called scenes. (See Shakespeare throughout.)

In parliamentary language, an ellipsis for an act of congress, legislature, etc. A statute, law, or edict, consisting of a bill which has been successfully carried through both houses of congress or legislature, and, received the approval of the executive.

In law: (1) Anything officially done by the court, as the phrases "Acts of Court," "Acts of Sederunt," etc. (2) An instrument in writing for declaring or proving the truth of anything. Such is a report, a certificate, a decree, a sentence, etc.

In bankruptcy, an act, the commission of which, by a debtor, renders him liable to be adjudged a bankrupt.

Acts done, distinguished into acts of God, of the law and of men.

In mental philosophy, an operation of the mind supposed to require the putting forth of energy, as distinguished from a state of mind in which the faculties remain passive.

In this sense such expressions as the following are used: the act of thinking, the act of judging, the act of resolving, the act of reasoning or of reason; each of these be-

## Acta Sanctorum

ing viewed as a single operation of the human mind.

In theology, the carrying out of an operation in a moment, as contradistinguished from the performance of a work requiring a considerable time for its accomplishment.

**Act of Settlement**, an act of the Parliament of England in 1701, vesting the hereditary right to the English throne in Sophia, Electress of Hanover, and her Protestant descendants, constituting the source of the sovereignty of the house of Hanover or Brunswick, the present ruling line. The act prohibited the king (or queen) from going to war in defense of non-English powers without the assent of Parliament.

**Act of Supremacy**. (1) An act of the Parliament of England, in 1534, by which the king was made the sole and supreme head of the Church of England. (2) A reenactment of the above, with changes, in 1559.

**Act of Toleration**, an act of the reign of William and Mary, granting freedom of religious worship, under certain comparatively moderate conditions, to all dissenters from the established Church of England, except Roman Catholics and persons denying the Trinity. This act, as confirmed in the reign of Anne, was the basis of various subsequent measures of religious toleration, culminating in the Catholic Relief Act of George IV., and the still more liberal legislation of Victoria.

**Act of Uniformity**. (1) An act of the Parliament of England (1559), adopting a revised liturgy for the Church of England, entitled "An Act for the Uniformity of Common Prayer and Service in the Church, and Administration of the Sacraments." (2) An act of Parliament (1662), requiring that the revised Book of Common Prayer and Ordination of Ministers, and no other, should be used in all places of public worship and be assented to by clergymen. By this test more than 2,000 non-conforming clergymen were ejected from their churches. It took effect on St. Bartholomew's Day (Aug. 24, 1662), and accordingly is known in English history as the "Bartholomew Act," the day of its enforcement being known as "Black Bartholomew."

**Acta Sanctorum**, or **Martyrum**, the collective title given to several old writings, respecting saints and martyrs in the Greek and Roman Catholic Churches, but now applied especially to one extensive collection begun by the Jesuits in the 17th century. This great undertaking has considerable importance, not only in a religious point of view, but also with regard to history and archæology. Commenced by the Jesuit Rosweyd, continued by J. Bolland, the work was carried on (1661) by a society of learned Jesuits, who were styled Bolland-



ists, until 1794, when its further progress was prevented through the invasion of Holland by the French. In recent times, the undertaking has been resumed.

**Actæa**, a genus of plants belonging to the order *ranunculacæ*, or crowfoots. One species, the *A. spicata* = the bane-berry, or herb-christopher, is indigenous to many lands. It bears black berries, which are

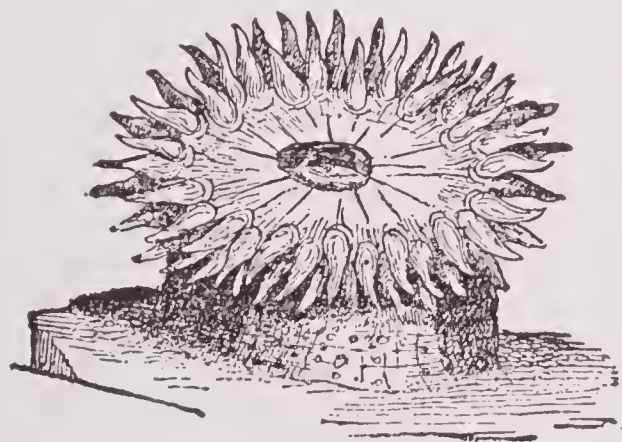


ACTÆA SPICATA.

poisonous. With alum, they yield a black dye. The roots are antispasmodic, expectorant, and astringent. *A. racemosa*, the snakeroot, receives its English name from being used in the United States as an antidote against the bite of the rattlesnake.

**Actæon** (ak'ti'on or ak-tē'on), son of Aristeus, was a great lover of hunting. One day, as he was pursuing a hart, he spied Diana bathing herself with her nymphs; which so enraged the goddess, that she threw water upon him and changed him into a hart, and afterward he was torn in pieces by his own dogs.

**Actinia**, in zoology, a genus of polypes, with many arms radiating from around their



ACTINIA.

mouth, in a manner somewhat resembling the rays of the sun surrounding his disc, or a double flower. From this arrangement of the tentacles, coupled with the bright col-

ors of these animals, they are called also animal flowers. Though simple and not aggregated, they still have a somewhat close affinity to the coral-building polypes. They are the type of the class actinozoa. Cuvier placed them with his *polypi carnosi*. They feed on crustacea, mollusca, small fishes, etc. In 1847, Dr. Johnston enumerated 20 species as British.

**Actinic Rays**, rays capable of producing chemical decomposition, as in photography, in the coloring of flowers and fruit. Formerly these rays were thought to belong exclusively to the blue and ultra blue parts of the spectrum, but now it is known that rays of any wave length may produce chemical changes; that that will happen depends upon the kind of substance a given ray falls upon, rather than the particular quality of the ray or its source, and one may make a photograph of the whole spectrum, extending a long way beyond the visible part, in both directions, by choosing a proper sensitive agent for the plate. All ether waves, from all sources and of all lengths, may now be considered as actinic, some substances being decomposed by certain wave lengths and other substances by different wave lengths.

**Actinism**, the chemical principle of light. Three distinct principles emanate from the sun — light, heat, and actinism. Numerous examples of the effects of their influence occur daily, which are erroneously attributed to the light which we see. It is actinism which fades colors, bleaches linen, rots fabrics, tans the human skin, puts out the fire, and performs the operations of photography. It acts principally by abstracting oxygen from the bodies which it affects. Fire is extinguished by sunlight, through the diminution of the amount of oxygen necessary for combustion; and photographic operations are mostly effected by the reduction of oxide of silver to the metallic state, by the abstraction of its oxygen. There may be actinism without light, or *vice versa*. Yellow glass transmits the latter, but stops the former. Dark blue glass, which transmits but little light, is quite pervious to actinism. Blue objects reflect great quantities of it, while red or yellow ones reflect but little or none. The electric and lime lights give out great quantities of actinism from their blue tinge; and gas and candles but very little, from their yellow color. The amount of actinism received from the sun differs considerably, according to the time of year, being at its maximum about the end of March, and gradually diminishing until the end of December, when it arrives at its minimum. Actinism, in large quantities, is necessary to the proper condition of the human system. It has been proved that when dark rooms have been col-



## Actinograph

ored with yellow paint or paper, the inhabitants of them have been sickly or delicate; as soon, however, as the color was changed to blue, a marked difference in their state of health took place.

**Actinograph**, an instrument invented by Mr. Hunt for regulating the variations of chemical influence on the solar rays. It is described in "British Association Reports" for 1845 and 1846.

**Actinolite** (Greek *aktis*, genit. *aktinos* = a ray, and *lithos* = a stone. The translation of the German *strahlstein* = radiated stone), a variety of amphibole. It is the actinote of Haiiy. Its affinity and composition are indicated by Dana's compound name for it—magnesia-lime-iron amphibole. It is bright green, or greyish-green, the green color being imparted by the iron it contains. It occurs crystallized, columnar, fibrous, or massive. Sp. gr., 3 to 32. There are three sub-varieties of it—glassy actinolite, which occurs in long, bright green crystals; asbestiform actinolite, and radiated actinolite.

**Actinometer**, an instrument for measuring either the intensity of sunlight, or its chemical activity. A device for doing this was first invented, by Sir John Herschel, in 1825. Dr. John W. Draper devised a different one afterward, but these have only a historic interest now, since the significance of actinism is better understood.

**Actinomyces**, the name now given to a disease long known to occur in cattle, but confounded with tubercle or sarcoma. In 1877, Bollinger, of Munich, showed that little yellow grains are always present, consisting of a minute fungus, with its mycelium arranged in a radiate manner. To this fungus he gave the name actinomyces; and further observation has confirmed his view that it is the cause of the disease. Actinomyces is most common in cattle; occurs also in pigs, and (rarely) in man. It consists of tumors, sometimes of large size, formed of inflammatory material deposited round numerous grains of the fungus. They frequently suppurate and break down. In cattle, they occur usually in the jaws, mouth and stomach; in man, in the neck, lungs, and adjacent parts.

**Actinozoa**, a class of animals included in the radiata of the system of Cuvier, but combined with hydrozoa to form the class coelentera in the systems of Frey, Leuckart, and Huxley.

**Actium**, a promontory on the W. coast of Greece, jutting out on the N. W. extremity of Acarnania, not far from the entrance of the Ambracian Gulf (Gulf of Arta), at present called La Punta. It is memorable on account of the naval battle fought here between Antony and Octavianus Sept. 2, 31 B. C., in sight of their ar-

## Acts of the Apostles

mies, encamped on the opposite shores of the Ambracian Gulf. The forces of Octavianus consisted of 80,000 infantry, 12,000 cavalry, and 260 ships of war; those of Antony, of 100,000 infantry, 12,000 cavalry, and 220 ships of war. Notwithstanding the advice of his most experienced generals to meet Octavianus by land, Antony, at the instigation of Cleopatra, determined on a naval engagement. Soon after the beginning of the battle, before anything decisive had taken place, the timid Cleopatra fled with 60 Egyptian ships. Antony foolishly followed her, and fled with her to Egypt. The deserted fleet was not overcome, however, till it had made a brave though hopeless resistance.

**Actor**, in the drama, one who represents some part or character on the stage. Among the Greeks a simple chorus, who sung hymns in honor of Bacchus, at first constituted the whole entertainment. A declaimer who recited the adventures of heroes, was introduced by Thespis for the sake of variety. Æschylus changed the declamation into the form of a dialogue between two persons, and Sophocles added a third. To this number the actors in the Greek drama were limited; and the Romans adopted the same rule in tragedy. In comedy the number of actors was not restricted. Actresses, in the drama, appear to have been wholly unknown to the ancients, men or eunuchs always performing the female parts. Later actresses did appear under the Roman empire, but were very ignominiously treated. Charles II. is said to have first encouraged the public appearance of actresses in England; and there is evidence that the queen of Charles I. performed in a court theater. Actors were long excluded from good society, and actresses still longer, and perhaps the English were the first who admitted the most distinguished into their first circles. At Athens actors were highly honored. At Rome they were despised, and deprived of the right of suffrage. The reason of this difference is, that among the Greeks the actors were freeborn citizens, and the dramatic performances had their origin in the sacred festivals; but among the Romans the drama was introduced by persons of the lowest class.

**Acts of the Apostles**, the fifth book of the New Testament. It contains a narrative of the achievements of the leading apostles, and especially of St. Paul, the greatest and most successful of them all. Its author was St. Luke (compare Luke i: 1-4 with Acts i: 1), who was Paul's companion from the time of his visit to Troa (Acts xvi: 8-11) to the advanced period of his life when he penned the second epistle to Timothy (II Tim. iv: 11). Internal evidence would seem to show that it was written in all probability about A. D. 61, though external testimony from the fathers to its existence



is not obtainable till a considerably later date. The undesigned coincidences between the Acts of the Apostles and the Epistles of Paul are numerous and important.

**Acupuncture**, an operation in which the insertion of needles is employed for the cure of different species of rheumatism, eye diseases, lumbago, etc. The operation simple, may be easily performed, gives little pain, causes neither bleeding nor inflammation, and seems at times of surprising efficacy. The invention of acupuncture is ascribed to the Chinese and Japanese, who acquire great skill in the use of it, by practising on a figure of wood or pasteboard. It was first known in Europe in the 17th century, but had been forgotten till some French surgeons revived it recently. It is now chiefly used for alleviating pain, sometimes by using the needles as conductors of galvanism, sometimes by using hollow needles through which a sedative is injected. This is found effectual in affording immediate relief in neuralgia. The mere insertion of the needle itself often gives temporary relief.

**Adagio** (ad-äzh'ë-ô), a slow or very slow movement or measure of time in music. In the more extended compositions of orchestral or chamber music, the second or third movement is generally marked adagio, and serves as a contrast to the rapid and energetic movement of the preceding and following parts of the sonata or symphony. The distinctive feature of the adagio being its power of expression, it affords the most direct means to the composer of manifesting his individuality of feeling. The finest specimens of the adagio are found in the works of the old masters, above all in Beethoven. In recent works, our composers have generally succeeded better in their rapid movements than in the adagio.

**Adalbert**, a great German ecclesiastic, born of a noble family about 1000; was appointed Archbishop of Bremen and Hamburg in 1045, and papal legate to the North in 1053. He soon extended his spiritual sway over Scandinavia, and carried Christianity to the Wends. In 1063 he became tutor of the young Henry IV., and soon, spite of the opposition of the nobles, ruled over the whole kingdom. His ambitious mind now conceived the design of founding a great northern patriarchate, which should vie with the Roman Curia itself; but he died, too soon for his vast design, at Goslar, March 16, 1072.

**Adam and Eve**, the names of the first pair of human beings in the account of the creation given in the book of Genesis. Adam is strictly a generic name, applicable to both man and woman, as used in the book of Genesis, but it came to be a proper name, used with the article, as in

chapters ii, iii, and iv. The origin of the name is uncertain, but is usually connected with the Hebrew root *Adam*, "to be red." It is often derived from *Adamah*, "the ground," but this is taking the simpler from the more developed form. The Assyrian equivalent is *Adamu*, "man," used only in a general sense, not as a proper name. This is connected by Sir Henry Rawlinson and Professor Sayce with *Adamatu*, "red skins," the Assyrian word by which the dark-skinned Accadians of primitive Babylonia are designated in the bilingual tablets. Eve is the Hebrew *Havvah*, which name, according to Gen. iii: 20, Adam gave her as the "mother of all living." Literally, the word means "life."

The early part of Genesis contains two somewhat different accounts of the creation of Adam. In the earlier account (i: 26-30), the creation of man and woman is given after the creation of the animals; in the second account (chapter ii), the creation of Adam is mentioned before that of the animals, and the forming of Eve afterward. The first narrator is commonly called the Elohistic, from his use of the name Elohim for God; the second, the Jehovistic, from his using the name Jehovah Elohim. The Elohistic narrator simply states that God created man in His own image. Man is created at the close of the six days' work as the lord of the whole lower world, for whom all things are made. The Jehovistic narrator gives a detailed account of Paradise, the original sin of Adam and Eve, their subjection to the curse, and expulsion from Eden. It is, in Ewald's phrase, the history proper of the creation of man. The first condition of Adam and Eve is one of innocent simplicity. They are placed in Eden, where they are allowed to taste freely of the fruit of every tree save one. Temptation comes from without, through the serpent's persuading Eve that the divine prohibition is really intended to keep human beings from becoming as wise as God. Eve yields to the temptation, and leads Adam also into her sin; and thus the moral consciousness of man awoke, and spiritual death passed upon mankind. Adam and Eve are then driven out of Paradise, and prevented, by the cherubim and a flaming sword which turned every way, from returning "to take also of the tree of life, and eat, and live forever." Adam lives 930 years; has three sons, Cain, Abel, and Seth, then sons and daughters.

Such is the form of the story which has usually been interpreted by orthodox Jews and Christians as a narrative of literal history, notwithstanding many difficulties about the anthropomorphic details, and the admitted uncertainty of the point where the literal ends and the figurative begins. Many of the later Jews explained the story as an



allegory. Philo, the foremost writer of the Alexandrian school, explains Eve as the sensuous part, Adam as the rational part, of human nature. The serpent attacks the sensuous element, which yields to the temptation of pleasure, and next enslaves the reason. Clement and Origen adapted this interpretation somewhat awkwardly to Christian theology. Augustine explained the story as history, but admitted a spiritual meaning superinduced upon the literal; and his explanation was adopted by the reformers, and, indeed, generally, by the orthodox within the Romish and the various Protestant churches alike. More modern critics have sought to separate the kernel of history from the poetical accretions, and attribute the real value of the story, not to its form, but to the underlying thoughts. Martensen describes it as a combination of history and sacred symbolism, "a figurative presentation of an actual event." The narrative may be regarded as embodying the philosophy of the Hebrew mind applied to the everlasting problem of the origin of sin and suffering; a question the solution of which is scarcely nearer us now than it was to the primitive Hebrews. It is not the form of the story which is material here, but the substance and the meaning; and the elemental truth of the fall of man by misuse of his free will remains a religious fact, apart altogether from the historical form in which the fact is stated. In the Pauline theology Adam stands as the covenant head or federal representative of the whole human race, in contradistinction to Christ, "the second man," "the last Adam."

The fundamental ideas of pantheism and emanation, which formed the basis of the great religions of the ancient world, were perfectly consistent with a vague theory of the origin of man, which explained him as having issued somehow from the very substance of divinity itself by a kind of spontaneous generation—a development of the chain of emanations—rather than as the result of a free act of a creative will. Such is the account in the "Sanchoniathon," a fragment of a Phœnician cosmogony that has reached us in a Greek version. Egyptian accounts explain that the fertile slime left by the Nile, under the vivifying influence of the heat of the sun's rays, sprouted into the bodies of men; or, as expressed in mythological form, men sprung from the eye of the sun-god. This emanation produced the material body, but a later demiurgic process molded the form to beauty and communicated to it a soul. Various nations were thus formed by different goddesses; the Egyptians—the highest race in the world—were molded by the supreme demiurge, Khnoum. One very detailed Babylonian account of the creation is preserved in the Greek of Berosus. According to it there

was a time when there was nothing but darkness and an abyss of waters, inhabited by a monstrous brood of composite creatures, over which presided a woman named Omoroca ("the sea," *Tiamat*). Bel cut this woman asunder, making of her lower half the earth, and of her upper half the heavens, while he destroyed all the creatures within her. He next cut off his own head, on which the other gods kneaded the blood as it gushed out with earth, and from it formed men. Hence it is that they are rational and partake of divine knowledge. Next he formed, in the same way, the animals, then the stars, the sun, the moon, and the five planets. Here, leaving out the polytheistic element, the facts follow the same order as in the narrative of the Jehovistic author of Genesis.

An ancient Greek account represents Prometheus as making the first man out of earth, or clay and water, and then quickening him with fire stolen from heaven; but earlier accounts limit his work to the latter function, and make men spring up out of the soil. Hesiod describes man in his primitive state as free from sickness and evil before Prometheus stole fire from heaven, and Pandora, who corresponds to Eve, brought miseries to the earth. Prometheus gives man the capability of knowledge; his daring theft is for man the beginning of a fuller and higher life. Æschylus regards Prometheus as the representative of humanity, led into misery by his self-will, until he submits to the higher will of God. This corresponds with the story of Genesis, save that in the latter the spiritual features are clearer and more distinct.

*Science and the Unity of Man.*—The question of the unity of man has caused much controversy. The old chronology was set aside when geology and archæology made it manifest that man existed on the earth many thousands of years ago. This discovery removed the chief difficulty of the monogenists, who had to account for the great varieties in the present races of men as having sprung from one common stock within a limited period of time. The polygenists pointed to the remarkable permanence of type, in spite of the differentiating conditions of climate and circumstance, to prove that such races as the negroes, Mongolians, and whites were distinct species—each sprung from a separate origin in its own region. But fuller knowledge of savage man has demonstrated the essential identity in the working of his mind, as well as the structure of his body, with the most cultured races; and experience has shown that all the present races, in spite of form and color, are capable of forming crossed races of every combination. Moreover, the modern doctrine of evolution, or the development of species, has confirmed the monog-



enist theory in insisting against constituting separate species where the differences are moderate enough to be accounted for as due to variation from a single type.

The question of the original unity or diversity of language is not, however, necessarily identical with that of the unity of the human race. For, even allowing mankind to have descended from a single pair, language might not have originated till long after they had passed away; and the formation of language may not have taken place at once, but may have been a gradual process going on for ages. However this may be, the faculty of speech is still one grand mark of distinction between man and the brute; and the fact remains that no anthropoid ape has ever raised himself to the level of articulate-speaking man.

The story of Adam has been a rich subject both in literature and art. It was frequently treated by the medieval painters, and formed the material of many mysteries and other poems. Of more modern works, it is enough to mention the splendid epic of Milton, "Paradise Lost." Here Adam and Eve are the archetypal man and woman, sketched with outlines that can only be compared for grand simplicity with Michael Angelo's two frescoes in the Sistine Chapel, of Adam and of Eve coming into life.

**Adam, Juliette (Mme. Edmond Adam, née Lamber)**, a French journalist and author of many works; born Oct. 4, 1836; editor of the "Nouvelle Revue" (the organ of the Extreme Republicans), which she founded in 1879. Her second husband, Edmond Adam, was a prominent politician; became a life senator, and died in 1877. She retired from journalism in 1899.

**Adam de la Hale** (ä-don'de lä äl), a French poet and composer, born at Arras, about 1235; nicknamed the Hunchback of Arras, although he was not deformed. His satirical extravaganza, "The Play of Adam, or The Play in the Arbor" (1262), constitutes the earliest comedy in the vulgar tongue; while the pastoral drama, "The Play of Robin and of Marion," may be looked upon as the earliest specimen of comic opera. He died at Naples, about 1287.

**Adam's Apple**, in botany (1) the name given by Gerard and other old authors to the plantain tree (*musa paradisiaca*), from the notion that its fruit was that sinfully eaten by Adam in Eden. (2) The name given, for the same reason, to a species of citrus.

In anatomy, a protuberance on the fore part of the throat, formed by the *os hyoides*. The name is supposed to have arisen from the absurd popular notion that a portion of the forbidden fruit, assumed to have been an apple, stuck in Adam's throat when he attempted to swallow it.

**Adam's Bridge** or **Ra-ma's Bridge**, a chain of shoals across the Gulf of Manaar, between Hindustan and the island of Ceylon, in the Ramajana fabled to have been constructed by monkeys.

**Adam's Peak**, a mountain in the middle of the island of Ceylon. It is a resort of Moslem and Buddhist pilgrims, and also notable on account of an upright shadow which it casts, apparently projected on vapor. Height, 7,420 feet. The native name is Samanella. The cone forming the summit is a naked mass of granite, terminating in a narrow platform, in the middle of which is a hollow, 5 feet long, having a resemblance (increased by human agency) to a human footstep. Mohammedan tradition makes this the scene of Adam's penitence, after his expulsion from Paradise; he stood 1,000 years on one foot weeping for his sin; hence the mark. To the Buddhists, the impression is the *Sri-pada*, or sacred footmark, left by Buddha on his departure from Ceylon; and the Hindus recognize Buddha as an avatar of Vishnu. Multitudes of devotees visit the mountain.

**Adams, Abigail**, wife of John Adams, second President of the United States; born at Weymouth, Mass., Nov. 23, 1744. Her letters, contained in "Familiar Letters of John Adams and His Wife, Abigail Adams, during the Revolution," evince keen political sagacity, and throw valuable light upon the men and the public affairs of the time. She died at Quincy, Mass., Oct. 28, 1818.

**Adams, Brooks**, an American essayist and politician, born at Quincy, Mass., 1848. He is the son of Charles Francis Adams, and a lawyer by profession. Besides contributions to magazines, he has written "The Emancipation of Massachusetts" (1887), and "The Law of Civilization and Decay."

**Adams, Charles**, an American historical and religious writer, born in New Hampshire in 1808; was a Methodist clergyman. Among his numerous works are "Evangelism in the Middle of the 19th Century" (1851); "Women of the Bible" (1851); "Life of Cromwell" (1867); "The Earth and Its Wonders" (1869); "Life Sketches of Macaulay" (1880). He died in 1890.

**Adams, Charles Follen**, an American dialect poet, born at Dorchester, Mass., April 21, 1842; author of "Leedle Yaweb Strauss, and Other Poems" (1878); "Dialect Ballads" (1887), etc.

**Adams, Charles Francis**, an American statesman, born in Boston, Aug. 18, 1807; was candidate for Vice-President in 1848, twice elected to Congress, was Minister to England from 1861 to 1868, and member of the Geneva Arbitration Commission of 1871. His chief literary work was "Life and Works of John Adams" (10 vols., 1850-



1856), his grandfather. He also edited the writings of his father, John Quincy Adams. He died in Boston, Nov. 21, 1886.

**Adams, Charles Francis**, an American publicist and lawyer, son of the preceding, born in Boston, May 27, 1835. He served in the Union army during the Civil War. Besides notable articles in the "North American Review," on railroad management, he has published "Chapters of Erie" (1871); "Three Episodes of Massachusetts History" (1892); "Essays on Educational Topics" (1879), and a biography of his father (1900). He was for several years President of the Union Pacific railway, but resigned in 1890.

**Adams, Charles Kendall**, an American historian and educator, born at Derby, Vt., Jan. 24, 1835. He became President of Cornell University (1885), of the American Historical Association (1890), of the University of Wisconsin (1892), and editor-in-chief of "Johnson's Universal Cyclopædia" (1892). He wrote "Democracy and Monarchy in France" (1872); "Christopher Columbus, His Life and Work" (1892); besides many valuable papers on historical and educational topics. He died July 27, 1902.

**Adams, Frank Dawson**, geologist, born in Montreal, Canada, Sept. 17, 1859; graduated at McGill University in 1878; took advanced courses at the Sheffield Scientific School of Yale, and at Heidelberg University, applying himself particularly to lithology and physical geology. In 1888 he became Lecturer on Geology at McGill University, and, in 1893, succeeded Sir William Dawson as Logan Professor of Geology there.

**Adams, George Burton**, an American historical writer, born in Vermont in 1851. He is a Professor of History at Yale University. He is the author of "Civilization During the Middle Ages" (1883), and "The Growth of the French Nation."

**Adams, Hannah**, an American literary pioneer, born at Medfield, Mass., in 1755; died at Brookline, Mass., Nov. 15, 1832. Her principal works were an "Autobiography;" "History of New England" (1799); "History of the Jews" (1812); besides several writings on topics connected with religion.

**Adams, Henry**, an American historian, born in Boston, Mass., Feb. 16, 1838; grandson of J. Q. Adams. He was for some time editor of the "North American Review," and Professor of History in Harvard College. He wrote biographies of eminent public men: "The Life of Albert Gallatin" (1879); "John Randolph" (1882); and studies of particular episodes of American history: "Documents Relating to New England Federalism" (1877). His principal work is the "History of the United States from 1801 to 1817."

**Adams, John**, 2d President of the United States; born in Braintree, Mass., Oct. 19, 1735. He was educated at Harvard and adopted the law as a profession. His attention was directed to politics by the question which began to excite the colonies as to the right of the English Parliament to impose taxation upon them, and he took up a position strongly opposed to the claims of the mother country. In 1765 he published in the Boston "Gazette" some essays, which were reprinted in London in 1768, under the title of "A Dissertation on Canon and Feudal Law," the subject really treated in which was the government of the colonies and the rights of the colonists. In 1774 he was chosen a delegate from Massachusetts to the 1st Continental Congress. On his return he was appointed a member of the Provincial Congress, which had already begun to take aggressive measures against the home government. In 1775 he again attended the Continental Congress at Philadelphia, in which he set himself in de-



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termined opposition to all attempts at reconciliation with the home government, and succeeded in persuading Congress to take means of national defense. To secure the good-will of Virginia he proposed Washington for the command of the army. Next session he was appointed a member of committee on naval affairs, and drew up the regulations which still form the basis of the American naval code. At the beginning of 1776 he accepted the post of chief-justice of Massachusetts, but he soon after resigned the appointment. He published at this time "Thoughts on Government, applicable to the Present State of the American Colonies," in which he supported self-government by the different colonies with confederation. On May 13, 1776, he seconded the motion for a declaration of independence proposed by Lee of Virginia, and was appointed a member of committee to draw it up. The declaration was drawn up by Jefferson and fought through Congress by Adams. He was also appointed a



member of the Committee on Foreign Relations. He was next appointed chairman of the board of war and ordnance, a position which he held for 18 months. Near the end of 1777 he was sent to France on a special mission, and for 10 years he resided abroad as representative of his country in France, Holland, and England. He succeeded in negotiating various loans with Holland, and after taking part in the peace negotiations was appointed, in 1785, the first ambassador of the United States to the court of St. James. He was recalled in 1788 and elected Vice-President of the republic under Washington. In 1790 he published "Discourses on Davila," in which he opposed the principles of the French revolution. In 1792 he was reëlected Vice-President, and at the following election he became President. The country was then divided into two parties, the Federalists, who favored aristocratic and were suspected of monarchic views, and the Republicans. Adams adhered to the former party. Hamilton did his utmost with his own party to prevent the election of Adams, and his term of office proved a stormy one, which broke up and dissolved the Federalist party. His reëlection was again opposed by Hamilton, which ended in effecting the return of the Republican candidate Jefferson. Living to a great age he survived the contemporaries who had despised him, and became, as one of the last survivors of the Revolution, a hero to the following generation. In 1820 he became a member of a State convention to revise the constitution of Massachusetts. He died July 4, 1826, on the 50th anniversary of the Declaration of Independence, and on the same day as Jefferson, who had been engaged with him in drawing it up. Adams's works were ably and carefully edited by his grandson Charles Francis Adams.

**Adams, John Quincy**, 6th President of the United States, son of John Adams, 2d President; born in Braintree, Mass., July 11, 1767. In his 11th year he accompanied his father on his first embassy to France, and was placed at school near Paris. He returned with his father in about 18 months, but soon went back to Europe, and attended school in Holland and at the University of Leyden. At the age of 15 Francis Dana, his father's secretary of legation, who had been appointed on a diplomatic mission to Russia, took him with him as his private secretary. After 14 months' stay in Russia he traveled back alone through Sweden and Denmark to The Hague. Soon after his father's appointment as ambassador at London he returned home to complete his studies. He graduated at Harvard in 1788, entered the office of Theophilus Parsons, and in 1791 was admitted to the bar. He now began to take an active interest in politics. He wrote a series of letters to the Boston "Sentinel" under the signature of "Publicola," in re-

ply to Payne's "Rights of Man," and in 1793 defended Washington's policy of neutrality under the signature of "Marcellus." These letters attracted attention, and in 1794 Washington appointed him minister to The Hague. In 1798 he received a commission to negotiate a treaty of commerce with Sweden. On the accession of Jefferson to the presidency he was recalled. The Federalist party had still sufficient influence in Massachusetts to elect him to the Senate in 1803. On the question of embargo, he abandoned his party. Having lost his reëlection on this account, he immediately resigned his seat and retired to the professorship of rhetoric at Harvard, which he held from 1806 to 1809. On the accession of Madison he was appointed (1809) ambassador to Russia. He assisted in negotiating the peace of 1814 with England, and was afterward appointed resident minister at London. On the accession of Monroe to the presidency he was offered and accepted the post of Secretary of State, and at the expiration of Monroe's term of office he succeeded him in the presidency (1825). In 1831 he was returned to Congress by Massachusetts, and represented that State till his death, Feb. 21, 1848.

**Adams, Julius Walker**, an American civil engineer, born in Boston, Mass., Oct. 18, 1812; took part of the course at the United States Military Academy; was engaged for many years on railroad and waterworks construction, and planned the sewerage system of Brooklyn, N. Y.; was Colonel of the 67th New York Volunteers in the Civil War; and was the pioneer engineer of the East River bridge. He died Dec. 13, 1899.

**Adams, Maude**, an American actress, born at Salt Lake City, Nov. 11, 1872; daughter of an actress who was leading woman of a stock company in that city, under the stage name of Adams. At 16 years of age Miss Adams joined E. H. Sothorn's company in the "Midnight Bell;" afterward she was in Charles Frohman's stock company, and later supported John Drew. She made a great success in J. M. Barrie's "Little Minister" in 1899-1900.

**Adams, Oscar Fay**, an American compiler and miscellaneous writer, born in Worcester, Mass. Besides various compilations, including a "Dictionary of American Authors" (1897), he has written "Dear Old Story-Tellers" (1889); "The Story of Jane Austen's Life" (1891); "The Presumption of Sex, and Other Papers" (1892).

**Adams, Samuel**, an American statesman and Revolutionary patriot, born at Boston, Mass., in 1722. He was elected to the Massachusetts legislature in 1765, was a delegate to the first Continental Congress in Philadelphia, and a signer of the Declaration of



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Independence. He was active in framing the constitution of his native state, which he served as President of the Senate, Lieutenant-Governor (1789–1794), and Governor (1794–1797). He was zealous for popular rights, and fearless in his opposition to monarchism. He died in 1803.

**Adams, Sarah Flower**, an English hymn-writer; born at Great Harlow, Essex, Feb. 22, 1805. In 1834 she was married to William Bridges Adams, a noted inventor. She was the author of "Vivia Perpetua," a dramatic poem (London, 1841), and of many lyrics and hymns, the most popular of which is "Nearer, My God, to Thee" (1860). She died in August, 1848.

**Adams, William Davenport**, an English journalist and critic, born in 1851. He has published "A Dictionary of English Literature" (1878); "The Witty and Humorous Side of the English Poets" (1880); "By-Ways in Bookland" (1888); "A Book of Burlesque" (1891); "With Poet and Player" (1891). He died July 27, 1904.

**Adams, William Taylor**, an American author and editor, best known by the pseudonym "Oliver Optic;" born July 30, 1822. He was a voluminous and highly popular writer of fiction for young readers, his works including several series of travel and adventure: "Young America Abroad," "Starry Flag Series," and others. He died March 27, 1897.

**Addams, Jane**, an American philanthropist, born in Cedarville, Ill., Sept. 6, 1860. She was graduated at Rockford College in 1881, and after post-graduate studies in Europe and the United States, became an active social reformer. She inaugurated in 1889 the establishment known as Hull House, an adaptation of the "social settlement" plan to Chicago conditions. She has acted as street cleaning inspector in Chicago, and has lectured on the improvement of the condition of the poor in great cities.

**Adder**, etymologically, nadder, the *n* having been attracted to the article and lost. The common English name of the viper is *pelias berus*. Its color is yellowish-brown or olive, with a double series of black spots along the back. The sides are a little paler and are also spotted with black. The adder has a broad, triangular head and a short tail. It rarely exceeds two feet in length. The adder is the only poisonous reptile in Great Britain, and is found in most of the countries of Europe. In the United States the name is popularly applied to several harmless snakes, but the true adder does not occur.

**Addington, Henry, Viscount Sidmouth**, an English statesman, born May 30, 1757; educated at Winchester and Brasenose College, Oxford; studied law, and, through the influence of Pitt, entered Parliament

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(1784); was speaker of the House of Commons (1789–1801); chancellor of the exchequer and first lord of the treasury; put through a bill disqualifying clergymen from sitting in the House of Commons, and later, with Pitt's advice, negotiated (1802) the Peace of Amiens, a cessation of war much needed by England. In 1805 he was raised to the peerage. As Home Secretary (1812–1822), he was strict in his administration of justice and in oversight of the press and public meetings. Partly due to his too great zeal was the Manchester massacre. He resigned in 1824, disapproving of the recognition of the independence of Buenos Ayres. He died Feb. 15, 1844.

**Addison, Joseph**, an English essayist, son of the Rev. Lancelot Addison, subsequently dean of Lichfield; born at his father's rectory, Milston, Wiltshire, May 1, 1672; passed through the schools of the Rev. Mr. Nash at Amesbury, Wiltshire, and the Rev. Mr. Taylor at Salisbury, and at the age of 11 was sent to the Charterhouse, where he made the acquaintance of his friend and future collaborator Steele. At the age of 15 he proceeded to Oxford, entering first at Queen's College, but two years later being elected to Magdalen College, on account, it is said, of his skill in Latin versification. He took the degree of M. A. in 1693, and



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held a fellowship in his college from 1699 to 1711. He had contemplated entering on the clerical profession, but was diverted from his purpose by his literary tastes and by the early patronage which he received from some of the greatest statesmen of the Whig party. Addison had the good fortune to secure as his earliest patron the poet Dryden. With sympathetic appreciation of Dryden's skill as a translator of classical poetry, the young scholar addressed to him some complimentary verses, which the poet approved of and inserted in his "Miscellanies" in 1693. A translation of the fourth "Georgic," with the exception of the story of Aristæus, by Addison, appeared in the same collection in 1694, and he subse-



quently translated for it two and a half books of "Ovid." A still higher honor was conferred on Addison by Dryden in prefixing his prose essay on Vergil's "Georgics" to his own translation of that poem, which appeared in 1697. Addison published in 1694 "An Account of the Greatest English Poets," a running criticism in verse, which he dedicated to his fellow student, the afterwards celebrated Dr. Sacheverell. It is said to be chiefly notable for the ignorance, common to the day, which it displays of early English poetry.

Through the introduction, it appears, of Congreve, Addison early secured an able and powerful patron in Charles Montague, afterwards Earl of Halifax, and in 1695 his own pen secured a greater in Lord Somers. He dedicated to this nobleman, then lord-keeper, a poem on one of King William's campaigns, and received as his reward a pension of £300 to enable him to travel in order to fit himself for the service of the king. In 1699, in which year appeared a collection of his Latin poems in the second volume of the "Musarum Anglieanarum Analecta," he left England and after spending more than two years in France and Italy was returning home through Switzerland when he was instructed to repair as envoy to the quarters of Prince Eugene, then engaged in an Italian campaign. The death of King William in March, 1702, cancelled this appointment with the overthrow of his friends. He says, indeed, that he never received more than a single year's payment of his pension, and had to defray the expenses of his travels himself. Nevertheless he was able to extend his tour to Germany and Holland, and returned to England at the close of 1703, having attempted without success to procure an appointment as a traveling tutor.

During his residence abroad his pen had not been idle. His tragedy of "Cato" is supposed to have been written, subject to after revision, during his stay in France. During his journey across Mount Cenis he wrote his "Letter from Italy," esteemed the best of his poems, and in Germany his "Dialogues on Medals," which was not published till after his death. His "Remarks on Several Parts of Italy in the Years 1701-1703" was published in 1705. It is an impersonal record of impressions in which current events have hardly any place, the absorbing topic being the correspondences traced between passages in the Latin poets and the scenes it illustrates. It was dedicated to Lord Somers. The first ministry of Queen Anne was a coalition one, in which the Whigs had still considerable power, chiefly due to the victories of Marlborough. Godolphin mentioned to Halifax his desire to have the achievements of the great commanders celebrated in appropriate verse. Halifax strongly recommended Addison,

and the commission was at once assigned to him, and he produced the "Campaign," which was about as good as a poem made to order by a man of taste and scholarly accomplishments, who was not quite a poet, could be expected to be. Before it was half finished Godolphin's approval was expressed in the form of an appointment to succeed Locke as a commissioner of appeal on excise. One official appointment succeeded another till the fall of the ministry, whose favor he had now made, in 1710. In 1706 he became under-secretary of state to Sir Charles Hodges, next year he accompanied Lord Halifax as his secretary on a mission to the Elector of Hanover. In 1708 he was elected M. P. for Lostwithiel, a seat he exchanged in 1710 for Malmesbury, which place he continued to represent till his death. In 1709 he became secretary to Lord Wharton as Lord-lieutenant of Ireland.

It may here be noticed that Addison's temperament, which greatly facilitated his elevation, determined its limit in a political direction. Extremely shy and even awkward in company, especially among persons of any superiority of pretension, he joined with this diffidence extreme caution of offending and solicitous anxiety to oblige. These qualities, which recommended him to men in office, wholly disqualified him for parliamentary life. He is said to have once attempted to speak in the House; but, if ever he had a higher ambition, he sunk at once and irretrievably into the position of an absolutely silent member.

The fall of the ministry in August, 1710, followed by the accession to power of an uncompromising Tory ministry, happened fortunately for Addison's fame. While he was absent in Ireland his old school companion, Steele, had started a paper partly devoted to news but chiefly to essays of a social, moral, and literary character, the "Tatler." Addison discovered the author of the enterprise by a literary criticism which he had communicated to his friend, and was readily admitted to share in it. The "Tatler" was begun April 12, 1709, and terminated Jan. 2, 1711. It was followed on March 1 by the "Spectator," which dropped the news section and consisted entirely of essays. It continued till Dec. 8, 1712. The "Guardian" succeeded, from March 2 to Oct. 1, 1713, and the "Spectator" was resumed from June 18 to Dec. 20, 1714. The "Tatler" was published thrice weekly, on Tuesdays, Thursdays, and Saturdays; the "Spectator" and "Guardian" every week day. The bulk of the papers were contributed in nearly equal proportion by Steele and Addison.

Addison's contributions to the "Spectator" are distinguished by one of the initials C., L., I., O. In humorous and satirical character sketches he hardly excelled, perhaps hardly equalled Steele. If more re-



finer he was less direct and pointed. But he was far ahead of his fellow contributor in scholarship and literary taste, and in the breadth and height of his ambition. He poured forth the stores of his knowledge on a greater variety of subjects, and indulged his imagination in more elaborate and artistic creations. But besides these independent efforts of his own he aspired to be a judge and censor of the literary productions of others, and he was, perhaps, beyond any man of his day, well qualified for the task. Certainly his judgments had less force and perhaps less depth than Johnson's, but they had much more of breadth, harmony, and completeness, were woven with more art into a system depending on theoretical principles, and were delivered with a grace and eloquence of which the oracular moralist was no master. If his system was somewhat shallow, it had probably the merit of directing attention more to criticism, and preparing the way for better and more philosophic standards of appreciation. Among the most remarkable of his contributions to the "Spectator" are his criticism on Milton's "Paradise Lost," his essays on the "Pleasures of the Imagination," "Vision of Mirza," his Saturday essays on moral and religious themes, and his "Reflections on the Divine Perfections." Preëminent among his character sketches is Sir Roger de Coverley. Steele originated the idea of a "Spectator" club and sketched the characters of its members. That of Sir Roger was immediately appropriated by Addison, to whom the delicate humor of its subsequent development is exclusively due. The remaining works of Addison not yet mentioned are of comparatively little interest or importance. In opposition to the "Examiner," conducted by Swift, he wrote, in the latter part of 1710, five numbers of a "Whig Examiner." In 1713 he published, anonymously, "The Trial and Conviction of Count Tariff," a libel on the financial policy of the ministry. He had assisted Steele at an early period with his comedy of the "Tender Husband," and the drama of "The Drummer or the Haunted House" was published by Sir Richard Steele after his death and attributed to him. The "Freeholder," a political paper in support of the government, published twice weekly from Dec. 23, 1715, to June 29, 1716, was written entirely by him. He also wrote a work on the "Evidences of the Christian Religion," and "Discourse on Ancient and Modern Learning." "Cato" was brought on the stage in April, 1713, reluctantly, as is said, and though destitute of dramatic qualities and even deficient in poetry, had a great run of success, which was largely owing to political causes.

In August, 1716, he married the Countess Dowager of Warwick. This connection brought him little accession of fortune, as

the widow forfeited her jointure by her remarriage. Her haughty demeanor, nevertheless, is said to have made his home unbearable to a man of his nicety of feeling. Whether from this cause, or from the long habit of frequenting taverns, to which he appears at first to have had rather an aversion, he acquired, according to prevalent reports, a habit of excessive wine-bibbing which shortened his days. These latter days were distinguished by a return to political life, and darkened by some painful literary quarrels. On the death of Queen Anne the lords justices who assumed the government appointed Addison their secretary. For a brief period he resumed his former office of secretary to the lord-lieutenant, and in 1715 he was named one of the lords of trade. In 1717 the leading Whigs retired from office, leaving an attenuated party called the German ministry. From this ministry, on April 16, Addison accepted office as one of the principal secretaries of state. He was probably equally unqualified in point of business capacity and of parliamentary efficiency for this responsible post, and he was probably also sensible of his own incapacity, for it is said that in accepting it he yielded to the ambition of his wife.

He retired after 11 months with a salary of £1,500. Of his literary quarrels one of the bitterest was with Pope. The cause of it was the publication by Tickell, Addison's secretary, of a part of a rival translation of the "Iliad," which Pope suspected was Addison's own, and a remark of Addison's that Tickell's translation was more faithful than Pope's. Pope in revenge wrote the savage satire contained in his lines on "Atticus," which he published after Addison's death in his epistle to Dr. Arbuthnot, and which at the time he printed and distributed among his friends. Addison does not appear to have replied publicly, but in the "Freeholder" he liberally praised Pope's "Iliad." Addison had also a quarrel with Gay, and on this occasion he appears to have been in the wrong, as he sent for Gay some time before his death, apologized for having injured him, and promised amends. But the saddest, as it appears to have been the paltriest, quarrel, was with his ancient comrade Steele. The cause of it was political. Steele attacked a bill for the limitation of the peerage in the "Plebeian." Addison replied in a pamphlet called the "Old Whig." Steele answered that Addison was so old a Whig that he had forgotten his principles, and Addison made a contemptuous reply. Addison died of asthma and dropsy at Holland House, June 17, 1719.

Of his style as a writer so much has been said that nothing remains to say but to quote the dictum of Johnson, "Whoever wishes to attain an English style, familiar but not coarse, and elegant but not ostentatious, must give his days and nights to



## Addison's Disease

the volumes of Addison." Addison had great conversational powers, and his intimates speak in the strongest terms of the enjoyment derived from his society, but it is acknowledged that he was extremely reserved before strangers. There is a story told of his having sent for his stepson, Lord Warwick, on his deathbed, and addressed him in these terms, "See in what peace a Christian can die." It is alluded to by Tickell, Addison's executor, and is first told circumstantially by Dr. Young, but the truth of the story has been questioned. Addison was buried in Westminster Abbey. He left a daughter born in the year of his death. His works were published by Tickell in four 4to vols. in 1721. An edition, with notes by Bishop Hurd, in six vols. 8vo, was published in 1811. A more complete edition, with Bishop Hurd's notes was published and edited by H. G. Bohn (in the well-known series, six vols.). A recent edition (in six vols.) is that of Professor Greene. There have been two recent editions of the "Spectator" (both in eight vols.) edited respectively by G. A. Aitkin and G. G. Smith. Among "Lives" may be mentioned that by Lucy Aikin (1843), which drew from Macaulay an admirable essay, and that by Professor Courthope.

**Addison's Disease**, the name of a peculiar skin disease, first described by Dr. Thomas Addison. Its symptoms are anæmia, excessive debility, loss of appetite, faintness, flabbiness of the muscles, and a dingy brownish discoloration of the skin. The patient generally suffers from dyspepsia, vomiting, and nervous troubles. The disease has sometimes been alleviated by careful nursing, but no cure for it has been found, and in the end it is invariably fatal.

**Addison, Thomas**, an English physician, born in 1793; the discoverer of Addison's disease. A collection of his writings was published in 1868. He died June 29, 1860.

**Add-Ran Christian University**, former name of the Texas Christian University, a co-educational institution at Waco, Tex., organized 1873, under auspices of Church of the Disciples; has grounds and buildings valued at over \$250,000; scientific apparatus, \$20,000; volumes in library, 5,000; productive funds, \$50,000; income, \$65,000; professors and instructors, 25; students, 380.

**Ade, George**, an American journalist and author, born in Illinois in 1866. He has published "Artie: a Story of the Streets and Town;" "Pink Marsh" (1897), a dialect story, and similar efforts.

**Adelaar, Cort Siverson**, one of the greatest naval commanders of the 17th century, was born at Brevig, in Norway, in 1622, and in his 20th year was employed in the naval service of Venice against the Turks. On one occasion he broke through a line of 67

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Turkish galleys which surrounded his ship, sunk 15, and burned several others. Fredrick III. secured his services as admiral of the Danish fleet, and ennobled him. In 1675, under Christian V., he took the command of the whole of the Danish naval force against Sweden, but died suddenly, at Copenhagen, before the expedition set out.

**Adelaide**, the capital of South Australia, 7 miles by rail S. E. of Port Adelaide, on St. Vincent gulf. It stands on a large plain, and is walled in on the eastern and southern sides by the Mount Lofty range; the town proper is inclosed by a wide belt of garden shrubbery. The first settlement was made in 1836, and named after the queen of William IV. The Torrens divides the town into North and South Adelaide, the former being occupied chiefly with residences, and the latter forming the business portion of the town. Four substantial iron bridges span the Torrens, which has been formed by a dam into a lake 1½ miles long. The streets are broad and regularly laid out, especially in Adelaide proper, to the south of the river, where they cross each other at right angles, and are planted with trees. Among the public buildings are the new Parliament Houses, erected at a cost of about \$500,000; government offices, post-office, and town-hall; South Australian Institute, with museum, library and art galleries; and hospital. The botanical garden, with the botanical garden park, covers more than 120 acres of ground. The chief manufactures are woolen, leather, iron, and earthenware goods; but the chief importance of Adelaide depends on its being the great emporium for South Australia. Wool, wine, wheat, flour and copper ore are the staple articles of export. Among educational institutions the most important are the Adelaide University; St. Peter's (Episcopal) College; St. Barnabas Theological College, opened in 1881, and Prince Alfred (Wesleyan) College. It is the seat of an Anglican and of a Roman Catholic bishop. Glenelg, on the sea, 5 miles away, is a favorite watering place. Pop., with suburbs (1907), 178,300. Port Adelaide, its haven, dates from 1840. It is a principal port of call for vessels arriving from Europe; has railway communication with Melbourne, Sydney, and Brisbane. Tramways were introduced in 1878. Pop., with Semaphore (1901), 21,000.

**Adelaide, Amelia Louisa Teresa Caroline**, wife of William IV., and Queen of England. She was sister to the Duke of Saxe-Meiningen, and was married July 11, 1818. She was a lady possessed of many exalted virtues, and was a liberal benefactress of the poor. Born 1792; died 1849.

**Adelaide, Eugenie Louise**, Princess of Orleans, daughter of Louis Philippe Joseph, Duke of Orleans, nick-named Egalité, and



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sister of Louis Philippe, King of France. Born at Paris, 1777; died in that city, Dec. 31, 1847, two months before the dynasty of Orleans fell. Proscribed as an *émigré* in 1792, she spent the greatest part of her exile in a convent, near Freiburg, Switzerland; rejoined her brother in England in 1809, and went with him to Sicily, where she lived until the restoration.

**Adelaide, Marchioness of Salisbury**, an English lady of whom it is told that Edward III., King of England, who was much taken with her charms, picked up, at a ball, one of her garters, which had fallen off in the dance. Seeing the lords and ladies laughing, Edward buckled the garter around his knee, and said, "*Honi soit qui mal y pense*" (evil be to him who evil thinks). This incident is said to have given rise to the Order of the Knights of the Garter, 1344, an origin very much questioned by modern writers.

**Adelieland** (ä'del-ē-länd), an Antarctic continent, discovered Jan. 20, 1840, by Du Mont d'Urville. It consists of a chain of mountains without prominent peaks, with a few shallow bays filled with icebergs and a number of islands with rounded summits.

**Adelphi College**, a co-educational (non-sectarian) institution, in Brooklyn, N. Y., organized in 1896; has normal, art, and musical departments; grounds and buildings valued at over \$556,000; productive funds, \$75,000; scientific apparatus, \$55,000; income, \$160,000; volumes in the library, \$12,700; faculty, 30; students, 450.

**Adelsberg**, a small town of Austria-Hungary, in Carniola, among limestone hills, in a lofty and barren district, on the road from Vienna to Trieste, remarkable for the stalactical caves in its vicinity. The principal one, in the mouth of which the Poik disappears in a vast chasm, extends to the distance of two or three miles, and is found to terminate in a lake. After proceeding 200 yards into it a vast gloomy space, called the Dome, forming a hall 300 feet long by 100 feet high, is entered. The river is heard rushing below, and on crossing it by a wooden bridge and ascending a flight of steps cut in the rock, a series of lofty halls, supported by gigantic concretions resembling lofty Gothic columns, and apparently filled with statues of exquisite whiteness and delicacy, meets the view. See **STALACTITES**.

**Adelung, Friedrich von**, a German philologist; born in Stettin, Prussia, Feb. 25, 1768. He studied for some time at Leipsic, devoting himself to philosophy and jurisprudence; then went to Italy, where he remained several years; was appointed private secretary of Count Pohlen, with whom he went to St. Petersburg, where he became

## Aden

instructor of the Archdukes Nicholas and Michael. In 1824 he was appointed director of the Oriental Institute, and in 1825 became president of the Academy of Sciences. He wrote: "Relations between the Sanskrit and the Russian Languages" (1815); "Biography of Baron Herberstein" (1817); "Essay on Sanskrit Literature" (1830). He died in St. Petersburg, Jan. 30, 1843.

**Adelung, Johann Christoph**, a German philologist and lexicographer; born in Spantekow, Aug. 8, 1732. He finished his education at Halle, and in 1759 was appointed professor in the Protestant academy at Erfurt, but two years after ecclesiastical disputes caused him to remove to Leipsic, where he applied himself to his great works on the German language and literature. In 1787 he became librarian of the public library in Dresden, an office which he held till his death. His life was devoted to an exhaustive investigation of his native language, which he traced to its remotest origins with a patience and a thoroughness that have remained unsurpassed, the principal result being "A Grammatical and Critical Dictionary of the High German Tongue." Science is further indebted to him for "Mithridates, or Universal Language Lore," in which all living tongues are directly or indirectly represented; and for a series of text-books that are still authoritative, and, to all appearances, will long continue so. The first edition of his "Dictionary" was published in 1774-1786, and the second in 1798-1801. The latter contains many valuable additions, but not sufficient to mark the development of the language in the meantime. It was of great service, however, in fixing the standard of the German language. He died in Dresden, Sept. 10, 1806.

**Aden**, a peninsula and town belonging to Great Britain, on the S. W. coast of Arabia, 105 miles E. of the strait of Bab-el-Mandeb, the entrance to the Red Sea. The peninsula is a mass of volcanic rocks, 5 miles long from E. to W., and rising to 1,776 feet. It is joined to the mainland by a narrow, level, and sandy isthmus. The town is on the eastern shore of the peninsula, stands in the crater of an extinct volcano, and is surrounded by barren, cinder-like rocks. The main crater is known as the Devil's Punchbowl. Frequently the heat is intense; but the very dry, hot climate, though depressing, is unusually healthy for the tropics. The Romans occupied it in the 1st century A. D. Till the discovery of the Cape route to India (1498), it was the chief mart of Asiatic produce for the Western nations; but, in 1838, it had sunk to be a village of 600 inhabitants. The increasing importance of the Red Sea route gave Aden great value as a station for England to hold; and, in 1839,



after a few hours' contest, Aden fell into the hands of the British. It is of high importance, both in a mercantile and naval point of view, especially as a great coaling station; it has a garrison and strong fortifications. The population and resources of the place have rapidly increased since 1838, and the opening of the Suez canal in 1869 gave it a great impetus. The annual value of its imports sometimes exceeds £2,000,000, while that of its exports (coffee, gums, spices) amounts to £1,500,000. It is a telegraphic station on the cable between Suez and Bombay, and on the line to Zanzibar and the Cape. To provide for its growing population, a considerable territory on the mainland has been acquired and added to the peninsula, the total area (including the island of Perim) being 75 square miles; and the settlement, which is politically connected with Bombay (7 days' sailing, or 1,819 nautical miles, distant), has a population of over 41,000. The majority of the natives are Arabs and Somalis, from Africa, all speaking Arabic. In the settlement there are, besides Aden proper, called the Camp, or the Crater, two other centers of population—Steamer Point, which is cooler than the Crater; and the outlying town of Shaikh Othman, with a Presbyterian mission, 10 miles toward the interior.

**Aden Cape**, on the S. coast of Arabia, 1,776 feet in height. This rocky peninsula, on which stands the town of Aden, stretches into the ocean about 5 miles, with an average breadth of  $2\frac{1}{2}$  miles, and is connected with the mainland by a sandy isthmus,  $\frac{3}{4}$  of a mile broad.

**Aden, Gulf of**, the portion of sea lying between the N. coast of Aden, terminating E. with Ras Jerdaffon (Cape Gardafui), and the S. coast of Arabia, between Ras Arrah and Ras Agab; the former in latitude  $12^{\circ} 40' N.$ , longitude  $44^{\circ} E.$ ; the latter in latitude  $15^{\circ} 15' N.$ , longitude  $51^{\circ} 30' E.$  Its length from E. to W. is thus about 480 miles; its breadth from N. to S. varying from 160 to 200 miles.

**Adenitis**, inflammation of the lymphatic glands. It almost always exists with angioleucitis—inflammation of the lymphatic vessels. It is produced when an open wound of any kind comes in contact with irritating or poisonous matter, generally from without, though sometimes also generated within itself. When one with a sore on his hand has to touch a noxious fluid, he should smear the wound with oil or grease to prevent the poisoning of the absorbents.

**Adenet Le Roi** (äd-nä' le rwä'), a French troubadour of the 13th century, whose surname is interpreted as meaning king (leader) of the minstrels, which function he per-

formed at the court of Henri III., Duke of Brabant. His work consists of remodelings of three famous "Chansons de Gestes," and of the romance of adventure, "Cleomades," his last and most important effort.

**Adersbach Rocks**, a range of mountains in the district of Glatz, valley of the Riesengebirge, Silesia, remarkable as being divided, for several miles, into detached perpendicular columns by fissures from 600 to 1,200 feet in depth. Geologists suppose it to have been of tabular sandstone, of varying degrees of hardness, and that the softer portions, lying in upright seams, were gradually washed away by the action of water.

**Adiaphorists** (a-dē-af'or-ists), or **Adiaphorites**, a party or wing of the Lutheran reformers of Germany, who held that certain things practiced by the Roman Catholic Church were indifferent and might be received. In 1548, an ecclesiastical controversy broke out among the reformers. The Emperor Charles V. having issued a paper popularly called the "Interim," in which he prescribed what faith and practice the Protestants were to adopt till the Council of Trent should dictate a permanent form of belief and worship, Maurice, elector of Saxony, urged Melancthon and his friends to decide what portions of the document they would accept and follow. Melancthon considered that, to a very large extent, the "Interim" might be accepted and obeyed. A controversy in consequence arose between the followers of Luther and those of Melancthon. It was called the adiaphoristic controversy, and embraced two questions: (1) What things were indifferent; and (2) whether, with regard to things indifferent, the Emperor could or could not, in conscience, be obeyed.

**Adige** (äd'ē-zha), a considerable river of North Italy, which has its source in the Alps of Tyrol, above Brixen; it enters Italy by Bolzano and the valley of Trento, flows in a southern direction by Roveredo, parallel to and for the most part about 6 miles from, the lake of Garda, then, turning abruptly toward the E., passes through Verona and Legnano; it afterward enters the great Delta, between the Brenta and the Po, and, forming several branches, empties its waters in to the Adriatic Sea. It is a deep and rapid stream, dividing, by its course, the old Venetian territories from Lombardy proper. The valley of the Adige has been rendered forever memorable by the wars of Bonaparte.

**Adipic Acid** (formula:  $C_6H_{10}O_4$  ( $C_4H_8$ )'' ( $CO\cdot OH$ )<sub>2</sub>), an organic diatomic dibasic acid, produced by the oxidation of fats by nitric acid.

**Adipocere**, a chemical substance in its character somewhat resembling wax or spermaceti. It arises through the chemistry of



nature, when the bodies of men and animals, buried in soil of a certain kind, are subjected to the action of running water, or otherwise brought in contact with moisture. In such circumstances the soft parts of the corpses, instead of decaying, may become transformed into adipocere. A notable case of the kind occurred in a Parisian burial-ground, in the year 1787. Mineral adipocere is a name given to a certain fatty matter found in the argillaceous iron ore of Merthyr, Wales.

**Adipose Cellular Tissue**, a term formerly applied to two distinct kinds of structure which the perfection of modern microscopes has now enabled physiologists to separate, as being different both in structure and function — adipose tissue, properly so called, and areolar tissue.

**Adipose Tissue**, a membrane in a state of great tenuity, fashioned into minute cells, in which fat is deposited. It occurs in man, and in the inferior animals, both when mature and when of imperfect development.

**Adirondack Mountains**, the highest range in New York State, stretching from near Canada, on the N., to near the Mohawk river on the S., a distance of 120 miles; and from Lakes George and Champlain, on the E., to an indefinite line on the W., covering an area of about 8,000 to 10,000 square miles, and occupying parts of Clinton, Essex, Franklin, and Hamilton counties. These mountains, the geological formation of which are chiefly granite, run in five parallel ranges; the highest range, or Adirondack proper, is on the E. side of the district, and the peaks rise to a great height. Mt. Marcy is 5,345 feet; Gray peak, 4,900 feet; White Face, 4,870 feet, etc. This whole district, sometimes called the Adirondack Wilderness, is covered with dense forests, except the tallest peaks, and some of these forests are still unexplored. Lumbering is carried on extensively, with outlets on the Hudson and St. Lawrence. The 1,000 lakes in the valleys beautifully diversify the scenery. They vary in size from small lakes of a few acres to Schroon lake, 20 square miles in area, and at a height of 807 feet above the sea. "Tear of the Clouds," a small lake, 4,320 feet above the sea, is the highest source of the Hudson. These lakes and streams are well stocked with trout and bass, and in this district are found black bears, wild cats, deer, otter, hawks, wild duck, eagles, rabbits, partridges, etc.; but no venomous serpents of any sort. The sportsman of this region usually kills his deer by "still-hunting." "Jack-hunting" is prohibited by the State game laws. One of the chief pleasures in the Adirondacks is the camp life, which some of the annual visitors make very luxurious.

**Adirondack Park**, a large district, principally forest land, set apart by the State of New York, in 1892, for the protection of the watershed of the Hudson and other rivers of the State, for public recreation, and for the practical study of forestry. It covers Hamilton county, and parts of Essex, Franklin, Herkimer and St. Lawrence counties, and contains many mountains and lakes, besides game-fish stocked ponds; area, 4,387 square miles.

**Aditi** (ad-ē'te), in the mythology of the Hindu Rig-Vedas, Infinity endued with life and form, from which are born the Adityas — the source and substratum of the universe; in later Vedic literature, the mother of the gods of storms (which are represented as life-producing), and of the sun. Aditi is the daughter of Daksha and wife of Kasyapa, and besides being the mother of the 33 gods, and of the sun, was also the mother of the Tushitas, or the 12 Adityas. The latter in the Vedic literature numbered seven and are the gods of the heavenly light, with Varuna at their head. In the Brahmanas and later they numbered 12, with supposed reference to the months of the year.

**Adjutant**, in military language, in the United States army, an officer selected by the colonel, whose duties in respect to his regiment are similar to those of an adjutant general with an army. Adjutant general: the principal organ of the commander of an army in publishing orders. The same organ of the commander of a corps, or department, is styled assistant adjutant general. The adjutant general has charge of the drill and discipline of the army.

**Adjutant Bird**, a large gallatorial or wading bird of Asia belonging to the genus *Leptoptilos* and the stork family. It is known in India as hurgila or argala, whence its scientific name *L. argala*. The adjutant was the first of birds to attract the attention of Bishop Heber on his landing at Calcutta. "In the morning, as the day broke," he wrote, "we were much struck by the singular spectacle before us. Besides the usual apparatus of a place of arms, the walks, roofs, and ramparts of the fort swarmed with gigantic birds, the hurgila, larger than the largest turkey, and twice as tall as the heron, which in some respects they much resemble, except that they have a large blue and red pouch under the lower bill. . . . These birds share with the jackals, who enter the fort through the drains, the post of scavenger; but unlike them, instead of shunning mankind day and night, they lounge about with perfect fearlessness all day long, and almost jostled us from our paths." The bag or pouch under the bill is unconnected with the gullet, but is capable of being inflated at will. Its use has not yet been ascertained. The bird is



described as being an omnivorous glutton, to whose all-digesting stomach nothing comes amiss. From this species, and a similar bird, *Ciconia Marabou*, are obtained the brilliant white marabou feathers. Those of the latter are regarded as the most valuable.

**Adler, Felix**, an American lecturer and scholar, born at Alzey, Germany, 1851. The son of an eminent Jewish rabbi, he emigrated when young to the United States, where, and at Berlin and Heidelberg, he was educated. After being for some time professor at Cornell University, he founded in New York (1876) the Society of Ethical Culture, of which he is lecturer. Similar societies have been established elsewhere in the United States and in other countries. He is an effective writer and speaker. He has published "Creed and Deed" (1878); "The Moral Instruction of Children" (1892). In June, 1902, he was called to the newly-created professorship of social and political ethics in the department of philosophy in Columbia University.

**Adler, Hermann**, a German writer, born in Hanover, May 29, 1839. He has lived most of his life in England, where he has held many positions of high trust connected with his race, having been, since 1891, Chief Rabbi of the British Empire, and has been active in general benevolence. Besides sermons, lectures, etc., he has written "The Jews in England;" "The Chief Rabbis of England;" "Ibn Gabirol, the Poet Philosopher," etc.

**Admetus**, in mythology, the name of various characters, the most noted being a king of Phææ, in Thessaly. Apollo, when banished from heaven, is said to have tended his flocks for nine years, and to have obtained from the Parææ that Admetus should never die if another person laid down his life for him. This was cheerfully done by his wife, Alceste. Admetus was one of the Argonauts, and was at the hunt of the Calydonian boar. Peleus promised his daughter in marriage only to him who could bring him a chariot drawn by a lion and a wild boar. Admetus did this by the aid of Apollo, and obtained Alceste in marriage.

**Administration**, in law, the management of the personal estate of anyone dying intestate, or without an executor. If the deceased leaves real estate, the estate devolves upon heirs related by blood; if personal property is left and no executors named, administrators are appointed by some court. In England, the power of such appointment was vested in the ecclesiastical courts until 1857, when it was transferred to a court of probate. In the United States, a surrogate or judge of probate appoints the administrator, and grants letters of administra-

tion as authority. The administrator is a trustee, within the jurisdiction of a court of equity, as well as of probate. His duties are to inventory the estate, collect accounts due, pay all debts, and distribute the remainder among those entitled to it. The word is also applied to the official terms of the President of the United States, and the Governors of States, and to their official advisors.

**Admiral**, the title of the highest rank of naval officer. The term is derived from the Arabic amîr, or emîr. The first English admiral was William de Leybourne (1286). His duties corresponded to those afterward vested in the lord high admiral, viz., the administrative powers now delegated to the lords commissioners of the admiralty. In Great Britain, there were formerly three grades of admirals, commanding subdivisions, known as the red, the white, and the blue, from the colors of their flags, but this distinction is now abolished. The last lord high admiral was the Duke of Clarence, afterward William IV. In the British navy, admirals are classified as admirals, vice-admirals, and rear-admirals, ranking respectively with generals, lieutenant-generals, and major-generals. These distinctions were adopted in the United States navy during the Civil War; the rank of rear-admiral being established in 1862, vice-admiral, in 1864, and admiral, in 1866, all created for Farragut. David D. Porter succeeded in the titles of vice-admiral and admiral, both of which grades were abolished at his death (1891). In 1899, the title was recreated in the United States navy, and conferred upon George Dewey. In 1882, congress reduced the number of rear-admirals from 10 to 6; in 1899, increased it to 18, comprising two classes of nine each, the first corresponding in rank to major-generals in the army, and the second to brigadier-generals; and subsequently increased it to 24.

**Admiralty**, that department of the British Government which, subject to the control of Parliament, has the supreme direction of naval affairs. This was formerly in the hands of a lord high admiral, but, from the reign of George II., it has been placed under certain officers called lords commissioners of the admiralty, five in number, whose head is termed the first lord of the admiralty. The high court of admiralty is that court which has jurisdiction over maritime causes. It was established in the reign of Edward III. Its judge was originally the lord high admiral, or his deputy, but is now appointed by commission from the crown. The term is applied to the building where the lords of the admiralty transact their business. In the United States, all admiralty and maritime jurisdiction is assigned by the Constitution to the Federal



## Admiralty Inlet

courts; in the first instance, to the district court, whence the case may be removed to the circuit, and thence to the supreme court. It covers the Great Lakes and the navigable rivers.

**Admiralty Inlet**, a narrow body of water, connecting Puget Sound with the Strait of Juan de Fuca.

**Admiralty Island**, a mountainous island, 90 miles long, off the W. coast of Alaska, to the N. E. of Sitka; belongs to the United States.

**Admiralty Islands**, a group of 40 islands, to the N. E. of New Guinea; Basco, the largest of them, being 60 miles in length, and is mountainous, but fruitful. The total area of the islands is 878 square miles. They were discovered by Schouten, in 1616. Carteret named them in 1767. Some are volcanic, others are coral islands. They abound in cocoanut trees, and are inhabited by a race of tawny, frizzle-headed savages of the Papuan stock, about 800 in number. Together with New Britain and some adjoining groups, they were annexed by Germany, in 1885, and now form part of the Bismarck Archipelago.

**Adonai** (a-dō'nī), a Hebrew name for the Supreme Being; a plural form of Adon, "lord," combined with the pronoun of the first person. In reading the Scriptures aloud, the Jews pronounce "Adonai" wherever the old name "Jhvh" is found in the text; and the name "Jehovah" has arisen out of the consonants of "Jhvh" with the vowel points of Adonai.

**Adonijah**, the fourth son of King David, by Haggith. He aimed at his father's crown, but Solomon was proclaimed King of Israel, when Adonijah fled to the tabernacle for protection. After the death of David, he was slain by order of Solomon, B. C. 1015.

**Adonis** (a-dō'nīs), son of Myrrha, daughter of Cinyras, King of Cyprus, was born in Arabia. Before the birth of her son, she was transformed into the tree which produces the fragrant gum, called by her name; this, however, did not hinder his being brought into the world in due season; he grew up a model of manly beauty, and was passionately beloved by Aphrodite (Venus), who quitted Olympus to dwell with him. Hunting was his favorite pursuit, until, having gone to the chase against the entreaties of his mistress, he was mortally wounded in the thigh by a wild boar. Venus, coming too late to his rescue, changed his blood into flowers. After death, he was said to stand as high in the favor of Persephone (Proserpine) as before in that of Aphrodite; but, the latter being inconsolable, her rival generously consented that Adonis should spend half the year with his celestial, half with his infernal, mistress. The fable has been

## Adoption

variously interpreted. One explanation makes the alternate abode of Adonis above and under the earth typical of the burial of seed, which in due season rises above ground for the propagation of its species;



ADONIS AND VENUS.

another, of the annual passage of the sun from the northern to the southern hemisphere.

**Adonis**, a pheasant's eye. A genus of plants so called because the red color of the species made them look as if they had been stained by the blood of Adonis. It belongs to the order *ranunculaceæ*, or crowfoots. It has 5 sepals and 5 to 10 petals without a nectary; stamens and styles, many; fruit consisting of numerous awnless achenes, grouped in a short spike or head. A species—the *Adonis autumnalis*, or corn-pheasant's eye—is found occasionally in corn-fields in Great Britain, but it has escaped from gardens, and is not properly wild. It is a beautiful plant, with bright, scarlet flowers, and having very markedly composite leaves, with linear segments. Plants of this genus are easily cultivated.

**Adoptiani, Adoptians or Adoptionists**, a Christian sect, which arose in Spain toward the end of the 8th century. Its leaders were Felix, Bishop of Urgel, and Elipand, Archbishop of Toledo, who believed that Christ was the Son of God, not by nature, but by adoption.

**Adoption**, the act of taking a stranger into one's family, as a son or daughter; or the taking of a person, a society, etc., into more intimate relations than formerly existed with another person or society; or the taking as one's own, with or without acknowledgment, an opinion, plan, etc., originating with another; also the selecting one from several courses open to a person's choice.

In law, both ancient and modern, the act of taking a stranger into one's family, constituted the person so adopted one's heir to



all intents and purposes. The practice was common among the Greeks and Romans, and is still practiced in some modern nations. There is a law of adoption in this country.

Adoption by matrimony is the placing the children of a former marriage on the same footing, with regard to inheritance, etc., as those of the present one.

Adoption by testament is the appointing a person one's heir on condition of his assuming the name, arms, etc., of his benefactor.

Adoption by hair was performed by cutting off the hair of the person adopted, and giving it to the adoptive father.

Adoption by arms, the presentation of arms by a prince to a brave man. These the recipient was expected to use for the protection of his benefactor.

In heraldry, arms of adoption, the heraldic arms received when the last representative of an expiring aristocratic family adopts a stranger to assume his armorial bearings and inherit his estates. The recipient may obtain permission from parliament to take the name of his benefactor, either appended to, or substituted for, his own.

In Scripture and theology, the act of admitting one into the family of God, or the state of being so admitted. The previous position of the person adopted in this manner was that of a "servant," now he is a "son," an "heir of God," and a "joint heir with Christ."

In ecclesiastical language, adoption by baptism is the act of becoming godfather or godmother to a child about to be baptized. Unlike real adoption, however, this does not constitute the child heir to its spiritual father or mother.

**Adorno**, a great plebeian family in Italy. It furnished many doges to Genoa. For 165 years they struggled for supremacy, especially with the Fregosi, and were definitely destroyed by Andrea Doria, in 1528. Gabriello was doge from 1363-1371. Antoniotto was four times doge toward the end of the 14th century. He delivered Pope Urban XI. when besieged in the castle of Necera, by Charles III., King of Naples, made a crusade against the Moors and Tunis, and finally, to protect his country from the ambitious plans of the Duke of Milan, placed Genoa under the suzerainty of Charles VI., of France. The following members of the Adorno family held office: Georges: doge 1413-1415; Rafael: doge 1443-1447; Barnabas: doge in 1447 (one month); Prospero: doge 1461-1478; Antoniotto: doge twice, 1513-1527.

**Adour**, a river of Southern France, having its source in the mountain ridge of the Tourmalet, in the department of Hautes-Pyrénées. Its course is first N., then W. and S. W. and S. S. W., passing St. Séver and Dax, to the former of which it is nav-

igable, and it falls into the sea a little below Bayonne, flowing through many exceedingly fertile valleys. Its whole length is estimated at about 200 miles. The current is rapid, and sometimes serious inundations are caused by the melting of the snows on the slopes of the Pyrenees. At the mouth of the river there is a shifting bar.

**Adowa**. See ADUA.

**Ad Pirum** (L., "at the pear tree"), a Roman station N. E. of Trieste, in the Birnbaumer Wald, on the road crossing the Alps into Italy; famous in connection with victory of Theodosius over the Frigidus in 394.

**Adra** (the ancient ABDERA), a seaport of Southern Spain, in the province of Almeria; 29 miles W. S. W. from the town of that name, near the mouth of the Adra, on an eminence facing the Mediterranean. The inhabitants are employed in agriculture, fishing, distilling brandy, and manufacturing lead from the ore of extensive mines in the neighborhood. Pop. (1900), 11,246.

**Adranos**, an ancient town of Asiatic Turkey, on a river of the same name, 10 miles S. W. of Olympus, and 135 miles N. E. of Smyrna. It is in ruins, but these are of an imposing and interesting character.

**Adrar** (Berber, "mountain"), a large oasis in the Sahara, reckoned at about three days' journey N. W. of Timbuktú; produces salt, dates, grain, and melons; chief town, Wadan.

**Adrastia**, a daughter of Jupiter and Necessity. She is called by some Nemesis, and is the avenger of wrong. The Egyptians placed her above the moon, whence she looked down upon the actions of men.

**Adrastus**, the name of many personages, in ancient history, the most remarkable of whom is the son of Talaus and Lysimache, who was King of Argos. Polynices, being banished from Thebes by his brother Eteocles, fled to Argos, where he married Argia, daughter of Adrastus. The king assisted his son-in-law, and marched against Thebes with an army led by seven of his most famous generals. All perished in the war, except Adrastus, who, with a few men, were saved from slaughter, fled to Athens, and implored the aid of Theseus against the Thebans, who opposed the burying of the Argives fallen in battle. Theseus went to his assistance and was victorious. Adrastus, after a long reign, died from grief, occasioned by the death of his son, Ægialeus. A temple was raised to his memory at Sicyon.

**Adrets, Francis de Beaumont, Baron des** (ad-rā'), a violent French Huguenot, who distinguished himself by many daring exploits, as well as cruelties. He subsequently became a Catholic, but died as he



had lived, in general detestation, in 1587. At some places he obliged his prisoners to throw themselves from the battlements upon the pikes of his soldiers. Reproaching one for retreating twice from the fatal leap, "Sir," replied the man, "I defy you, with all your bravery, to take it in three." This keen rejoinder saved his life.

**Adria**, in the Province of Rovigo, Northern Italy, between the rivers Po and Adige, is one of the oldest cities in Europe, having been founded by the Etruscans. So late as the 12th century A. D., it was a flourishing harbor on the Adriatic sea, to which it gave name; but, by the continual deposition of alluvium on the E. coast of Italy, it has been gradually separated from the sea, from which it is now 14 miles distant. It still retains several interesting remains of Etruscan and Roman antiquity, with a fine cathedral. Pop. (1901), 15,711.

**Adrian**, or **Hadrian**, **Publius Ælius**, a Roman emperor, born at Rome, 76 A. D. Entering the army quite young, he became tribune of a legion, and married Sabina, the heiress of Trajan, whom he accompanied on his expeditions, and became successively prætor, governor of Pannonia, and consul. On Trajan's death, in 117, he assumed the government, made peace with the Persians, and remitted the debts of the Roman people. No monarch informed himself more by traveling than Adrian. In 120, he visited Gaul, whence he passed over to Britain. He afterward visited Africa and Asia, and in 125 was initiated into the Eleusinian mysteries at Athens. In his reign, the Christians underwent a dreadful persecution. He built a temple to Jupiter, on Mount Calvary, and placed a statue of Adonis in the manger of Bethlehem; he also had images of swine engraved on the gates of Jerusalem, all of which acts indicate a contempt for Christianity. Adrian died at Baïæ, in 139. On his death bed he composed some Latin verses, addressed to his soul, which betray his uncertainty with regard to a future state. He had great virtues, which were, however, blended with as great vices. He adopted as his son Titus Antonius, on condition that he should adopt Marcus Annus Verus and the son of Lucius Verus.

**Adrian I., Pope**, born at Rome; succeeded Stephen III. in 772. Like his predecessor, he had to struggle against the power of the Longobards, who had invaded the Exarchate and other provinces bestowed by Pepin, King of the Franks, on the Roman sec. Adrian applied to Charlemagne for assistance against Desiderius, King of the Longobards. The King of the Franks crossed the Alps, defeated Desiderius, and overthrew the kingdom of the Longobards in Italy, in 774. Charlemagne then went to Rome, where Adrian acknowledged him

as King of Italy, and the latter renewed the grant of the provinces bestowed on the Roman see by Pepin. Charlemagne paid another visit to Adrian, at Rome, in 787, when his son, Pepin, was christened by the Pope. In 787, the seventh general council of the Church was held at Nicæa. Adrian died after a pontificate of nearly 24 years, 795. Adrian was a man of talent and dexterity; he succeeded in gaining and preserving the friendship of the greatest sovereign of his time, and under him Rome began to breathe again after the continual alarms caused by the Longobards, the last of the barbarian invaders of the western empire.

**Adrian II.**, born at Rome; succeeded Nicholas I. in the papal chair in 867. He had been married, and had a daughter by his wife Stephania, from whom he afterward separated in order to live in celibacy. During the pontificate of Adrian, Photius, Patriarch of Constantinople, withdrew from the Church of Rome, from which time the schism between the Greek and Latin Churches dates, which continues to this day. Adrian died in 872, and was succeeded by John VIII.

**Adrian III.**, born at Rome; succeeded Marinus in 884, and died the following year.

**Adrian IV.**, the only Englishman who was ever raised to the dignity of the papal chair, succeeded Anastasius IV. in 1154. His name was Nicholas Breakespere; and for some time he filled a mean situation in the monastery of St. Albans. Being refused the habit in that house, he went to France, and became a clerk in the monastery of St. Rufus, of which he was afterward chosen abbot. Eugenius III. created him cardinal, in 1146, and, in 1148, made him legate to Denmark and Norway, which nations he converted to the Christian faith. When nominated pope, he granted to Henry II. a bull for the conquest of Ireland. In 1155, he excommunicated the King of Sicily; and, about the same time, the Emperor Frederic, meeting him near Sutinam, held his stirrup while he mounted his horse. Adrian took the Emperor with him, and consecrated him King of the Romans, in St. Peter's church. The next year the King of Sicily submitted, and was absolved. Died, supposed of poison, in 1159. Adrian, by his active conduct, left the papal territory in a better state than he found it. He was succeeded by Alexander III.

**Adrian V.**, a Genoese, succeeded Innocent in 1276, and died five weeks after his election. He was succeeded by John XX.

**Adrian VI.**, born at Utrecht, of an obscure family, advanced himself by his talents to the post of vice-chancellor of the University of Louvain. Ferdinand of Spain



gave him the bishopric of Tortosa. After Ferdinand's death, he was co-regent of Spain with Cardinal Ximenes. He was elected pope in 1522, after the death of Leo X., chiefly through the influence of Charles V., whose authority was then spreading over Italy. He died in 1525, and was succeeded by Clement VII.

**Adrian**, city and county-seat of Lenawee co., Mich.; on the Raisin river, and the Wabash, the Lima Northern, and the Lake Shore and Michigan Southern railroads; 30 miles N. W. of Toledo, Ohio. It is the seat of Adrian College (Methodist Protestant), the State Industrial Home for Girls, and St. Joseph's Hospital and Academy (Roman Catholic), and has important manufactures, a large farming trade, a State bank, and daily and weekly periodicals. Pop. (1890) 8,756; (1900), 9,654; (1910), 10,763.

**Adrian College**, a co-educational institution, in Adrian, Mich.; organized in 1859, under the auspices of the Methodist Protestant Church; has grounds and buildings valued at over \$205,000; productive funds, \$50,000; scientific apparatus, \$10,000; income, \$51,000; volumes in the library, 8,000; professors and instructors, 25; students, 210; number of graduates since organization, over 650.

**Adrianople** (Turkish, Edirné; Bulgarian, Odrin), the third city of European Turkey, stands on the navigable Maritza (the ancient Hebrus), 198 miles W. N. W. of Constantinople by rail. The city has upward of 80,000 inhabitants, of whom about one-third are Turks. The splendid mosque of Selim II., the palace, and the immense bazaar of Ali Pasha, may be named as its principal features. It has a silk factory, and a considerable trade in opium, attar of roses, and wine. Founded or greatly improved by the Emperor Hadrian, Adrianople was the seat of the Ottoman sultanate from 1366 to 1453. The Russo-Turkish War was here concluded, Sept. 14, 1829, by the Peace of Adrianople. After the capture of the Turkish army defending the Shipka Pass, in January, 1878, the Russians entered Adrianople unopposed; and an armistice was concluded here on the 31st.

**Adriatic Sea**, a large arm of the Mediterranean Sea, extending, in a N. W. direction, between the E. coast of Italy and the W. coast of the Balkan peninsula, being terminated to the S. by the Strait of Otranto, 45 miles wide. In the N. it forms the Gulf of Venice, and in the N. E. the Gulf of Trieste. The W. coast is comparatively low and has few inlets, and the N. is marshy and edged with lagoons. On the other side, the coasts of Illyria, Croatia, Dalmatia, and Albania are steep, rocky, and barren, with many inlets, and begirt with a

chain of almost innumerable small, rocky islands. The total area of the sea, including islands, is calculated at 52,220 square miles — the area of the islands being 1,290; the mean depth is 110 fathoms, the greatest depth, 565 fathoms. The most considerable rivers flowing into the sea are the Adige and the Po, which are continually depositing soil on the coast, so that places once on the shore are now inland. The extreme saltiness of the Adriatic is probably owing to the comparatively small quantity of fresh water poured into it by rivers. Navigation on the Adriatic is safe and pleasant in summer, but in winter the N. E. gales (*bora*) are formidable on account of the rocky and dangerous coasts on the E. Venice, Trieste, Ancona, Bari and Brindisi are the chief ports, Brindisi having special importance.

**Adua** (a-dö'a), a town in Tigré, Abyssinia, made known through the severe defeat of General Baratieri, who, in the night of March 1, 1896, attacked the Abyssinian army of 80,000 men, under command of Negus Menelek. The three columns in which the Italians marched became separated in the mountainous regions, and the left wing, under General Albatone, was overwhelmed by the superiority of numbers and driven back. The center, under General Arimondi, and the right wing, under General Dabormida, made a brilliant attack on the Abyssinians, but their number was so inferior that both of them were put to flight; 250 officers and more than 7,000 men and their whole artillery were lost. On account of this annihilating blow the fall of the ministry of Crispi followed.

**Adullam** (ad-ul'am), one of the cities of the plain, in the tribe of Judah, fortified by King Rehoboam. The Cave of Adullam, where David hid when pursued by the Philistines, was probably near the Dead Sea.

**Adulteration**, the act of debasing a pure or genuine article for pecuniary profit, by adding to it an inferior or spurious article, or taking one of its constituents away. Another definition which has been given is: "The act of adding intentionally to an article, for purposes of gain, any substance or substances the presence of which is not acknowledged in the name under which the article is sold." In England, as early as the 13th century, the legislature attempted, though with but partial success, to strike a blow against it, in the Act 51 Henry III., stat. 6, often quoted as the "Pillory and Tumbril Act." In the United States, and in the principal European countries, the laws against adulterations are carefully drawn and systematically administered. Deliberate adulterations are of two classes: (1) Those which are injurious to health, and (2) those which produce no seriously hurtful effects. Careful investigation has demon-



Adultery

strated that adulterations of the latter class are comparatively rare. The articles most liable to adulteration are milk, butter, spices, coffee, syrup, and molasses, cream of tartar, honey, vinegar, jellies, and jams, olive oil and canned goods. According to reports by American official analysts, most of the staple articles of common household consumption, while frequently subjected to considerable sophistication, are seldom injuriously adulterated. For example: Spices and condiments are adulterated up to 66 per cent. with exhausted spices; ground coffee, up to 45 per cent. with ground cereals, flour, and buckwheat hulls; tea, up to 48 per cent. with exhausted tea leaves, leaves of other plants, and damaged tea; low-grade sugars, up to 20 per cent. with grape-sugar; syrups, up to 50 per cent. with grape-sugar or glucose; bread, up to 2 per cent. with alum, to increase its whiteness; cream of tartar and baking-powder, up to 44 per cent. with gypsum, starches, and fillers to increase the bulk; butter, up to 40 per cent. with foreign fats; vinegar, in most cases not at all, though it is seldom made of cider; olive oil, up to 60 per cent. with peanut and cotton-seed oil. In Massachusetts, in 1898, out of 10,638 samples of milk, food, other than milk, and drugs, 2,687 were found to be adulterated.

**Adultery**, unlawful intercourse between two married persons not standing to each other in the relation of husband and wife, or between a married person and another unmarried. In the former case, it has been called double, and in the latter, single adultery. Varied punishments, mostly of a very severe character, have in nearly all countries and ages been inflicted on those who have committed this offense. In some cases it has been deemed lawful for a husband or the woman's father to kill the guilty person if taken in the act. By the law of England, the slaughter of the offending parties in such cases is deemed manslaughter of a not very aggravated sort. In English law the act is punishable only by the censure of the ecclesiastical courts, but, when committed by a wife, it is regarded as a civil injury, and an action for criminal conversation may be brought by the husband against the paramour. Adultery is now considered in England a ground for total divorce. In the United States there is a wide diversity in the laws relating to this offense. In some States it has been made a crime, while, in others, civil proceedings are allowed substantially similar to those of the English law.

**Adummim**, a mediæval stronghold on the road to Jericho; according to tradition, the scene of the story of the Good Samaritan.

**Advaita**, a philosophical school of India, founded by Sankarûjûrya (or Çankarâcâ-

Adventure Bay

rya), who flourished about the middle of the 8th century A. D., or earlier. Its principal doctrines are that the human soul is not essentially different from God, but that it is imprisoned in the body from which at death it is released to return to the impersonal God, and that the material world is not different from God. Its adherents are called Advaitavâdin, or Confessors of Monism.

**Advent**, a term applied by the Christian Church to certain weeks before Christmas. Anciently, the season of Advent consisted of six weeks, and this is still the duration of it in the Greek Church. In the Catholic Church, however, and in the Protestant Churches that observe Advent, it only lasts four weeks, beginning with the Sunday nearest St. Andrew's Day (Nov. 30), either before or after. It is appointed to be observed as a season of devotion, being intended to commemorate the coming of Christ in the flesh, and to direct the thoughts to His second coming. This season was observed with great austerity by the primitive Christians.

**Adventists**, a religious sect founded by William Miller; also called Millerites and Second Adventists (*q. v.*). At first they believed that Christ's second coming would occur in October, 1843. When that hope was not realized, the number of believers decreased. The Adventists still look with certainty for the coming of Christ, but not at a fixed time. They are now divided into the following bodies: Evangelical, Advent Christian, Seventh Day, Church of God, Life and Advent Union, and Churches of God in Jesus Christ. The following table gives a summary of the various Adventist churches in the United States, as compiled from statistics published in 1906:

| Denominations.                             | Ministers. | Churches. | Communicants. |
|--|------------|-----------|---------------|
| 1. Evangelical.....                        | 34         | 30        | 1,147         |
| 2. Advent Christian.....                   | 912        | 610       | 26,500        |
| 3. Seventh Day.....                        | 486        | 1,707     | 60,471        |
| 4. Church of God .....                     | 19         | 29        | 647           |
| 5. Life and Advent Union                   | 60         | 28        | 3,800         |
| 6. Churches of God in<br>Jesus Christ..... | 54         | 95        | 2,872         |
| Total Adventists.....                      | 1,565      | 2,499     | 95,437        |

**Adventure Bay**, a bay on the S. E. coast of New Holland; discovered by Captain Furneaux in 1773, and named by him after the ship which he commanded, and which formed part of the expedition under the orders of Captain Cook. The anchoring ground is good and well sheltered, and the neighboring shore furnishes abundance of wood and water. Captain Cook found the aborigines to be mild and cheerful, but totally devoid of activity and genius, and nearly on a level with the wretched natives of Terra del Fuego.



**Advertising in America.** Advertising is any means of giving publicity. Originally it was by announcement by public crier or by a wall sign. Such were the methods of ancient Greece, Palestine, Pompeii and Rome. Picture signs, sometimes in colors, were used on doorways as insignia of the business conducted within; a goat indicated a dairy business, and a boy being whipped, a school. Through the Middle Ages the public crier was the chief promoter and medium of publicity, and he remained so until the introduction of printing provided more suitable means. In the 17th century small advertisements for such articles as coffee, tea, medicines and books began to appear in the few papers then published. The advertisements in America's colonial newspapers afford an interesting opportunity for studying the customs and needs of the people at that period. In fact, the advertisements of all times are a valuable historical commentary. Advertising did not become an important factor in business until the 19th century, being hampered in England as late as 1854 by the stamp tax upon all periodicals, which acted as a deterrent upon publishers. The growth of advertising has been in a direct ratio with the growth of journalism, and the following table showing the increase in the number of papers in the United States at different periods is also indicative of the increase in advertising. In 1795 there were in the United States 200 regularly issued papers; in 1850, 2,526; in 1895, 20,255. In 1905 the number of magazines alone was 2,900. Advertising in a large way began at the time of the establishment of the New York "Sun" in 1833, and the New York "Herald" and "Tribune" and the Philadelphia "Public Ledger" a little later. Since then it has grown to a point where at least one metropolitan daily netted its proprietors in 1903 a profit of a million dollars, most of which doubtless came out of the pockets of the advertisers. In 1902 the expenditure for advertising in the United States was \$500,000,000, which was increased in 1904 to a billion dollars. Of this sum, the magazines, trade-journals and newspapers get about 75 per cent. The balance is divided among other forms of advertising, made up of such mediums as the following: booklets, store papers, handbills, calendars, almanacs, gift novelties, posters, dead-wall signs, bill-boards, window lithographs and hangers, street-car cards, sample distributing, electric signs, personal demonstration, press agents, canvassers and detail men.

Within the last twenty-five years advertising has been specialized until in its more important phases it is largely in the hands of experts. Some of the best advertisement writers are employed at large salaries to superintend the advertising of big compa-

nies. A few of the heaviest advertisers of the country spend annually over a million dollars each in publicity. The bulk of the newspaper and magazine advertising is placed through the advertising agencies, the first one of which was established in 1841 in Philadelphia by V. B. Balmer. The advertising agency is in reality a "middleman," who stands between the publisher and the advertiser. It places at the service of its patrons the assistance of skilled artists and advertisement writers. It receives the sum of money which the advertiser wishes to spend for a year's publicity, selects appropriate mediums, makes the contracts, writes and distributes the "copy" (if desired), checks up the advertisements as they appear, insuring the fulfilment of the contracts, and pays the accounts as they come due. It furnishes the advertiser with the clerical work of his campaign without charge, obtaining its pay in the discount (given only to agencies) from the quoted rates of the publications used. Local advertisers usually deal direct with their newspapers, receiving a discount from the regular rates. The highest class of advertising is placed in the magazines, since they reach the highest class of readers. The advertising rates in the magazines of standard size may be said to approximate a dollar a page (per issue) for each thousand of circulation, though they vary from two-thirds of that amount in the instances of large circulations to three times as much in the case of some trade journals. Five hundred dollars is about the highest rate for a page of the regular magazine size, unless there be choice of position, such as outside cover page or opposite reading matter inside. With the extra large-page magazines the rate sometimes runs as high as \$4,000, which, however, is not excessive, since the circulation in such an instance reaches the million and a quarter mark. In the large-page periodicals the rate is usually fixed at so much per line, the length of the line (the width of the column) being given in 12-point ems. With such a circulation as that mentioned above, \$6.00 a line is the rate. Without the advertising patronage, the newspapers and magazines of the country could not exist in their present expensive forms. The subscription prices obtained by hundreds of periodicals do not amount to enough to pay even for the white paper used. The publishers themselves rarely get the full price. The yearly subscription rate is cut to the newsdealers, postmasters and special canvassers, while the news company, taking a ten-cent magazine for example, sells to the retail dealer for 7 or 7½ cents, and in its turn pays the publisher about two cents less. Besides this, the newsdealers have the privilege of returning unsold copies of most magazines. Illustrations are used extensively in advertising, and some of them,



especially those on the magazine covers, are from drawings by prominent artists and are reproduced in a very expensive form. Occasionally an extensive advertiser will employ a prize offer to attract contributions for his use, and the sums paid for such work will usually be sufficient to secure that of the highest class. Advertising has become a recognized profession, numbering thousands of workers in its ranks, these being subdivided into organizations of bill-board men and others; and an international advertising association has been formed to harmonize the interests of the experts in all countries. One of the important developments due to the influence of advertising is the growth of the sale of goods by mail, and large mail-order houses, some of them doing a business of a million dollars annually, are scattered over the United States. Advertising has in some instances been carried to such an objectionable extent in the way of the disfiguring of natural scenery by unsightly signs and legends, that legislative aid has been invoked to restrict it, and a law forbids the use of the United States flag for advertising purposes. In some cities (Philadelphia, for instance), the street distribution of circulars and dodgers is forbidden.

FRANK FARRINGTON.

**Advocate.** (1) Originally one whose aid was called in or invoked; one who helped in any business matter; (2) In law, at first, one who gave his legal aid in a case, without, however, pleading, this being the function of the *patronus*; (3) The *advocatus fisci*, who attended to the interests of the *fiscus*, or the emperor's privy purse.

In the old German empire, a person appointed by the emperor to do justice. In Germany and elsewhere juridical advocates were made judges in consequence of their attending when causes were pleaded in the court's court.

In the Mediæval Church, one appointed to defend the rights and revenues of a church or monastery. The word advocate, in the sense of a defender of the Church, was ultimately superseded by that of patron, but it still lingers in the term advowson.

Constitutional advocates, in Rome, pleaded before the consistory in cases relating to the disposal of benefices which they opposed. Elective advocates were chosen by a bishop, an abbot, or a chapter. Feudal advocates were persons assigned lands on condition of their fighting for the Church, leading out their vassals for the purpose. Matricular advocates defended the cathedral churches. Military advocates were appointed to fight for the Church. Devil's advocate, a Roman ecclesiastic, whose office it is to urge whatever objections may exist to the canonization of any proposed saint.

In English law, originally one who

pleaded a cause in a civil, but not in a criminal, court. Formerly, certain persons called advocates, learned in the civil and canon law, were alone entitled to plead as counsel in the English ecclesiastical and admiralty courts, but these are now thrown open to the ordinary bar.

Now, in English and American law, one who pleads a cause in any court, civil or criminal. It is not, properly speaking, a technical word, but is used only in a popular sense, as synonymous with barrister.

The queen's advocate was a member of the College of Advocates, whose office it was to advise and act as counsel for the crown in questions of civil, canon, and international law. He ranked next to the solicitor-general.

In the army the judge-advocate is the officer through whom prosecutions before courts-martial are conducted. There is also a judge-advocate-general for the army at large.

In Scotch law an advocate is a member of the faculty of advocates, or Scottish bar. These have not derived their privileges from any act of Parliament incorporating them into a society, but have possessed them from a period of unascertained antiquity. The association is formed on the model of that of the French *avocats*, and, like it, is presided over by a dean, or *doyen*.

The lord advocate is the principal crown lawyer in Scotland. It is his duty to act as public prosecutor, which he does in great cases in which the crown is interested, leaving the inferior ones to the procurators fiscal, who act under his instructions. He is virtually Secretary of State for Scotland, and, as a rule, it is through him that the Government proposes, explains, and defends the special legislation for that country.

**Æacus** (ē'ak-us), son of Jupiter, by Ægina, and king of the island of Cænopia. He was a man of such integrity that the ancients have made him one of the judges of hell, with Minos and Rhadamanthus (*qq.v.*).

**Æcidium**, a little wheal; a genus of plants belonging to the alliance *Fungales* and the sub-order *Cæomacci*. The various species constitute what is called rust. The species are widespread and numerous. They are found on the dandelion, the violets, the pines, the epilobiums, and various other plants. On grain crops they may often be seen under the glumes of the calyx. When ripe they burst and discharge a powder of a bright orange color. One species is, in consequence, known to agriculturists as red gum. They do not appear to injure crops. It is incorrect that *Æcidium berberidis*, a parasite on the barberry, tends to produce mildew on wheat in its vicinity.

**Ædessa**, or **Edessa**, a town of Macedonia, near Pella. Caranus, King of Mace-



donia, took it by following goats that sought shelter from the rain, and called it from that circumstance (*aigras*, *capras*) *Ægeas*. It was the burial-place of the Macedonian kings; and an oracle had said that, as long as the kings were buried there, so long would that kingdom exist. Alexander was buried in a different place; and on that account some authors have said that the kingdom became extinct.

**Ædile**, in ancient Rome magistrates who had charge of public and private buildings, of aqueducts, roads, sewers, weights, measures, the national worship, and, specially when there were no censors, public morality. There were two leading divisions of *ædiles* — plebeian and curule. Two of the former class were created A. U. 260, to assist the tribunes in their judicial functions. The same number of curule *ædiles* were elected from the patricians, A. U. 387, to perform certain public games. For a time these officers were chosen alternately from the patricians and the plebeians, then they were taken indiscriminately from either of these castes. Their insignia of office were like those of the old kings — the *toga prætexta* (a purple robe) and the *sella curulis*, or curule chair, ornamented with ivory. To the ordinary two plebeian *ædiles* Julius Cæsar added another pair, called cereal *ædiles*, to look after the corn supplies and the food of the capital generally.

**Ædui** (*id'wē* or *ed-ū'ē*), one of the most powerful tribes in Gaul at the time of Cæsar's arrival (58 B. C.), whose territory lay between the rivers Liger (*Loire*) and Arar (*Saône*). They formed an alliance with Cæsar, who freed them from the yoke of Ariovistus, but they joined the rest of the Gauls under Vercingetorix in the great and final struggle for independence, which was fought round the little hill-town of Alesia. After his victory, Cæsar treated them leniently for the sake of their old alliance. Their principal town was Bibracte.

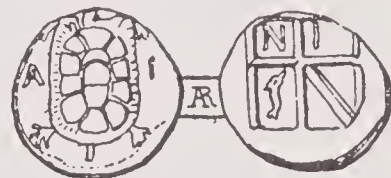
**Æeta** (*ī'et-a*), or **Æetas**, in mythology, the King of Colchis, son of Sol and Perseis, daughter of Oceanus, was father of Medea, Absyrtus, and Chalciope, by Idea, one of the Oceanides. He killed Phryxus, son of Athamas, who had fled to his court on a golden ram. The Argonauts went against Colchis, and recovered the golden fleece by means of Medea, though it was guarded by bulls that breathed fire, and by a venomous dragon. This expedition has been celebrated by all the ancient poets.

**Ægæon**, the son of Cælus or of Pontus and Terra, the same as Briareus. It is supposed that he was a notorious pirate, chiefly residing at *Ægæ*, whence his name; and that the fable about his hundred hands arises from his having 100 men to manage his oars in his piratical excursions.

**Ægean Sea** (*ē-jē'an* or *ī'gā-an*), the old name of the gulf between Asia Minor and Greece, now usually called the Grecian Archipelago.

**Ægeus** (*īg'ūs* or *ēj'us*), a king of Athens, son of Pandion, and father of Theseus. When the latter sailed to Crete on his venturesome expedition to deliver Athens from the intolerable burden of the tribute due to the Minotaur, he promised his father to hoist white sails on his return as a signal of safety. But the hero forgot his promise in the joy of triumph; and his father, who was anxiously watching for the sign of victory, seeing only the black sails of his son's ship as it approached the coast of Attica, believed that he had perished, and flung himself into the sea, which from him was named the *Ægean*.

**Ægina** (*ē-jī'na*), a Greek island about 40 square miles in area, in the Gulf of *Ægina* (the ancient *Saronicus Sinus*). It is mountainous, with deep valleys and chasms. The modern town of *Ægina* stands on the site of the ancient town, at the N. W. end of the island. There are considerable remains still left of the ancient city, and the ruins of solidly built walls and harbor moles still attest its size and importance. The island contains about 6,000 inhabitants. The most ancient name of the island was *Ænone*, and the Myrmidons dwelt in its valleys and caverns. For a century before the Persian war it was a prosperous State; during this period it was also the chief seat of Greek art. Its sailors covered themselves with glory at Salamis.



COIN OF ÆGINA.

The Athenians, in 429 B. C., expelled the original inhabitants, whose language and style of art were Dorian.

**Æginetan Sculptures**.—*Ægina* holds an important position in the history of Greek art. On an eminence in the eastern part of the island stand the ruins of a temple of Pallas Athene. Among these ruins a series of statues were excavated in 1811, which are now the most remarkable ornaments of the Glyptothek at Munich. One group represents a combat of Greeks and Trojans for the body of Achilles. The figures are true to nature, with the structure of bones, muscles, and even veins, distinctly marked; but there is no individuality, all the faces having that uniform forced smile which is characteristic of all sculpture before the time of Phidias. Probably they date from not more than 50 years before Phidias.

**Ægina**, a daughter of Asopus, had *Æacus* by Jupiter changed into a flame of fire. She afterward married Actor, son of Myrmidon, by whom she had some children, who conspired against their father. She is



## Æginhard

said to have been changed by Jupiter into the island which bears her name.

**Æginhard**, a German, educated by Charlemagne, of whom he became the faithful secretary. He retired from the active scenes of life after the loss of Imma, his beloved wife, whom some have falsely called daughter of the emperor, asserting that she conveyed her husband on her shoulders from her house, through the snow, that his escape might not be traced by the jealousy of her father. Æginhard is the author of a valuable life of Charlemagne, besides annals from 741 to 837, and letters. He died in 840.

**Ægis** (ē'jis or ī'gis), the shield of Zeus, which had been fashioned by Hephæstus (Vulcan). When Zeus was angry, he waved and shook the ægis, making a sound like that of a tempest, by which the nations were overawed. It was the symbol of divine protection, and became, in course of time, the exclusive attribute of Zeus and Athene.



PART OF THE TEMPLE OF ATHENE, AT ÆGINA.

**Ægisthus**, son of Thyestes, and cousin of Agamemnon. He did not accompany the Greeks to Troy, and, during the absence of Agamemnon, lived in adultery with Clytemnestra, his wife. He assisted her in murdering her husband on his return, but was himself put to death seven years later by Orestes, son of Agamemnon. This is the account given by Homer; the tragic poets make Clytemnestra alone murder Agamemnon, her motive in Æschylus being her jealousy of Cassandra; in Sophocles and Euripides, her wrath at the death of Iphigenia. Later writers also describe Ægisthus as the son of Thyestes by unwitting incest with his daughter Pelopia.

**Ægle**, in zoology, a genus of decapodous short-tailed crabs. The *A. rufopunctata*, or red-spotted ægle, is found in the Mauritius and the Philippine Islands.

In botany, a genus of plants belonging to the order *aurantiaceæ* (citron worts). The

## Æmilianus

ægle marmelos, the bhel, bale, bilwa, or Bengal quince, a thorny tree with ternate leaves and a delicious pulpy fruit, with a smooth, yellow, very hard rind, grows wild in India. Dr. Royle says that the astringent rind is used in dyeing yellow. In Ceylon a perfume is prepared from it, and the seed is employed as a cement. In India the legumes are used in asthma, the fruit, a little unripe, in diarrhœa and dysentery, and a decoction of the root and bark in hypochondriacal complaints and palpitation of the heart.

In astronomy, an asteroid, the 96th found. It was discovered by Coggia, on Feb. 17, 1868.

**Ægospotamos**, a town, in the Thracian Chersonesus, on a river of the same name, where the Athenian fleet, consisting of 180 ships, was defeated by Lysander, on the 13th of December, B. C. 405, in the last year of the Peloponnesian War.

**Ægyptus** (ē-jip'tus or ī'gip-tus), son of Belus, and brother to Danaus, gave his 50 sons in marriage to the 50 daughters of his brother. Danaus, who had established himself at Argos, and was jealous of his brother, obliged all his daughters to murder their husbands the first night of their nuptials. This was executed, with the exception that Hypermnestra alone spared her husband, Lynceus. Even Ægyptus was killed by his niece Polyxena. Ægyptus was king, after his father, of a part of Africa, which from him has been called Ægyptus.

**Ælfric**, an Anglo-Saxon abbot, surnamed GRAMMATICUS; born about 955. He became Archbishop of Canterbury; compiled a Latin grammar and glossary; translated most of the historical books of the Old Testament and canons for the regulation of the clergy; and was active in resisting the Danish invaders. He died in November, 1005.

**Ælianus, Claudius** (ē-li-ā'nus), a noted Roman sophist who flourished in the first half of the 2d century. Of his many works, written in Greek, three are extant: "Peasants' Letters," purporting to be written by different peasants in Attica; "Various Histories," or narratives, in 14 books; "Of the Nature of Animals," anecdotes of animals. Editions of his works were published in 1731, 1780, and (Paris) 1805.

**Æmilianus, C. Julius**, a Moor, who, from the lowest stations, rose to be Emperor of Rome. He reigned only four months, when he was killed, in his 46th year, by his own



soldiers, who then offered the crown to Valerian.

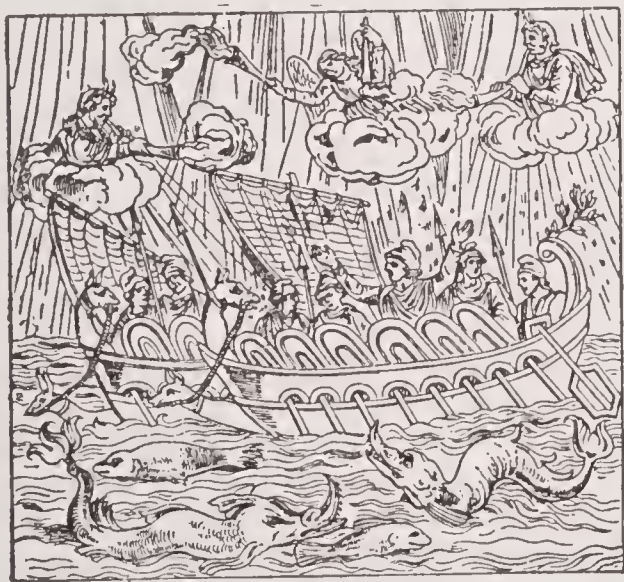
**Æmilius Paulus**, the name of several historical persons, the most remarkable of whom was the son of the consul Æmilius Paulus, who fell in the battle of Cannæ, 216 B. C. Young Æmilius inherited his father's valor, and enjoyed an unwonted degree of public esteem and confidence. In 168 B. C. he was elected consul for the second time, and intrusted with the war against Perseus, King of Macedon, whom he defeated in the battle of Pydna.

**Æneas** (en-ē'as), a Trojan prince, son of Anchises and the goddess Venus. The care of his infancy was intrusted to a nymph; but at the age of 5 he was recalled to Troy, and placed under the inspection of Alcathous, the friend and companion of his father. He afterward improved himself in Thes-saly, under Chiron, whose house was frequented by all the young princes and heroes of the age. Soon after his return home, he married Creusa, Pri-

am's daughter, by whom he had a son, called Ascanius. When Troy was in flames, he carried away upon his shoulders his father Anchises and the statues of his household gods, leading by his hand his son Ascanius, and leaving his wife to follow behind. According to Vergil and other Latin authors, he was sailing from Sicily to Italy when he landed in Epirus, and was driven on the coasts of Africa and received by Dido, Queen of Carthage, to



ÆNEAS' FLIGHT  
FROM TROY.



ÆNEAS IN A STORM.

whom, on his first interview, he gave one of the garments of the beautiful Helen. Dido being enamored of him, wished to marry him; but he left Carthage by order of the gods. In his voyage he passed to Cumæ, where the Sibyl conducted him to hell, that

he might hear from his father the fate which awaited him and all his posterity. After a voyage of seven years, and the loss of 13 ships, he arrived in the Tiber. Latinus, the king of the country, received him with hospitality, and promised him his daughter Lavinia, who had been before betrothed to King Turnus by her mother Amata. To prevent this marriage, Turnus made war against Æneas; and, after many battles, the contest was terminated by a combat between the two rivals, in which Turnus was killed. Æneas married Lavinia, in whose honor he built the town of Lavinium, and succeeded his father-in-law. His reign was but of short duration, various accounts being given of the cause of his death.

**Æneid**, one of the great epic poems of the world. It was written in Latin by Vergil, and published after his death, which took place about 16 B. C. Its hero is Æneas, one of the Trojan chiefs, whose adventures during and after the siege of Troy it recounts, till the time when he succeeded in fully establishing himself in Italy. The poet, like the majority of his countrymen, believed that the imperial family of the Cæsars had Æneas for their remote ancestor, and that many other illustrious Romans were descended from his companions in arms.

**Æolian** or **Æolic**, one of the three great dialects of the Greek language, the others being the Doric and the Ionic. The expression, Attic dialect, often occurs, but this should be regarded as the normal type of Greek rather than as a divergent dialect of that tongue.

**Æolic digamma**, a letter similar in character and sound to the letter *F*. It is so called because the Æolians used to prefix it to certain words beginning with a vowel, and insert it between the vowels in the middle of words. It does not appear as a letter of the ordinary classical Greek alphabet.

**Æolic rocks** are those formed by the action of the wind. Example, sand dunes. They are sometimes called also aërial rocks.

**Æolic verse**, called also eulogie, archilochian and pindaric verse, is a verse consisting of one iambus or spondee, then of two anapests separated by a long syllable, and then another syllable concluding all.

**Æolian Harp**, a harp played by Æolus—in other words, by the wind. It is made by stretching strings of catgut over a wooden sound-box. If exposed to the action of the wind, a succession of pleasing sounds proceeds from it, plaintive when the breeze is slight, but bolder as it increases in force.

**Æolians**, the name of one of those peoples classed under the general appellation



of Greeks. We trace the name of Æolians to Thessaly, their primitive abode, as far as we know, where they appear to have been closely related to the Phthiotic Achæans of the same country. The Achæi of the Peloponnesus were kinsmen, and, in fact, part of the Æolians; and the great emigration, commonly called the Æolian, was an emigration of Achæan people. It seems probable that the emigration from the Peloponnesus commenced before the Dorian invasion, or return of the Heraclidæ, as it is often called, which caused so great a revolution in the peninsula. Strabo says that the Æolian settlements in Asia were four generations prior to those called the Ionian. The Æolian colonies on the Asiatic main land were widely spread, extending at least from Cyzicus, along the shores of the Hellespont and the Ægean, to the river Caicus, and even the Hermus. Many positions in the interior were also occupied by them, as well as the fine island of Lesbos, with Tenedos, and others of smaller importance. Homer mentions all these parts as possessed by a different people; which would be a proof, if any were wanting, that the race of new settlers came after his time. There were 12 cities or States included in the older settlements in that tract of Asia Minor on the Ægean, which was known in Greek geography by the name of Æolis, and formed a part of the subsequent larger division of Mysia. Smyrna, one of them, which early fell into the hands of the Ionians, the neighbors of the Æolians, still exists nearly on the old spot, with exactly the same name, thus adding one to the many instances of the durable impression made by Greek colonists wherever they settled.

**Æolus** (ē'ō-lus), the god of the winds, who was fabled by the early poets to have his seat in the floating island of Æolia; but the Latin and later Greek poets placed him in the Lipari isles. Here the winds were pent up in vast caves, it being the duty of Æolus to let them loose and to restrain their violence, at the pleasure of Jupiter.

**Æon**, a period of time, a lifetime, a generation; a long space of time, eternity; a space of time clearly marked out; a period, an age, a dispensation.

In ancient philosophy and theology, among the gnostics, a virtue, attribute, or perfection of God, personified and regarded as an inferior sort of god or goddess. Thus Valentinian, in the 2d century, taught that in the pleroma (the gnostic name for the habitation of God) there were 30 æons, 15 male and 15 female; besides these there were four unmarried—Horus, Christ, the Holy Spirit, and Jesus.

In modern science and literature, a period of immense duration, specially one of those

which geology makes known, as the Silurian and Devonian æons.

**Æpinus, Francis Maria Ulric Theodore** (ep'ē-nös), a distinguished electrician, who was the first to see the affinity between magnetism and electricity in its full extent, and to perceive how these may illustrate each other. He is also the inventor of the condenser of electricity, and of the electropus. He published several memoirs relating to philosophical subjects, and seems to have devoted a considerable portion of his time to mechanical pursuits. Born at Rostock, Germany, in 1724; died at Dorpat, in Livonia, in 1802.

**Ærodynamics**, the science which treats of the force exerted by air when in motion. See DYNAMICS.

**Ærolite** or **Ærolith**, a stone which falls from the air, or sky. The name is somewhat inappropriate, now that it is known that the connection of these stones with the air is but slight, they simply traversing it as, under the operation of gravity, they fall from the regions beyond to the earth. They have also received the name of meteorites, from the fact that the fall of one or more ærolites is generally preceded by the appearance of a meteoric fire ball, which, after gleaming forth for a brief period, then explodes, irresistibly suggesting the inference that the ærolites which fall constitute its fragments. Hence, ærolites and large meteors are classed under one category. Sometimes ærolite and meteorite are made quite synonymous terms; but it is better to draw a distinction between the two, making meteorite the general word and limiting ærolite to the stony varieties of the genus. The ærolites, in this limited sense, as a rule, fall to the ground in an incandescent state. They are generally sub-angular, but with the angular points rounded off, and are coated, to the depth of about a quarter of a line, with a black crust like varnish. When fractured, they commonly display a series of small, gray spherical bodies in a gritty substance, occasionally with yellow spots interspersed. When thus consisting of stony spherules they are sometimes termed chondritic ærolites, from Gr. *chondrites* = of the shape or size of groats; *chondros* = a corn, grain, groat. Iron is found in large quantity in nearly every ærolite, sometimes malleable, and sometimes in a state of oxide. It is always in connection with nickel. Other substances found in more limited quantity in ærolites are silica, magnesia, sulphur, alumina, lime, manganese, chrome, cobalt, carbon, soda, and water. No new element has been found, but the combination of the old ones is different from any occurring in this planet. Though the fact that stones could fall from the sky to the earth was doubted by the scientific

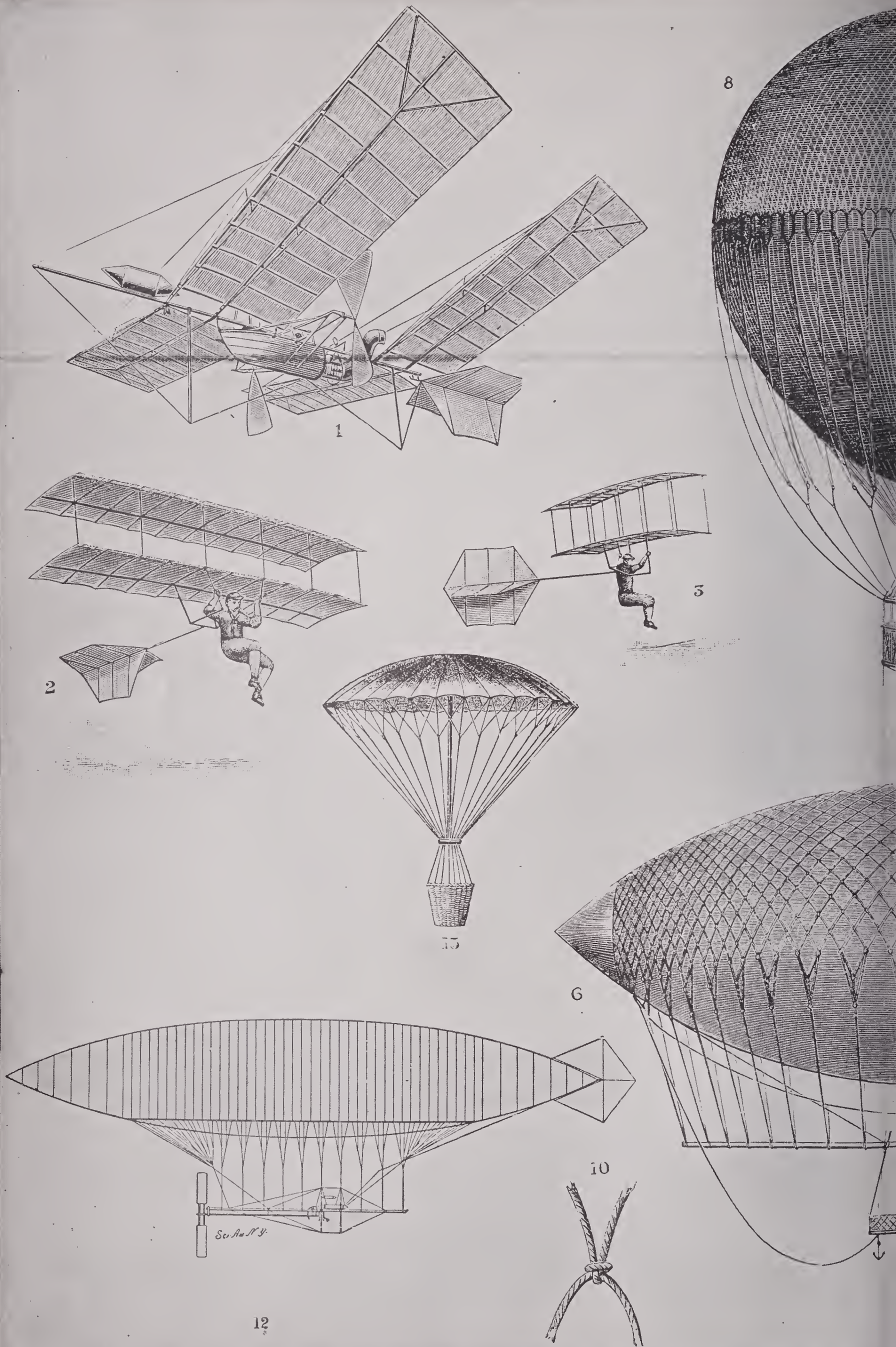


## AERONAUTICS.—AERIAL MACHINES.

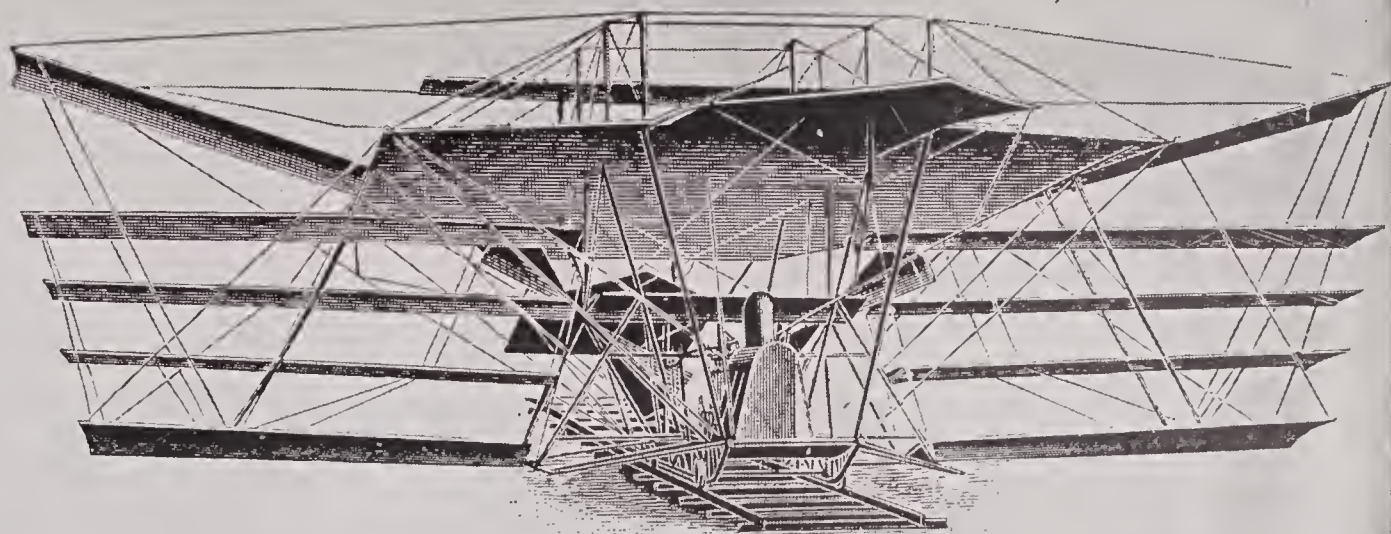
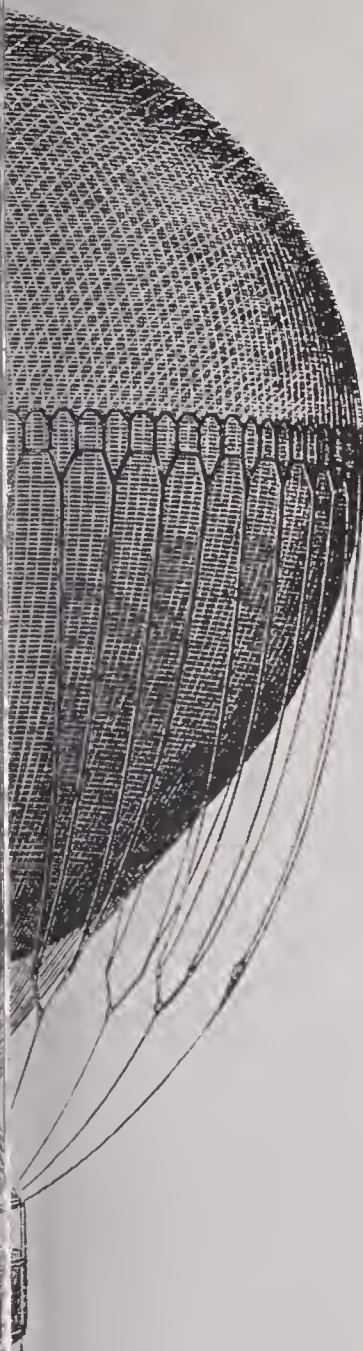
FIG.

1. Langley's Flying Machine.
2. Chanute's Gliding Machine—off.
3. Chanute's Gliding Machine—stopping.
4. The Maxim Flying Machine.
5. The Boiler of the Maxim Machine.
6. Balloon with Electric Motor.
7. Propeller of same, with Motor and Gearing enlarged.
8. Great Captive Balloon used at Paris.
9. Section of Car of same.
- 10, 11. Knot of ordinary Netting as compared with that adopted in  
Netting of Captive Balloon.
12. Outline Diagram of the Santos-Dumont Air Ship.
13. Parachute as it appears when descending.

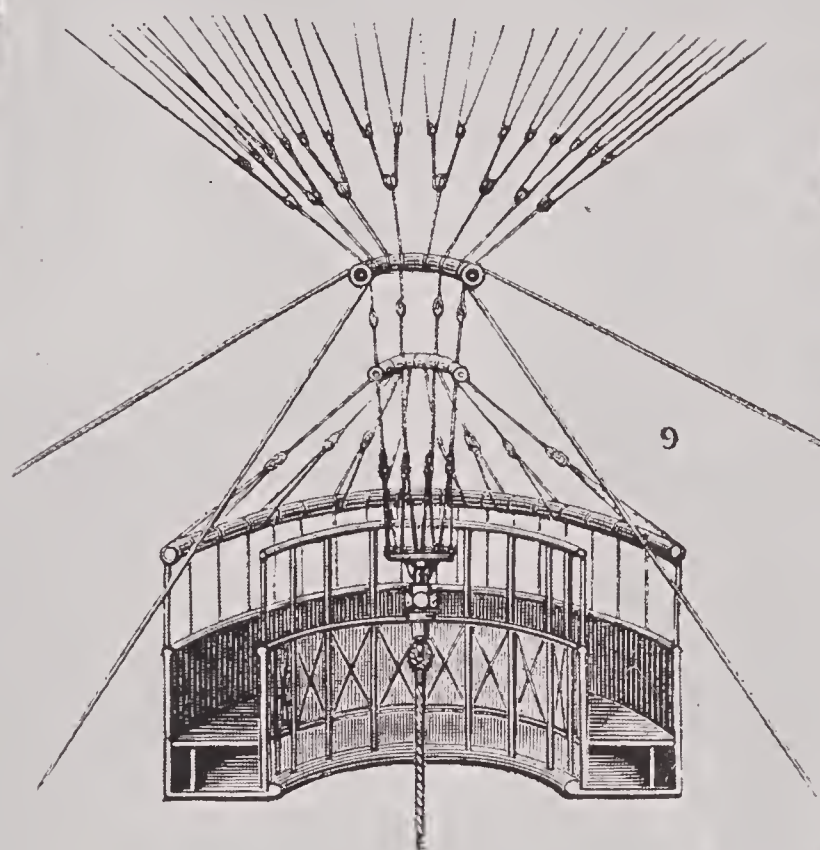




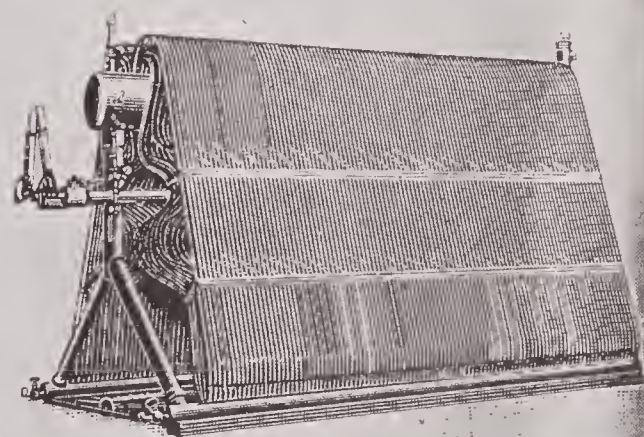




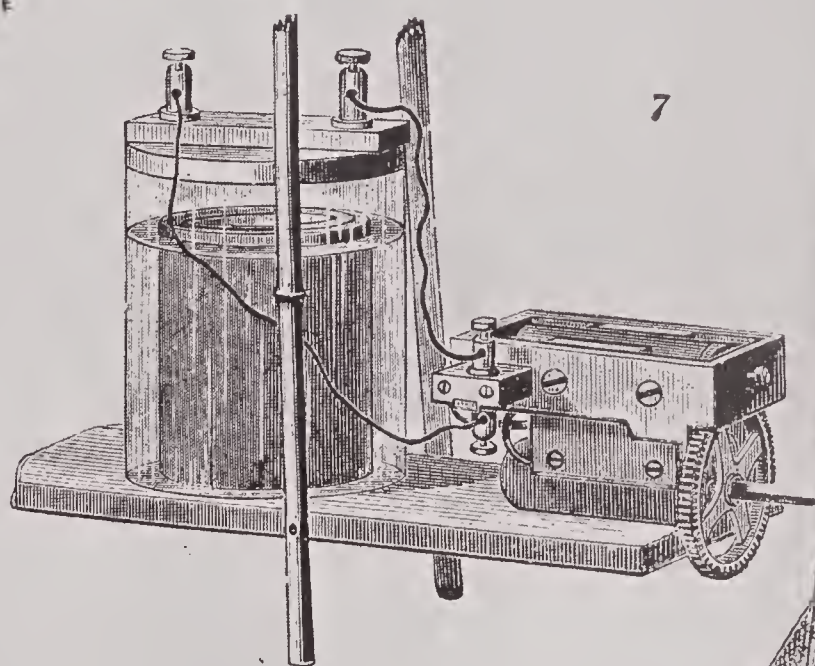
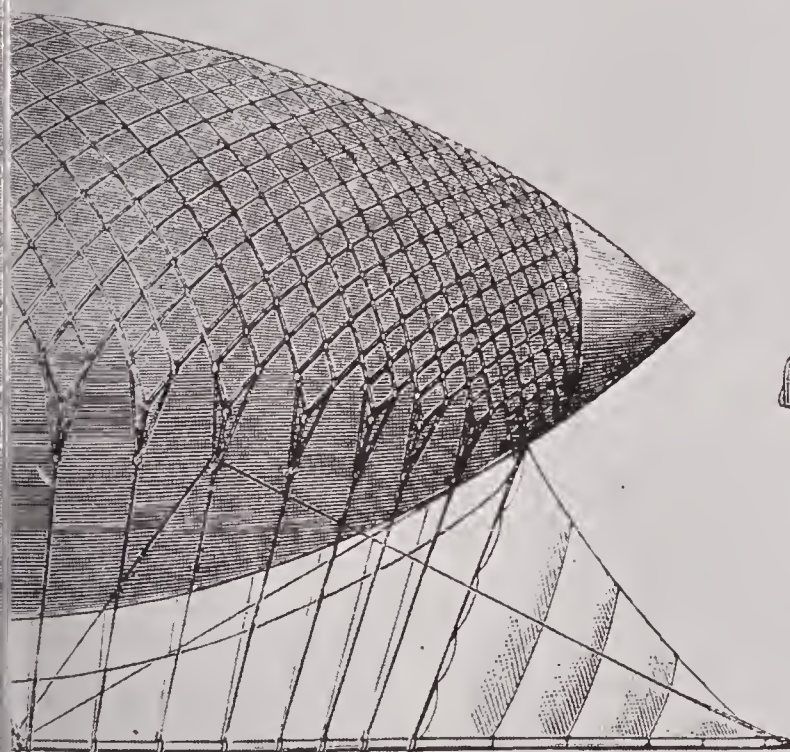
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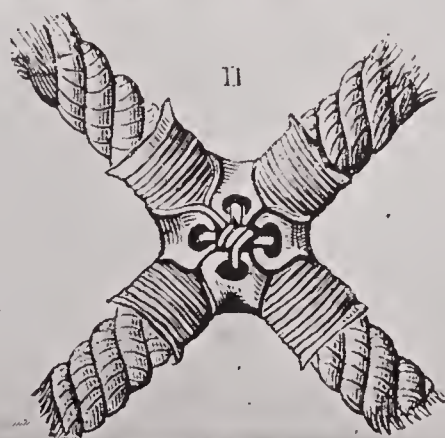
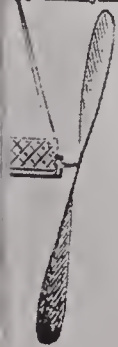
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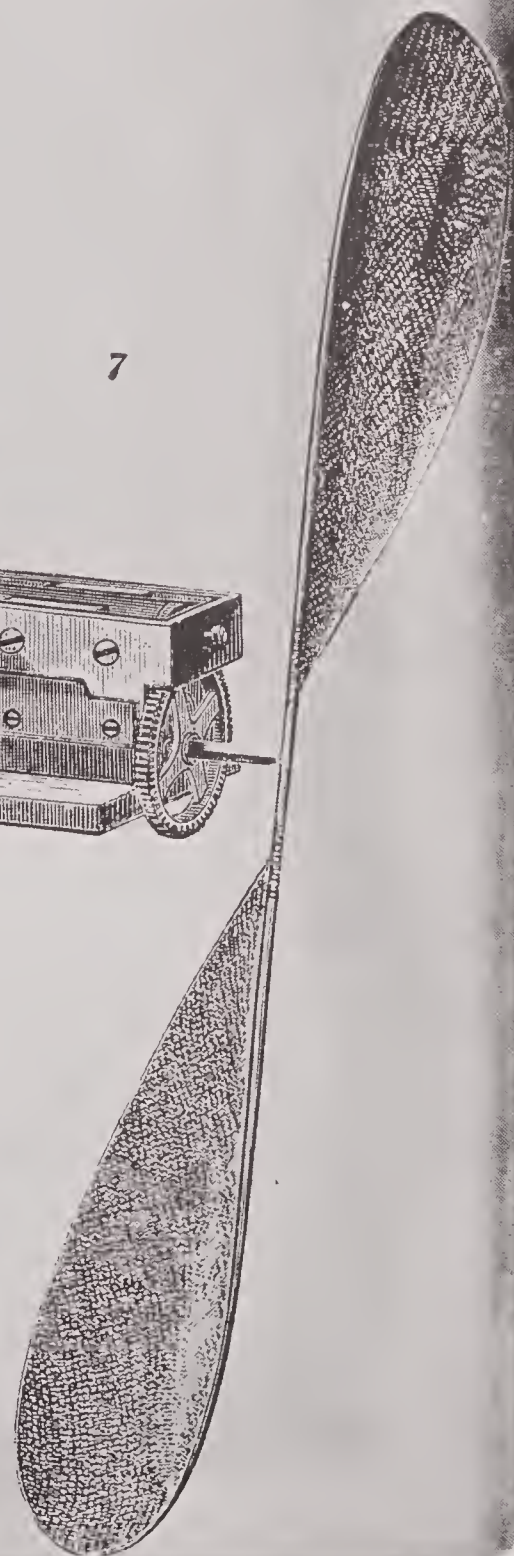
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## Aeronautics

almost till the close of the 18th century, the occurrence of such a phenomenon had been again and again popularly reported in various countries, and from a high period of antiquity. There is reason to believe that the object of worship in many a pagan shrine in ancient times was an aërolite; that this was the case with the idol worshipped in the great temple of Diana, at Ephesus, is all but implied in the town clerk's words. "The image which fell down from Jupiter" (Acts xix: 35).

**Aeronautics**, the constructing and operating of practical airships and flying machines.

The word Aeronautics indicates primarily and traditionally the principles governing the construction and operation of balloons (see BALLOON), but since the advent of the aeroplane and other forms of flying machines the meaning has been extended to include these also. (See AEROPLANE and FLYING MACHINE).

Since, however, the theories and practice of the two types of levitating apparatus are radically different, there are properly two distinct sciences connoted by the word aeronautics. These are aviation, or the science of flight, and ballooning, or the science of aerostation.

**Aeroplane**, a flying machine consisting of one or more surfaces of area sufficient to support the weight of human beings in the air, when propelled at high speed by a suitable motor.

At the present time the aeroplane seems to be the most promising answer to man's age-long prayer for the power of flight. It most closely imitates the behavior of the eagle, condor, albatross, and other large birds, which float for hours, high in the air, without apparent movement of the wings. As such birds are the longest and strongest fliers, as well as the largest, they would seem to furnish more appropriate models for artificial flying machines than the quick-flapping smaller birds and insects, which the designers of the various forms of ornithopter (see FLYING MACHINE) have attempted, rather unsuccessfully, to imitate. Like every other artificial flying apparatus, except the balloon, the aeroplane demands for its sustentation in the air some constantly acting agent of propulsion, failing which it will inevitably fall to the ground. Indeed, the element of motion is the sole secret of the successful "heavier-than-air" flying machine. This principle is exhibited also in a projectile, such as a stone, arrow, javelin or bullet, which, hurled strongly and rapidly by the force of mere muscle, a sling, a bowstring, or gunpowder, respectively, can maintain its elevation above the earth, flying through the air as long and as far as the momentum of the original hurling impulse endures. Similarly a stiff

## Aeroplane

card or disc of tin, projected from the hand in an approximately horizontal plane, may be so impelled as to soar to a considerable height before losing its balance and falling edgewise. The hurling energy acts to keep the card or tin disc afloat so long as the air can be made to serve as a support, so to speak, against gravity, or so long as no edge tips toward the ground.

Given the possibility of perfectly balancing a plane or concave surface in the air, and keeping it immovable laterally, it would remain suspended, theoretically, for as long a period as the elasticity of the air beneath would enable it to resist the pull of gravity, and in direct ratio to its area. This principle is well exhibited in the parachute, an umbrella-shaped structure, hanging beneath which a man may jump from a high-flying balloon and be wafted slowly and safely to earth. The weight of the man acts to hold the parachute parallel to the earth, so that, unless its fabric be rent, it utilizes the elastic property of the air in resisting the violent pull of gravity. With strongly moving air currents, on the other hand, acting upon a surface, and against a stable anchorage, we have the familiar phenomenon of the kite.

Such examples prepare us to understand the two fundamental requirements of successful artificial flight, as now recognized by all authorities: first, an engine or prime mover capable of developing high speed and power with small weight; second, some controllable mechanical means for maintaining the balance necessary to resist the down-pull of gravity as surely and effectively as vital instinct achieves it for birds and other flying creatures. Contrivances built to attain these ends can readily maintain the steady flight of an aeroplane at one constant elevation and in one direction. There must be provided, also, suitable rudders; one set for changing the direction laterally in a horizontal plane, and another for elevating or lowering the plane of travel. The latter device is essential for any attempt at soaring or descending.

The modern aeroplane is a developed glider of the type used in the experiments of the German, Otto Lilienthal, and of the American, Octave Chanute, which were continued to a successful issue by the Wright brothers, Wilbur and Orville. Lilienthal used a biplane consisting of two wings "broadly resembling those of a bat." With this apparatus he made over 2,000 gliding flights between 1891 and 1896 from the summit of a hill near Berlin, his attention being principally occupied with experimental observations on the best means of preserving equilibrium. He partially solved the problem by shifting his weight to counteract any deviations from a stable center of gravity; rather a crude device



from the viewpoint of present standards. Somewhat after Lilienthal, Chanute and Herring began their experiments, also with a biplane glider, fashioned, however, more nearly on the lines of up-to-date machines. Their contribution to the control of the machine was the method of compensating eccentricities in the center of pressure by alternating the pitch of the planes, rather than the less wieldy and decidedly dangerous method of shifting the carried weight. They also were the first to use adjustable tails and rudders for promoting the control of the apparatus. The Wright brothers, profiting directly by the experience and instructions of Chanute, began their memorable experiments in 1900. Three years later, after a large number of gliding flights, they first used a motor and propellers, thus transforming their improved glider into a true self-propelling aeroplane.

Most notable among the contributions made by the Wrights must be mentioned the device of warping the tips of the planes to counteract the tendency to slide sidewise from the horizontal. This "transverse control," as it is termed, is effected by wire connections from a lever convenient to the operator's hand, and is contemporaneous with an appropriate movement of the vertical steering rudder, the two motions combining to keep the machine in equilibrium. Although the device of warping the planes is claimed as original by the Wrights, who have protected it by a broad basic patent, others contend that it was used by a Frenchman named Mouillard as early as 1895, and was also suggested by Chanute. Curtiss and others accomplish the same result by the use of ailerons, or subsidiary horizontal planes, set parallel to and between the main planes, and capable of being swung on pivots to any desired angle.

That successful mechanical flight was not earlier achieved is due principally to two simple elements: first, to the very recent perfection of high-powered engines of small weight; second, to the apparent inability of inventors to handle properly their machines. With sufficient experience in control and operation several of the earlier types of aeroplanes would probably have flown. Most of the constructive elements were anticipated years before successful flight was achieved. As long ago as 1843 a certain Henson published in England drawings and descriptions of a proposed steam-propelled aeroplane, which not only in general design, but also in special constructive details, strangely anticipated several of the well-known French monoplanes of the present day. With his high-pressure engine, for which he claimed the remarkable efficiency, for those days, of one horsepower per each 30 pounds of weight, Henson's aeroplane might have attained a speed sufficient to

keep it in the air. So far as is known, however, he made no attempt to build a practical machine from his designs.

Among later experimenters whose efforts have greatly furthered the science of aviation, although themselves failing of the glory of success, may be mentioned Maxim, Ader and Langley. Maxim began experimenting as early as 1888, and in 1894 produced his completed machine. It was a very large affair, spreading some 4,000 square feet of supporting surfaces. It was designed to carry three men, and was provided with a steam motor of 363 horsepower weighing some 10 pounds per horsepower. The whole weighed 8,000 pounds, and was flown free but once, and then unintentionally, the result being that the machine was upset and broken by reason of its defective equilibrium in a side wind. In 1897 Ader tested an apparatus (his third), which reproduced with a few modifications the complete structure of a bird. It spread 270 square feet of surface and weighed 1,100 pounds, including a steam engine of 40 horsepower, weighing some 7 pounds per horsepower. This apparatus rose into the air upon a trial conducted under the auspices of the French War Department, which had defrayed the cost, but was upset by a wind-gust for lack of adequate equilibrium, and the government declined to advance any more funds. In 1901 Kress, of Vienna, tested an apparatus of 1,011 square feet sustaining surfaces, mounted upon floats so as to start and alight on water, equipped with a gasoline motor of 30 horsepower, which weighed 28 pounds per horsepower; the whole weighing 1,870 pounds, with the operator. It gained a good speed, but just as it was rising from the water it was upset by a side wind and sank to the bottom. The funds being exhausted, further experimenting stopped. In 1903 Langley, after fourteen years of experimentation, attempted to launch an apparatus carrying a man, similar to models which had several times previously flown nearly a mile. The full-sized machine was built (\$50,000) at the cost of the United States Government as a war engine. It spread 1,040 square feet of sustaining surface and weighed 830 pounds, this including a gasoline engine of 52 horsepower weighing less than 5 pounds to the horsepower, including cooling water, carbureter, battery, etc. Two attempts were made, and on each occasion something went wrong with the launching-gear, so that the apparatus fell instead of flying. There is little doubt that it would have flown if it had been properly launched, but here again further funds were refused, and the experiments were unwisely discontinued.

The necessity of persistent and long-continued experimentation to discover the principles governing the control of flying



apparatus was early recognized by Maxim and Langley, whose multitudinous observations still supply valuable data for practical designers. The Wright brothers experimented steadily for nearly eight years before attempting their first public demonstrations in America and France. According to reliable accounts, they labored for one whole year to perfect their knowledge of the best means for steering their machine. Other apparently small details occupied similarly extended periods of effort, even with the full benefit of the knowledge gleaned by Chanute and other pioneers. Thus only did they learn the "feel of the air."

In practical operation all types of aeroplane are perfectly similar, achieving like results by like mechanical means. In leaving the ground an aeroplane is urged forward by the rotation of its propellers, making the initial ascent at that angle with the horizon which is determined by the lift of its horizontal elevation or tilting rudder. Several types of aeroplane are equipped with wire wheels upon which they run along the ground until the speed of the propeller is sufficient to lift the apparatus safely into the air. The Wright machine regularly slides along an inclined plane on runners. Until the required propeller speed is attained the elevation rudder is depressed.

Once in the air the apparatus continues to aviate, so long as the speed is sufficient, all its movements being controlled by the tilting and vertical rudders, and its balance by the transverse control. The manual controls are also adequate to the task of allowing it to glide safely to earth with the engine stopped. The aviation of an aeroplane has been compared to the progress of a man running across a lake covered with blocks of cut or broken ice. Should the man stand still upon any of the blocks, he would sink, but, by virtue of a sufficient momentum, he may spring from one to another, not resting upon any one sufficiently long to allow it to sink with him. Professor Langley used the figure of a skater rushing at high speed over thin ice, and, because of his speed, failing to break through, as otherwise he must do. In the aeroplane, moving rapidly through the air, the center of gravity and the center of pressure are so effectively balanced that it is literally progressing constantly beyond each and every point at which it must otherwise be pulled inevitably to the ground. In this respect it is also analogous to a tight-rope walker, who maintains his balance principally by walking constantly along his narrow path, each successive step taking him from and beyond one and then another point at which he is in danger of falling off.

In view of the principles above stated, it is obvious that the most desirable construction in the supporting surfaces of an aero-

plane is the one by which the elasticity of the air may constantly be utilized to give the apparatus an upward impulse as it moves forward. This is actually accomplished by constructing the surfaces concave on the under side, rather than flat; or, in other words, building an aeroplane that is not a true plane surface. The concavity, moreover, is not made on a true arc, but rather on an eccentric curve, in which the greatest curvature is located on a transverse line about one-quarter the total depth of the "plane" from the front. From this point the surface curves gently to the rear. The effect produced by this construction is that the currents of air, rushing beneath the curved surface from in front, are compelled to ascend somewhat abruptly, forming a series of rotary motions in this "pocket," and producing the strongest pressure there, and thus imparting an inclined upward tendency to the front edge of the "plane." This effect is heightened by the action of air currents on the upper surface, where a rarefaction, or partial vacuum, occurs on the forward portion of the high curve, the air sliding to the rear over the inclined surface and thus greatly assisting the lifting effect of the condensing air beneath. The line along which the air acts to elevate the planes, as just described, determines the so-called "center of pressure," which in practical aeroplanes is just forward of the center of gravity, where the downward-pulling tendency is felt. The forces acting upon these two centers are constantly equalized and equilibrium maintained by manipulation of the tilting rudder for forward balancing and by the transverse control, warping the plane tips, for lateral balancing.

Another element highly essential to the proper balanced operation of an aeroplane is the *line of thrust*, along which acts the propelling force of the propeller. It should be so disposed as to contribute to the average equilibrium of the apparatus. The *angle of incidence*, or angle of inclination of the supporting plane to the line of flight, is of equal importance. The "planes" are not only curved, but also tipped upward and forward. In the Wright machine this angle is about 2 degrees; with the Bleriot monoplane it is about 12 degrees, varying as the type and special peculiarities of any given machine. Although the angle of incidence is an essential element in promoting the success of aviation, it need not be large. Indeed, authoritative opinion favors the smaller angles.

The proportions of an aeroplane vary according to the speed at which it is to be propelled. The higher the speed, the smaller the possible dimensions. Langley determined, as the result of long-continued experimentation, that the necessary area of the supporting plane varies inversely as the



square of the velocity. On the same principle, he determined that in a biplane the distance between the two horizontal supporting planes should not be less than the depth of the plane from front to rear for speeds of forty miles per hour and under. As speeds increase the planes may be set nearer together.

While the constructive elements of aeroplanes have been modeled on the anatomy of birds and other flying creatures as closely as an artificial machine can imitate a natural machine or organism, the engine developing the necessary propelling energy has been steadily approaching nearer to nature's efficiency standards. According to accurate observations, the muscles of birds are able to develop energy in the ratio of between 15 and 20 pounds weight to the horsepower. Previous to 1890, when mechanical science received a new impulse in the impending development of the automobile, the average efficiency for engines was in the neighborhood of 200 pounds per horsepower. Since that time the high-speed internal-combustion or gasoline engine has been so far perfected that an efficiency of 5 pounds per horsepower, or even less, is constantly available. With such improvements in the constructive details of aeroplanes as are inevitable in the next few years, we are rapidly approaching the time when artificial flight will be both swifter and stronger in ratio of the carried weight than is natural flight.

At the present time there are two distinct types of aeroplane in practical operation: the biplane, consisting of two horizontal carrying "planes," the one set above the other, somewhat after the design of a box kite; the monoplane, consisting of a single carrying surface, disposed like the spread wings of a flying insect at either side of the framework carrying the motor, the driver's seat, and the operating devices. The construction of the biplane has been compared to a flying beetle with his wing cases extended above his film-like wings; that of the monoplane to a huge dragon-fly with his elongated abdomen extending far to the rear of the point where the wings insert upon the thorax. The biplane is the type most favored in America, while the monoplane is peculiarly European. While several experimenters have proposed machines consisting of three or more planes, nothing practical has been produced along these lines.

The general principles already outlined apply to both types of aeroplane, but there are peculiar features in both cases which deserve special notice. Thus the monoplane has the long, rigid, tail-like structure to the rear of the main plane, which is lacking in the biplane, but which, as its advocates claim, contributes to the stability of the apparatus in the air. To this tail are attached the rudders for both steering and

elevation. In the biplane, on the other hand, the prevailing practice has been hitherto to attach the tilting rudder on an outrigger in front of the main planes and the steering rudder at the rear.

The types of engine used for the propulsion of aeroplanes are in general design and efficiency similar to those used on automobiles. The V-shaped multiple-cylinder motor is steadily gaining in favor for biplanes; while the rotary motor, one in which the cylinders are disposed on the radii from a common center and rotate about it in operation, has been used to some extent and is increasing in favor.

In point of size and speed of propellers, practice is fairly uniform. In the biplane the rule is to set the propeller at the rear, but in the monoplane the propeller is set in front, pulling the machine in the direction of travel. The Voisin biplane alone among machines of its type has the propeller in front.

The Wrights are the originators of and still the only notable designers using the two-propeller arrangement. They dispose their propellers to the rear of their lower main plane, the two being geared to revolve in opposite directions. The advantage claimed for this arrangement is that it is possible to use lower rotative speeds without reducing the total thrust; any speed of the propeller greater than a certain definite number of revolutions per minute being a distinct disadvantage. One objection frequently urged is that in the event of breaking one propeller the other will cause the aeroplane to move in a circle instead of straight ahead. To this the answer has always been made that the breakage of a propeller is an imperative signal to stop the engine and descend to earth.

The various methods in use for maintaining the horizontal equilibrium of an aeroplane are in general only so many modifications of the Wright tip-warping device. Several early monoplanes used auxiliary wing tips, which could be raised and depressed by the operator as required. Other models, however, provide to bend the main plane on a line about one-fourth the length from the tip. The Curtiss biplane, as previously stated, uses small auxiliary planes set between the main planes, and these, by virtue of tilting manually produced, are capable of neutralizing sidewise falling tendencies. In the Farman biplane the ailerons are downward-hanging flaps hinged at the rear of the main planes. In travel these assume a horizontal position under wind pressure. On a sidewise tip of the machine the ailerons on the low side are pulled down and act to right the machine by opposing a resistance to the air, which is resolved into a lifting effort. The Voisin biplane does away with all necessity for manual regulation of the equilibrium by the device



of "partitioning," which is to say introducing rigid vertical partitions between the two main planes, transforming the space into several cells or boxes open in the direction of travel. Owing to the resistance offered to the air, these partitions oppose any deviation from the horizontal in lateral directions, thus leaving the operator free to devote attention to steering his machine.

J. E. HOMANS.

**Æschines**, a celebrated Athenian orator, the rival and opponent of Demosthenes; born in Attica, in the demus of Cothocidæ, 389 B. C. His father, according to Demosthenes, was the slave of a schoolmaster, and his mother is described as a dancer. As Æschines himself and his brothers held honorable positions in the Athenian commonwealth, one of his brothers having for three years been one of the 10 Athenian generals, it is probable that these accounts of the meanness of his origin have been exaggerated by party malice. His father was poor, and kept a school, in which Æschines in his youth performed menial offices not deemed honorable in a free-born Athenian. According to Demosthenes, his father was named Tromes, but Æschines, in order to make him appear of better family, called him Atrometus. After assisting in his father's school Æschines was employed as a professional gymnast. He underwent the usual period of military service, was employed as a scribe by the statesmen Aristophon and Eubulus, went upon the stage as an actor, and served with distinction in several important campaigns particularly those of Mantinea and Tanynæ. After the last-named battle he was sent to carry home the news of the victory, and obtained a crown as the reward of his valor.

He had already begun to acquire reputation as a public speaker, and was at first a zealous opponent of the growing power of Macedonia. In 348 he was sent to the Peloponnesus to secure a union of the Greeks against Philip, but failing in his mission he became convinced of its impracticability. He was afterward employed to negotiate peace with Philip, and continued thereafter steadfastly to support the Macedonian alliance. Though openly accused of bribery, he was for a long period employed and trusted by the Athenians, among whom he headed the Macedonian party, but having failed in 330 B. C. in a prosecution against Ctesiphon for proposing to bestow a crown of gold upon Demosthenes, on which occasion Demosthenes made his celebrated oration "On the Crown," he withdrew from Athens. Although this accusation had been delayed till the Macedonian party was predominant, Æschines did not obtain the number of votes (one-fifth) necessary to free him from a fine of 3,000 drachmas for bringing a false accusation. He afterward employed himself for several years teaching

rhetoric in Ionia and Caria. After the death of Alexander (323 B. C.), he went to Rhodes, and established a school of eloquence. He died in Samos, 314 B. C.

Three of the orations of Æschines are extant—one made against Timarehus, who accused him after his second embassy to Philip of having been bribed; another oration on the embassy; and a third against Ctesiphon. He is said to have read this oration to his pupils at Rhodes, and on their expressing surprise at his failure he replied, "You would cease to be astonished if you had heard Demosthenes."

**Æschylus**, the first in order of time of the three great tragic poets of Greece; born in Eleusis, Attica, in 525 B. C. Euphorion, his father, was probably connected with the mysteries of Demeter, and he is said himself to have been initiated. In 499 B. C. he made his first appearance as a competitor for the prize of tragedy, but was not successful. Before attaining his first triumph he had to appear as an actor on a grander scene. He was present, and highly distinguished himself, at the battles of Marathon, Artemisium, Salamis, and Plataea. He must have gained as a poet by his experience in this momentous struggle, and probably too his fame as a warrior would help to recommend his compositions as a poet to his countrymen. His first dramatic victory was achieved in 484 B. C. The names of the pieces which composed his trilogy at this time are not known. The "Persæ" ("Persians"), the earliest of his extant pieces, formed part of a trilogy which gained the prize in 472 B. C. Altogether he is reputed to have composed 70 tragedies and gained 13 triumphs. In the satirical pieces which accompanied the trilogy of tragedies he is said also to have been a master. Only seven of his tragedies are extant. They are: "The Persians" (remarkable as being founded on contemporary events), "The Seven against Thebes," "The Suppliants," "Prometheus Bound," "Agamemnon," "The Choephoroi," and "The Eumenides." The last three form the trilogy of the "Oresteia" (so named as being based on the story of Orestes), the only complete Greek trilogy we possess. It was represented in 458 B. C., between which date and that of "The Persians" the others were brought out; but, according to a suggestion of Böckh, the representation of the "Oresteia" in 458 B. C. was a repetition in the absence of the poet.

In 468 B. C. he was defeated by Sophocles, and is said to have retired through mortification at this defeat to the court of Hiero, King of Syracuse. Of the fact of his residence at Syracuse at this time there appears to be no doubt, and without ascribing his retirement to mere jealousy, there are other reasons for associating it with his



defeat. Æschylus belonged to the old aristocratic party, which had long been on the decline. His rival Sophocles, whose first appearance as a dramatist had thus been honored with a triumph, was favored by the democratic party, Cimon himself being one of the judges. The decline of his party might thus render Athens an uncongenial residence to Æschylus, and indispose him for an arduous contest in which he did not feel that justice was done to his claims. During his residence at Syracuse he composed many pieces, in which he not only selected local subjects, but used words unintelligible to the Athenians. Unless Böckh's theory is received it must be supposed that Æschylus returned to Athens for the representation of his "Oresteia." There is a story that he was accused before the Areopagus for impiety either in representing the "Eumenides" on the stage or in divulging the mysteries of Demeter; and it is to the period of this representation that the accusation is usually referred. If Æschylus came to Athens he must soon have returned to Sicily, where he died in Gela in 456. A tomb was erected to him, with an epitaph by himself, in which he speaks of himself as an exile from Athens, and refers to his part in the battle of Marathon, but not to his writings. Of the manner of his death an improbable story is told, namely, that an eagle, mistaking his bald head for a stone, let fall a tortoise on it to break the shell, and thus killed him.

Æschylus was in a sense the creator of the Greek tragedy, the stage up till his time being occupied with comparatively feeble productions. His style, as is common with early poets, was grand, sublime, and full of energy, though sometimes erring in excessive splendor of diction and imagery. Longinus, the celebrated Greek critic, complains of it as being often harsh and overstrained. His plays have little or no plot, and in personal portraiture he does not represent the subtle complexities of human character, which belong to a later development of art, but the bold outlines of strength and daring which pertain to the conception of gods and heroes. A fatalistic tendency dominates his views of the unseen, and by making men the sport of superior beings supplies abundant material for tragedy. An ethical principle of retribution is not, however, wholly lost sight of. The practice of contending for the prize with a trilogy of plays was established before his time, but he was the first to reduce the trilogy to a unity by linking together three distinct but associated subjects, each of which formed the theme of a play complete in itself yet related to the others.

Æschylus was a great improver of the stage as well as of the drama. He introduced a second actor upon the scene, and was thus the founder of true dramatic dialogue, to

which he subordinated the chorus, which had formerly been the principal part. At a subsequent period he followed the example of Sophocles in introducing a third actor. The dialogue he introduced was measured and formal, and without the license of broken lines. This gave it a distant and stately character agreeable to the kind of superhuman heroes which it suited the genius of Æschylus to put upon the stage. To make the appearance of his personages suitable to their character, he introduced the thick-soled cothurnus or buskin to raise the stature of the actors, and he gave them dresses appropriate to the parts they had to play. He himself sometimes acted in his own plays. He also made use of the scene-painter's services, and Agatharchus is said to have painted for him the first scenes drawn according to the laws of linear perspective. From the testimony of Aristotle, however, it seems to be doubtful whether scene-painting was actually introduced by Æschylus or Sophocles. After its introduction it would no doubt be used by both. He carefully trained the dancers to represent incidents in the play by appropriate action, and he removed from the stage scenes of violence and blood.

By a special decree of the Athenian people a chorus was provided at the public expense for any one who wished to produce any work of Æschylus a second time. After his death his sons Euphorion and Bion, and his nephew Philocles, gained triumphs with works of his over Sophocles and Euripides, and thus was established a tragic school of Æschylus, which continued to flourish for more than a century. The first edition of Æschylus was printed at Venice in 1518. The best of the earlier editions was that of Stanley (London, 1663). The best recent editions are those of Ahrens (Paris, 1877), Wecklein (Berlin, 1884), and F. A. Paley (in the "Bibliotheca Classica"). There are English poetical translations by Potter, Blackie, Plumptre, Morshead, and Swanwick, and a prose translation by Paley.

**Æsculapius** (eskū-lā'pē-us), the god of medicine, son of Apollo and the nymph Coronis. Apollo brought his son to Chiron, who instructed him in medicine and hunting. In the former, he acquired a high



ÆSCULAPIUS.



degree of skill, so as to surpass even the fame of his teacher. He not only prevented the death of the living, but even recalled the dead to life. Jupiter, however, induced by the complaints of his brother, Pluto, slew Æsculapius with a thunderbolt. After his death, he received divine honors. Æsculapius had two sons, Machaon and Podalirius, who were called Asclepiades, and, during the Trojan War, made themselves famous as heroes and physicians. His daughters were Hygeia, Iaso, Panacea, and Ægle, the first of whom was worshipped as the goddess of health. Æsculapius is represented with a large beard, holding a knotty staff, round which was entwined a serpent, the symbol of convalescence. Near him stands the cock, the symbol of watchfulness. He is sometimes crowned with the laurel of Apollo. Sometimes his little son, Telesphorus, is represented beside him, with a cap upon his head, wrapped up in a cloak. Sometimes also Æsculapius is represented under the image of a serpent only.



ÆSOP.

**Æsop** (ē'sop), a Greek fabulist, who lived in the 7th century B. C. According to tradition, he was a captive of war, and for part of his life a slave. Many of his fables have been traced to Egyptian and Indian sources. Socrates, during his imprisonment, put into verse a portion of the Æsopian fables.

A more complete collection of them was by Babrius, a Greek fabulist. In the lapse of time, what might be called the Æsopian canon was much obscured, and spurious fables were incorporated into it. The stories related of Æsop, even by the ancients, are not entitled to credit.

**Æsopus, Clodius**, a celebrated actor who flourished about the 670th year of Rome. He was a contemporary of Roscius. His folly in spending money on expensive dishes made him as conspicuous as his dramatic talents. He is said, at one entertainment, to have had a dish filled with singing and speaking birds, which cost \$4,000. When acting, he entered into his part to such a degree as sometimes to be seized with a perfect ecstasy. Plutarch mentions a report concerning him while representing Atreus, that, deliberating how he should revenge himself on Thyestes, he was so transported beyond himself that he smote one of the

servants who was crossing the stage, and killed him on the spot.

**Æsthetics**, the name given to the branch of philosophy or of science which is concerned with that class of emotions, or with those attributes, real or apparent, of objects generally comprehended under the term beauty, and other related expressions. The term æsthetics first received this application from Baumgarten, a German philosopher, who was the first modern writer to treat systematically on this subject. Kant uses the word æsthetics (*aisthetikos*, perceivable by the senses) in a broader etymological sense, treating in his transcendental æsthetic of the *a priori* principles of sensuous knowledge. There are, as indicated, two modes of treating æsthetics, scientifically or empirically, by collection and collation of the objects or associations by which the æsthetical emotions are excited, and philosophically by analysis and determination of the cause or source and mode of the emotions. Neither of these modes is independent of the other; but the scientific mode, from the multitude of details it involves, is little amenable to summary treatment, and in form at least we shall be compelled to limit ourselves to the other.

Æsthetics, like every other branch of philosophy, has suffered from the conflict of first principles which has continually impeded the development of details; but it has also profited by this conflict, which has itself brought out facts which might otherwise have been hid. Space will not permit us to give a historical summary, and we must confine ourselves to the briefest indications of the views of the leading thinkers.

Socrates, according to Xenophon, regarded the beautiful as coincident with the good, and both as resolvable into the useful. Plato, in accordance with his idealistic theory, held the existence of an absolute beauty, which is the ground of beauty in all things. He also asserted the intimate union of the good, the beautiful, and the true. Aristotle, whose contributions to æsthetics are of the highest value, treated of them in much more detail than Plato, but chiefly from the scientific or critical point of view. In his "Poetics" he declares poetry to be a more serious and philosophical matter than philosophy itself. In his treatises on "Poetry" and "Rhetoric" he lays down a theory of art, and establishes principles of beauty. His philosophical views were in many respects opposed to those of Plato. He does not admit an absolute conception of the beautiful; but he distinguishes beauty from the good, the useful, the fit, and the necessary. He resolves beauty into certain elements, as order, symmetry, definiteness, and a certain magnitude, which appears to be relative to the perceptive capacity. A distinction of beauty, according to him, is the absence of



lust or desire in the pleasure it excites. Beauty has no utilitarian or ethical object; the aim of art is merely to give immediate pleasure; its essence is imitation; the chief objects of imitation in poetry and music are passions, dispositions, and actions. The essence of poetry consists in this imitation, and not in form. The end of tragedy, he says, is to effect a purification of pity and fear by means of these passions themselves. He also speaks of a purifying effect of music in quieting wilder forms of excitement. As this seems a contradiction of his negation of an ethical end in æsthetics it has been disputed whether this purification is ethical or æsthetical. Plotinus agrees with Plato and disagrees with Aristotle, in holding that beauty may subsist in single and simple objects, and consequently in restoring the absolute conception of beauty. He differs from Plato and Aristotle in raising art above nature. When the artist has *logoi* (the equivalent in the system of Plotinus of the ideas in that of Plato) for his models his creations may be more beautiful than natural objects. Baumgarten's treatment of æsthetics is essentially Platonic. He made the division of philosophy into logic, ethics, and æsthetics; the first dealing with knowledge, the second with action (will and desire), the third with æsthetics.

Where Baumgarten fails of a Platonic standard is in limiting æsthetics to the conceptions derived from the senses, and in making them consist in confused or obscure conceptions, in contradistinction to logical knowledge, which consists in clear conceptions. Kant defines beauty in reference to his four categories, quantity, quality, relation, and modality. In accordance with the subjective character of his system he denies an absolute conception of beauty, but his detailed treatment of the subject is inconsistent with the denial. Thus he attributes a beauty to single colors and tones, not on any plea of complexity, but on the ground of purity. He holds also that the highest meaning of beauty is to symbolize moral good, and arbitrarily attaches moral characters to the seven primary colors. The value of art is mediate, and the beauty of art is inferior to that of nature. He classifies the arts according as they express the (subjective?) æsthetic idea. The treatment of beauty in the systems of Schelling and Hegel can with difficulty be made comprehensible without a detailed reference to the principles of these remarkable speculations. Idealistic systems, which, to say the least, it is difficult to distinguish from pantheism, while it is impossible to find a beauty and even sublimity in the boldness of their developments, they may be described from an outside point of view as exaggerations of Platonism, in which human consciousness is made the exhaustive measure of universal being. The control of subject and object,

which with Schelling constitutes the absolute, is seen in artistic conception within the limits of the ego, and a feeling of infinite satisfaction accompanies this perfect perception by intelligence of its real self. Art accordingly is higher than philosophy, and the beauty of art is superior to the beauty of nature. Schelling's views of art are not clearly developed into particular criticism. In tragedy he finds a conflict of liberty in the subject with objective necessity. In art, according to Hegel, the absolute is immediately present to sensuous perception. With him, as with Schlegel, it is the highest revelation of beauty, and superior to nature. The beautiful is the shining of the idea (the Hegelian idea, or absolute notion into which all existence is resolvable) through a sensuous medium. Its essence accordingly is in appearance, and in this it differs from the true. Its complement is religion, which embodies the certainty of the idea.

Hegel classifies the arts according to the supremacy of form and matter, a classification which appears somewhat superficial, and is very open to criticism. He treats of beauty in much detail, and where he is not Hegelian he is essentially Platonic. The extravagance of Hegelianism, along with its pantheistic tendencies, become more pronounced in the systems of the followers of Hegel, into which we have not space to enter. English writers on beauty are numerous, but they rarely ascend to the heights of German speculation. Shaftesbury adopted the notion that beauty is perceived by a special internal sense; in which he was followed by Hutcheson, who held that beauty existed only in the perceiving mind, and not in the object. Numerous English writers, among whom the principal are Alison and Jeffrey, have supported the theory that the source of beauty is to be found in association—a theory analogous to that which places morality in sympathy. The ability of its supporters gave this view a temporary popularity, but its baselessness has been effectively exposed by successive critics. Dugald Stewart attempted to show that there is no common quality in the beautiful beyond that of producing a certain refined pleasure; and Bain agrees with this criticism, but endeavors to restrict the beautiful within a group of emotions chiefly excited by association or combination of simpler elementary feelings. Herbert Spencer avails himself of a hint supplied by Schiller, which he makes subservient to the theory of evolution. He makes beauty consist in the play (sport) of the higher powers of perception and emotion, defined as an activity not directly subservient to any processes conducive to life, but being gratifications sought for themselves alone. He classifies æsthetic pleasures according to the complexity of the emotions excited, or the



number of powers duly exercised; and he attributes the depth and apparent vagueness of musical emotions to associations with vocal tones built up during vast ages. Among numerous writers who have made valuable contributions to the scientific discussion of æsthetics may be mentioned Winckelmann, Lessing, Jean Paul Richter, the Schlegels, Gervinus, Helmholtz, and Ruskin.

The theory of Plato affords, we believe, the true basis both of philosophical apprehension and of scientific investigation of the beautiful. What is meant when it is said there is no common quality in what is recognized as beauty beyond the excitement of a pleasurable emotion? It is not pretended that all pleasurable emotions are comprehended in the notion of beauty; the mere excitement of pleasure is not then sufficient to distinguish the notion. Is the use of the term then a mistake, and does it imply nothing more than the arbitrary grouping together of some pleasurable emotions to the exclusion of others? We have the most conclusive psychological evidence in the structure of all languages that this is not the case, and that there is some notion, simple or complex, subjective or objective, requiring this term to express it. If, then, we attempt to distinguish between pleasurable emotions, and to group them as emotions of beauty or emotions not of beauty, we must either suppose our emotions to be self-excited, or we must assume a corresponding difference in the exciting cause. We have thus got both an objective and a subjective beauty and it remains to inquire into the nature of the object, whether real or phenomenal, simple or complex, by which the notion of beauty is excited. Association cannot be an original cause of the emotion, for association as such, and without regard to the nature of the association, can excite no definite emotion such as that of pleasure. If the notion of beauty then is actually excited by association, as it undoubtedly is, it remains to be inquired by what association, and by what elements of the association? Nor can the explanation of Aristotle and other philosophers be received, that beauty is merely a recognition of harmony, proportion, symmetry, and such modes in complex objects, for it is as undoubted that there is a self-beauty, the beauty of a straight line in being straight, of a circle in being round, or of blueness in being blue, as that there is a beauty of harmony and proportion. Lastly, we cannot limit beauty to the objects of the senses; all that is perceived by intelligence, whether in the forms or processes of matter, or in the states or operations of mind, is capable of exciting the emotion of beauty. There is then no common category in which the beautiful can be included except the beautiful. It is not the useful, or the good, or

the true, the great or small, the high or low, but the beautiful. But Plato has also shown that our ideas, though not resolvable into each other, are mutually dependent and related. They are united in concrete thought and apprehension, and they form in their totality a whole which constitutes the oneness of intelligence. If beauty then cannot be resolved into other notions, its relations to and combinations with these notions can be traced, and this constitutes its philosophical definition.

Our knowledge is indeed too limited to enable us to trace all the relations of ideas which are infinite, but a just use of psychology enables us to apprehend in their simplest form even the highest verities, and Plato, in associating in one triad beauty, goodness, and truth, has expressed the highest relation and evolved the highest knowledge attainable of them. The psychological evidence of this union lies within the range of experience, and its generalization is the legitimate operation of reason. To a limited intelligence goodness and truth (or reality) seem often wide apart, but every intelligence must apprehend the desirableness of their union, and occasionally witness practical exemplifications more or less perfect of it. If uniting such partial realizations we assume that to a perfect intelligence truth and goodness would be in perfect unity, the contemplation of this union will excite in us the highest emotion of beauty. This, then, may be regarded as both the type and the exhaustive realization of the notion of beauty. This trinity has, as indicated also by Baumgarten, a relation to the distribution or natural operation of our faculties. We have reason to apprehend truth, imagination to perceive beauty, and conscience to recognize goodness. Imagination as a mental faculty must not be understood as a mere power of reproducing objects of sense in the form of pictorial images. It is the mental power by which we apprehend and combine at will all the elements directly presented to our consciousness, whether from external observation or internal experience. It, as well as reason, is operative, but it differs from reason both in its mode of operation and in its end. Instead of the slowly elaborate process by which reason searches out the true relations of its objects, it seeks by the readiest process objects of immediate contemplation on which it can dwell with satisfaction, and accordingly selects for combination those elements which present to it the most immediate affinities. In its constructive data it is as comprehensive as reason, but in its processes it is less sure. It even forms hypotheses, that is, semblances of reason, but it leaves reason to verify them. Hence the reason why the perception of the beautiful has been assigned to an inner sense. Hence also the reason why the ap-



prehension of beauty separates itself from the apprehension of truth and of goodness.

The apprehension of beauty is always the apprehension of some perfection, of some identification of the good in the real, but in order to produce the emotion of beauty this identification must be manifest. This it is, and this alone apparently, which associates beauty with the work of imagination rather than with the work of reason, and makes the former the special faculty of beauty. The processes of reason are slow, and their results remain long imperfect; thus there is no immediate realization of the perfection of truth attained by them; but when some final discovery completes a chain of reasoning, and a whole truth stands revealed, there is an immediate perception of goodness in the completed truth, and the emotion of beauty is at once evoked. The work of imagination is subject to the review of reason, but as reason and imagination work on the same fundamental principles, it is the application of these principles alone which reason can review. Particular manifestations of beauty are thus capable of analysis, and we may resolve the elements of the most complex manifestations into two, self-beauty and beauty of combination. The first exists when the simple type or idea is realized in the example, when a straight line is straight, a circle round, a color or a sound pure. When a type is suggested by simulation, on the contrary but so imperfectly realized that the defect is apparent, the result is ugliness. It thus needs no metaphysics to distinguish beauty from its opposite. In combination beauty is given when perfect types are combined according to laws of symmetry, proportion, and design. Every single curve, for example, has a particular law, and that curve is beautiful when produced according to its law; but when a variety of curves are combined according to some law of symmetry in one outline, there is, besides the self-beauty of the several curves, a beauty in the observance of the law of combination, and in this complex beauty of outline, besides the manifested beauty of form, there may be suggested beauties of suppressed continuations. So with combinations of sound and color and more complex combinations, as in the forms of animal and vegetable life.

Two related laws of beauty in combination appear to be the production of the greatest variety with the least expenditure of means, and the repetition under slight modifications of similar forms. The latter from the comparisons it suggests has a highly educative effect on the perceptive faculties. Thus all the canons of beauty are absolute, but as these canons are applicable only to the elements, whether of self-beauty or of combination, and as we are ignorant of the laws which determine the number and variety of the more complex

combinations, which we learn to know only by observation and comparison, principles of criticism only can be formed, and no absolute standard of taste for common empirical observation. Diversities of opinion are thus easily accounted for. The existence of beauty in the object is distinct from its perception, and in a complex object each observer will only perceive those beauties which the capacity and training of his own faculties enable him to perceive. Even the demonstration to reason of the observance of a law of beauty will not help a defective capacity. The instrumentality of our senses in interpreting to us the beauties of nature demands particular attention. Beauty in an object implies relation of the object to mind in which the canons of beauty exist, but not surely to the perceiving mind only but also to the conceiving or creating mind. The perception of beauty thus establishes a community between the perceiving and the creating mind. It is an evidence of the validity of the information we derive from those operations of our senses which are deemed most arbitrary. It is the stamp of the Creator on the instruments of our faculties.

It is easily possible for art within a narrow range to excel nature, for while nature supplies our types, she rarely carries out in any individual example all the details of typical excellence variously presented. The whole causes of these deviations of nature from her own standards it is impossible to assign, but observation shows that ethical causes have a place among them, and the best reason of men has always inclined to give them a larger place than actually appears. In this also art imitates nature, but in this wider sphere to suppose that art could excel nature would be to assume the superiority of man to the Author of nature. There is thus no ethical indifference for art. To limit it to the mechanical imitation of nature, or the mere selection and combination of æsthetical types without an ethical purpose, would be to place it below the level of reason, and to contradict instead of imitate nature. In assigning a purifying effect to art Aristotle spoke truly as a critic and historian, and to denude this purification of an ethical significance would be to lower his authority as a witness, but not to alter the fact. No canon of criticism is more frequently repeated at the present day than that of Aristotle, that art is without ethical end. This criticism, however, is not true to nature. Art cannot cease to be æsthetical in order to be ethical. It must always deal with the perceptive, but within its own province it is subject to its own ethical code, and it has besides affinities with the general ends of ethics which cannot be ignored with impunity. The pleasure it affords must always be pure, and it may also be instructive.



**Ætion** (ā-ē'shē-on or it'ē-on), a Greek painter, whose pictures of the nuptials of Alexander and Roxana, shown at the Olympic games, obtained for him, although he was quite unknown, the daughter of the president in marriage.

**Ætius** (ē'tē-us), a famous general, in the reign of Valentinian III., Emperor of the West. He was brought up in the emperor's guards, and, after the battle of Pollentia, in 403, was delivered as a hostage to Alaric, and next to the Huns. On the death of Honorius he took the side of the usurper, John, for whose service he engaged an army of Huns. He was afterward taken into favor by Valentinian. Being jealous of the power of Boniface, governor of Africa, he secretly advised his recall, and, at the same time, counseled the governor not to obey the mandate. This produced a revolt, which caused an irruption of the Vandals into that province. The treachery of Ætius being discovered, a war ensued between him and Boniface, in which the latter was slain. Ætius now appealed to the Huns, of whom he raised a large army, and, returning, so greatly alarmed Placidia, the mother of Valentinian, that she put herself into his power. He defended the declining empire with great bravery, and compelled Attila to retire beyond the Rhine. He was stabbed, in 454, by Valentinian, who had become jealous of his fame and influence.

**Ætna.** See ETNA.

**Ætolia** (ē-tō'lē-a), a district of ancient Greece, lying on the N. coast of the Gulf of Corinth. It was divided from Acarnania by the river Achelous, and on the N. touched Thessaly. In later times, these boundaries were considerably extended to the N. and E. The country had few cities; was, except on the coast, generally wild and barren. Here, according to the legend, Meleager slew the Calydonian boar. The Ætolians make a great figure in the heroic age of Greece; but, at the time of the Peloponnesian War, they were rude and barbarous. The Ætolian confederacy, first called into existence about 323 B. C., became an important rival to the Achaean League. Their assembly was styled the Panætolicon. They sided with the Romans against the Achaean League, but afterward aided Antiochus III. against the Romans, and were subjugated by the Romans in 189 B. C., though not formally included in a Roman province till 146. Along with Acarnania, Ætolia now forms a department of the modern kingdom of Greece, with a united area of over 3,000 square miles. The mountains in the N. E. are offsets of the Pindus chain, and slope steeply on the S. W. down to the central plains. The chief towns are Missolonghi and Lepanto.

**Affiliation**, the adoption of the child of another; the act of connection with a society. An order of affiliation is that which a magistrate issues on the oath of a woman, to compel the father of an illegitimate child to provide for his maintenance. If the mother be of sufficient ability to maintain the bastard while it is dependent upon her, and neglect that duty, so that it becomes chargeable to a county, she is liable to be punished, under the provisions of the vagrant act. If she be not of sufficient ability, the law will compel the father to supply a fund for its maintenance.

**Affinity.** (1) Neighborhood; (2) relationship by marriage; (3) union, connection.

In ordinary language and law, literally, the relationship contracted by marriage between a husband and his wife's kindred, or between a wife and her husband's kindred. It is opposed to consanguinity, or natural relationship by blood. It is of three kinds: (1) Direct, viz., that subsisting between a husband and his wife's blood relations, and *vice versa*; (2) secondary, or that which subsists between a husband and his wife's relations by marriage; and (3) collateral, or that which subsists between a husband and the relations of his wife's relations.

In biology, a resemblance, or resemblances, on essential points of structure, between species, genera, orders, classes, etc., really akin to each other, and which should be placed side by side in any natural system of classification. Affinity differs from analogy, the latter term being applied to resemblances between animals or plants not really akin, but which ought to be more or less widely separated in classifications. Thus the falcons, the hawks, the eagles, etc., are related to each other by genuine affinity; but the similarity on certain points, such as the possession of retractile claws, between the raptorial birds and the feline race of mammals, is one only of analogy.

In chemistry, chemical affinity, or chemical attraction, is the force by which union takes place between two or more elements to form a chemical compound. According to another definition, it is a force exerted between two or more bodies at an infinitely minute distance apart, by which they give rise to a new substance, having different properties to those of its component parts. Elements have the greatest affinity for other elements which differ most in their chemical properties. Thus, H has great affinity for Cl and O, but the affinity between O and Cl is much weaker. Acids unite readily with alkalis; most metals, with sulphur. When two salts are mixed together, they are decomposed if an insoluble substance can be formed: thus  $\text{AgNO}_3 + \text{NaCl}$  yields  $\text{NaNO}_3$  and insoluble  $\text{AgCl}$ , and  $\text{BaCl}_2 + \text{MgSO}_4$  yields  $\text{MgCl}_2$  and insoluble  $\text{BaSO}_4$ .



## Affirmation

A strong acid generally expels a weaker one, as  $\text{H}_2\text{SO}_4$  expels  $\text{HCl}$  or  $\text{CO}_2$ , and  $\text{CO}_2$  precipitates  $\text{SiO}_2$ ; but when two salts are fused, if a more volatile compound is formed, it is driven off, as when  $\text{NH}_4\text{Cl}$  is heated with dry  $\text{CaCO}_3$ , then  $(\text{NH}_4)_2\text{CO}_3$  volatilizes.  $\text{SiO}_2$ , fused with salts, expels the strongest acids and forms silicates. Iron filings, heated to redness, in a tube, decomposes the vapor of water, but  $\text{H}_2$ , passed over red-hot oxide of iron, reduces it to a metallic state. These reactions are due to the diffusion of gases, the resulting gas being diffused through the mass of vapor passing through the tube. The relative affinities between different substances varies with their temperature, insolubility, and power of vaporization. The nascent state is favorable to chemical combination: thus,  $\text{H}$  and  $\text{N}$  unite readily when organic matter containing  $\text{N}$  is decomposed by heat or putrefaction; also  $\text{H}$  with  $\text{S}$ . This is due to the bonds of the atoms being liberated at the moment of decomposition. Disposing affinity is the action of a third body, which brings about the union of two other bodies, as  $\text{Ag} + \text{SiO}_2$  and alkali form a silicate of silver;  $\text{Pt}$  is attacked by fused  $\text{KHO}$ . Organic decompositions in the presence of caustic alkali, or lime, are also examples. Catalysis is the action of a body to bring about a chemical reaction while the body itself undergoes no perceptible change, as  $\text{MnO}_2$  in the preparation of  $\text{O}$  from  $\text{KClO}_3$ . Certain chemical compounds at high temperatures are dissociated from each other, as  $\text{NH}_4\text{Cl}$  at high temperatures forms  $\text{NH}_3 + \text{HCl}$ . Chemical union is promoted by finely dividing the substances; thus, finely divided metals, as iron or lead, take fire in the air, uniting with  $\text{O}$ . Alternation of temperature alters the affinity; thus, mercury heated to its boiling-point absorbs oxygen, which it liberates at a higher temperature; also,  $\text{BaO}$  absorbs  $\text{O}$  at a low heat, forming  $\text{BaO}_2$ , and gives it off at higher temperatures. Strong bases generally replace weaker bases; thus, alkalies precipitate oxides of iron, etc.

Affinity of solution is such an affinity as exists between a soluble salt and the fluid in which it is dissolved. Till the liquid is saturated with the salt, the two can combine in an indefinite ratio, instead of being limited to the fixed proportions in which alone chemical affinity operates.

In natural philosophy, current affinity is the force of voltaic electricity.

**Affirmation**, the act of affirming, in the sense of solemnly declaring in a court of law that certain testimony about to be given is true. Also, the statement made. First, the Quakers and Moravians, who objected on conscientious grounds to take oaths, were allowed to make solemn affirmations instead; now, everyone objecting to take an

## Afghanistan

oath has the same privilege; but, as is just, false affirmations, no less than false oaths, are liable to the penalties of perjury.

**Affre, Denis Auguste** (äf-fr), was born Sept. 27, 1793, and, in 1840, on account of his prudent and temperate character, was made Archbishop of Paris by the Government of Louis Philippe. Though not yielding a blind submission to all the measures of that government, he abstained from offensive opposition; and when, in 1848, a republic was proclaimed, he kept aloof from political strife, but displayed earnest care for the public welfare. During the June insurrection, he climbed on a barricade in the Place de la Bastille, carrying a green bough in his hand, as a messenger of peace; but he had scarcely uttered a few words, when the firing recommenced, and he fell mortally wounded, to die next day, June 27th. He was the author of several theological writings, and of a work on Egyptian hieroglyphics.

\***Afghanistan**, the land of the Afghans, a country in Asia, of a quadrangular shape, lying chiefly between lat.  $30^\circ$  and  $38^\circ$  N.; lon.  $61^\circ$  and  $73^\circ$  E. It is bounded on the E. mainly by India and Indian frontier tribes, S. by Baluchistan, W. by Persia, and N. by the Russian Transcaspian territory, Bokhara, and the Russian Pamir territory. The length from E. to W. is about 560, the breadth about 450 miles. The boundaries have recently been all defined, and the area is about 210,000 square miles. The population is estimated at between 4,000,000 and 5,000,000.

**Topography.**—Afghanistan consists chiefly of lofty, bare, uninhabited table-lands, ranges of snow-covered mountains, and deep ravines and valleys. Many of the last are well watered and very fertile, but about four-fifths of the whole surface is rocky, mountainous, and unproductive. The surface on the N. E. is covered with lofty ranges belonging to the Hindu Kush, whose heights are often 18,000 and sometimes exceed 20,000 feet. The loftiest passes are above 12,000 feet, and the road often passes along the base of mural precipices rising from 2,000 to 3,000 feet. The whole N. E. portion of the country has a general elevation of over 6,000 feet; but toward the S. W., in which direction the principal mountain chains of the interior run, the country sinks down to not more than 1,600 feet. The principal avenues of communication between Afghanistan and India are the famous Kyber Pass, by which the Kabul river enters the Panjab; the Gumul Pass, also leading to the Panjab; and the Bolan Pass on the S., through which the route passes to Sind. Of the rivers, mostly in the center of the country, the largest is the Helmund, which flows in a S. W. direction more than 400 miles, till it enters the Hamoon or Seistan

\*For Map, see PERSIA.



swamp, previous to which, however, its water is almost all drawn off by canals for irrigation. It receives the Arghandab, a considerable stream. Next in importance are the Kabul in the N. E., the Hari Rud in the N. W. The only lake worth mention (the Hamoon being almost entirely in Persia) is that called Ab-Istada, a shallow sheet of water about 12 miles in diameter, situated toward the E. of the country at the height of about 7,000 feet.

*Climate and Productions.*—The climate is extremely cold in the higher, and intensely hot in the lower regions. On the whole, however, it is salubrious, yet diseases are more common than we might expect. The most common trees are pines, oaks, the wild olive, cypress, birch, walnut, and holly. Many indigo-yielding plants grow spontaneously on offsets of the Hindu Kush, and asafœtida is common. In the plains the mulberry, tamarisk, acacia, date palm, willow, plane, and poplar are found; and fine fruits, in the greatest variety and abundance, grow wild. The cultivable land, a very small proportion of the whole area, is under indifferent management. In many parts two harvests are annually reaped. The principal crops are wheat, forming the staple food of the people; barley, given to horses; peas and beans, rice, maize, and several of the grains of Hindustan. Other crops are tobacco, madder, some sugar cane, and cotton. The more important domestic animals are the camel and dromedary, the horse, ass, and mule, the ox, and sheep with large fine fleeces and enormous fat tails; of wild animals there are the tiger, bears, leopards, wolves, jackal, hyena, foxes, etc. The minerals include all the more valuable metals, particularly iron, which along with lead is about the only metal worked. The manufactures are unimportant, but the trade is extensive, and employs about 24,000 camels. The chief exports are wool, horses, silk, carpets, rosaries, fruits, madder, etc. A considerable amount of wool is forwarded to Karachi for export. The chief political divisions are Kabul, Jalalabad, Ghazni, Kandahar, Herat, and Afghan Turkestan. The chief towns are Kabul, Kandahar, Ghazni, and Herat.

*Peoples.*—The inhabitants belong to different races, but the Afghans proper form the great mass of the people. These call themselves Pushtaneh or Puktaneh, Afghans being the Persian name. They are an Iranic race, and are divided into a number of tribes, among which the Duranis and Ghilzais are the most important, the latter being the strongest of all the tribes. A tradition, evidently modern and legendary, gives them an Israelitish origin. The Afghans are bold, hardy, and warlike, fond of freedom and resolute in maintaining it, but of a restless, turbulent temper, and much given to plunder. Their language is

distinct from the Persian, though it contains a great number of Persian words, and is written like the Persian with the Arabic characters. In religion the Afghans are Mohammedans of the Sunnite sect. Other races in Afghanistan are the Hazareh, a Mongol race living chiefly in the N. W.; the Tajiks, who are a remnant of the aboriginal population, and are scattered over the country; and the Hindkis, an Indian race living in the E.

*History.*—Of the early history of Afghanistan little is known—a circumstance the less to be regretted that its interest commences only with modern times. The collective name of the country itself is of modern and external origin, not being used by the Afghans themselves. In 1738 it was conquered by the Persians under Nadir Shah. In 1747 he was murdered, and Ahmed Shah, one of his generals, obtained the sovereignty of Afghanistan, and became the founder of the Durani, the first Afghan dynasty, which lasted about 80 years. At the end of that time Herat was all that remained in the hands of a Durani sovereign, while Dost Mohammed Khan, the ruler of Kabul, had acquired a preponderating influence in the country. He was desirous of gaining the assistance of the British against Persia, but believing that he was meditating treachery against them, they resolved to dethrone him and restore Shah Shuja, a former ruler. In April, 1839, a British army under Sir John Keane entered Afghanistan, and after overcoming some slight resistance entered Kabul, and placed Shah Shuja on the throne. A force of 8,000 was left to support the new sovereign, and the rest of the army returned to India. Sir W. Macnaghten remained as envoy at Kabul, with Sir Alexander Burnes as assistant envoy. The Afghans were by no means content with the new state of affairs, however. A widespread conspiracy was organized, which came to a head on Nov. 2, 1841, when Burnes, Macnaghten, and a number of British officers, besides women and children, were murdered. The other British leaders were disheartened and paralyzed, and a treaty was made with the Afghans, at whose head was Akbar, son of Dost Mohammed, by which the former agreed to withdraw the forces from the country, while the latter were to furnish them with provisions and escort them on their way to Jalalabad. On Jan. 6, 1842, the British left Kabul and began their most disastrous retreat. The cold was intense, they had almost no food—for the treacherous Afghans did not fulfil their promises—and day after day they were assailed by bodies of the enemy. By the 13th, 26,000 persons, among whom were many camp followers, women and children, were destroyed. Some were preserved as prisoners, but only



## Afghanistan

one man, Dr. Brydon, reached Jalalabad with the dismal news.

Jalalabad, in which General Sale was stationed with a small force, was soon after besieged by Akbar, but on the approach of General Pollock, who had forced his way through the Kyber Pass with a fresh army from India, the Afghan forces withdrew. After joining his forces with those of General Nott, who had meanwhile maintained himself in Kandahar, and had taken Ghazni, General Pollock entered Kabul and soon finished the war, though not without some hard fighting. Dost Mohammed again obtained the throne of Kabul, and acquired extensive power in Afghanistan. He joined with the Sikhs against the British; but in 1855 he made an offensive and defensive alliance with the latter, which he renewed in 1857. He died in 1863, having nominated his son Shere Ali his successor. He entered into friendly relations with the British, and this state of matters continued till 1878, when the Ameer having repulsed a British envoy and refused to receive a British mission (a Russian mission being meantime at his court) war was declared against him, and the British troops entered Afghanistan (Nov., 1878). They met with comparatively little resistance; the Ameer fled to Turkestan, where he soon after died; and his son Yakooob Khan having succeeded him concluded a treaty with the British (at Gandamak, May, 1879), in which a certain extension of the British frontier, the control by Great Britain of the foreign policy of Afghanistan, and the residence of a British envoy in Kabul, were the chief stipulations.

Not long after this settlement, however, the British resident at Kabul, Sir Louis P. Cavagnari, and the other members of the mission, were treacherously attacked and slain by the Afghans, and troops had again to be sent into the country. Kabul was again occupied and Kandahar and Ghazni were also taken; while Yakooob Khan was sent to imprisonment in India. In 1880 Abdur-Rahman, a grandson of Dost Mohammed, was recognized by Great Britain as Ameer of the country. The occupation of Merv by Russia in 1881, and the subsequent continuous pushing forward of the Cossack outposts toward Herat and the S., now began to be seriously considered by the British as menacing India. After some negotiations between the two governments, it was arranged that an Anglo-Russian commission should be constituted to settle the frontier between Afghanistan and Russian territory. In the meantime, however, the Russian troops were advancing, and in 1885 they reached Penjdeh, where they came into conflict with a body of Afghans. For a time war seemed imminent between Great Britain and Russia, but it was at last settled that the boundary line extending from

## Africa

the Hari Rud to the Oxus should run so as to exclude Penjdeh, but include Meruchak in Afghanistan, following the Oxus E. from about Khojah Saleh to Lake Victoria, N. of Chitral. The boundary between Afghanistan and British India was long uncertain, but in 1893 an arrangement was come to between the Ameer and Sir Mortimer Durand. The boundary then agreed on was demarcated shortly afterward and is so drawn as to leave Chitral, Bajaur, Swat, Chilas, and Waziristan to Great Britain, while Afghanistan is given the territories of Asmar, Birmal, and Kafiristan. The Ameer's annual subsidy was also increased from 12 to 18 lacs, and restrictions on the import of arms, etc., were removed. Abdur-Rahman proved himself a vigorous ruler and the steady friend of Great Britain, and did much under the guidance of Englishmen to civilize his subjects and develop the resources of his country. He was for a time suspected of secretly assisting the frontier tribes in their revolt in 1897, but he later gave unmistakable proof of his loyalty. He died in Kabul, Oct. 3, 1901. His second son, Prince Nasrullah Khan, visited Great Britain in 1895 and received many tokens of British friendship.

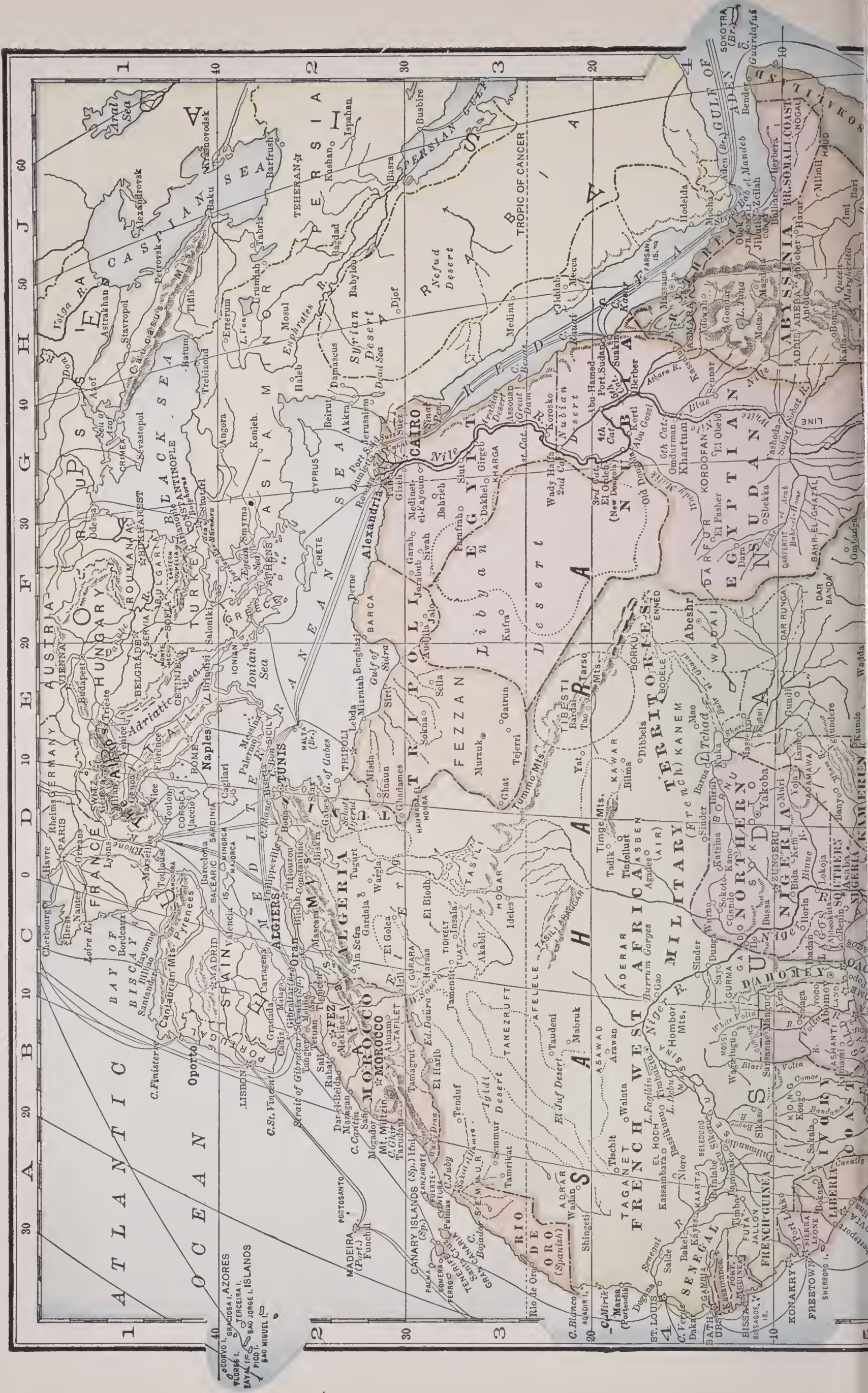
**Africa**, one of the three great divisions of the Old World, and the third in area of the five continents, lies nearly due S. of Europe and S. W. of Asia. It is of a compact form, being nearly equal at its extreme points in length and breadth. The N. section of the continent, however, has an average breadth of nearly double the S. This great change of form arises mostly from the greater projection of the upper part toward the W., and the transition on this side from the broad to the narrow section is effected suddenly by an inward turn of the W. coast, which faces S. for nearly 20° of longitude, forming the Gulf of Guinea, the greatest indentation of the coast.

*Topography.*—Africa is united to Asia at its N. E. extremity by the Isthmus of Suez, now crossed by a great ship canal. From this point the coast runs in a W. and somewhat N. direction to the Strait of Gibraltar, the point of greatest proximity to Europe. This N. coast forms the S. shore of the Mediterranean Sea, and brings all the N. countries of Africa into close proximity with the European and Asiatic countries lying contiguous to that great ocean highway, which formed the chief medium of communication between the principal divisions of the ancient world. It presents some considerable indentations, the chief of which is that forming the Gulfs of Cades and Sidra. From the Isthmus of Suez S. the coast runs in a somewhat E. direction, parallel to the Asiatic peninsula of Arabia, and between the two lies the long and narrow expanse of the Red Sea. To the

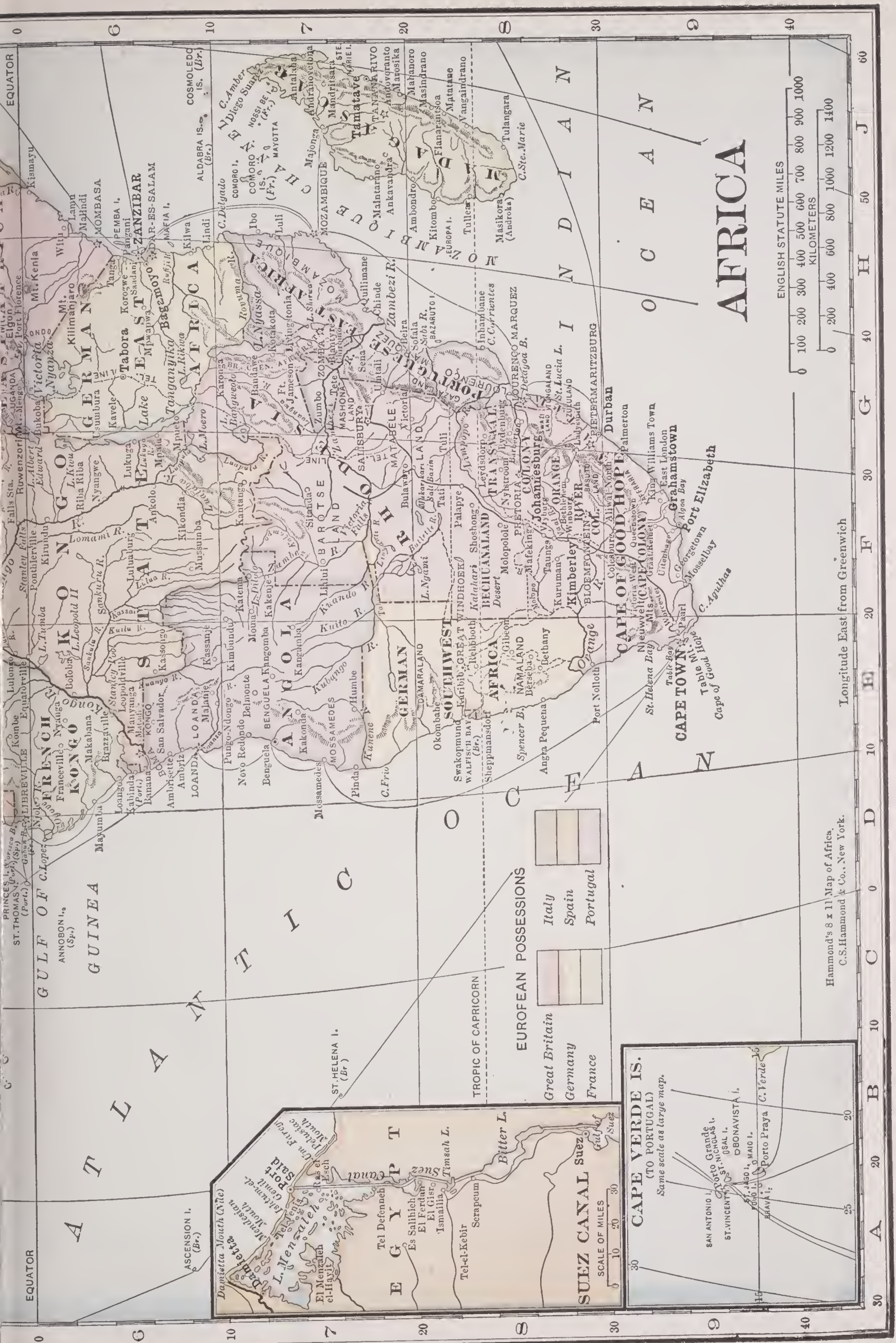




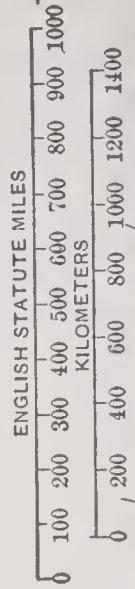




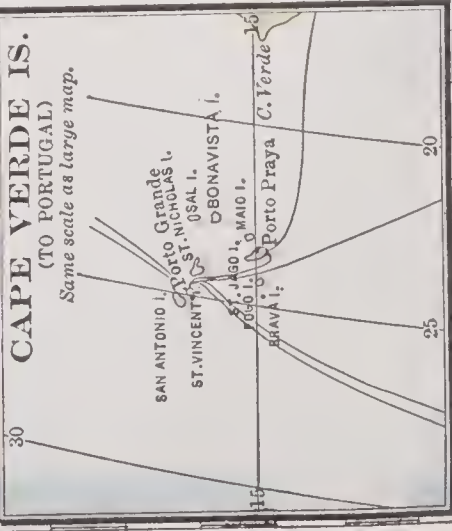




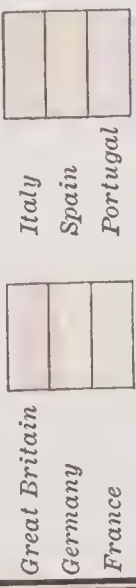
# AFRICA



Hammond's 8 x 11 Map of Africa,  
C.S. Hammond & Co., New York.



## EUROPEAN POSSESSIONS



Longitude East from Greenwich







S. of Arabia the African coast projects considerably to the E., overlapping and again running nearly parallel with the S. coast of Arabia, with which it forms the Strait of Bab-el-Mandeb and Gulf of Aden. After this projection, terminating in Cape Guardafui, the coast trends to the S. W. with comparatively slight undulations till it reaches the S. extremity of the continent. About midway, separated from the mainland by the Mozambique Channel, and at a distance of 250 miles, is the great island of Madagascar. With the exception of those named, the coast of Africa presents no great indentations. The total extent of coast accordingly, considering that the continent is almost entirely surrounded with water, is comparatively small. It is estimated at 16,000 miles, a fifth less than that of Europe. Africa is washed on the W. by the Atlantic Ocean, on the S. by the Southern Ocean, on the E., below the Gulf of Aden, by the Indian Ocean. The continent at its S. extremity presents a coast-line of nearly 400 miles, exclusive of indentations, to the Southern Ocean. This is what is compendiously known as "the Cape," first doubled by Bartholomeu Dias and Vasco da Gama. The principal indentations of the S. coast are Algoa bay and False bay.

Africa extends from lat.  $37^{\circ} 20'$  N. to lat.  $34^{\circ} 51'$  S., and the extreme points, Cape Blanco and Cape Agulhas, are nearly 5,000 miles apart. From W. to E., between Cape Verde, lon.  $17^{\circ} 32'$  W., and Cape Guardafui (Jerdaffun), lon.  $51^{\circ} 16'$  E., the distance is about 4,600 miles. The continental area is estimated at 11,500,000 square miles. The islands belonging to Africa are not numerous, and, except Madagascar none of them is large. In the Atlantic Ocean there are Madeira, the Canaries, the Cape Verde Islands, the Bissagos, the islands off the coast of Guinea, Fernando Po, St. Thomas, Annobon, etc., Ascension Island, St. Helena, and Tristan d'Acunha; in the Indian Ocean, Sokotra, Zanzibar, Comoro Isles, Madagascar, Mauritius, Réunion, with their dependencies; and some small islands in the Southern Ocean. The total area of the African islands is 239,000 square miles.

*Northern Africa.*—The interior of Africa forms two great divisions nearly corresponding with the external diversity of form already indicated. The N. section has its greatest extension from E. to W., the S. from N. to S. The N. division lies for the most part above the sixth degree of N. latitude, extending from the Atlantic on the W. to the Somali coast and the Red Sea on the E. Its principal feature is the Sahara or Great Desert, which is inclosed on the N. by the elevated plateau of Barbary and that of Barca, on the E. by the Nile valley, on the W. by the Atlantic Ocean, and on the S. by the Niger and the countries of the Sudan. The N. coast re-

gion (plateau of Barbary) is traversed by the Atlas system and its continuations, rising to the height of 13,000 feet or even more. Exclusive of the mountains it has an elevation of from 1,500 to 3,000 feet. From Barca, where the former level prevails, it descends gradually toward Egypt. The character of the desert, though sufficiently inhospitable, is much less uniformly monotonous than till recent researches it was commonly reputed to be. Instead of an undeviating sandy plain irregularly interspersed with speck-like oases, it contains elevated plateaux and even mountains with more or less permanent streams, and habitable valleys which lose themselves in the vast low-lying tracts of sand with which the more elevated regions alternate. The desert itself is furrowed with *wadis* (dry river-beds) radiating in all directions, while under the sand collections of water have been found, which by means of artesian wells have been turned to account by the French in their dependency Algeria. A considerable nomadic population is thinly scattered over the habitable parts of the desert, and in the more favored regions there are settled communities (see SAHARA). To the S. of the Sahara, and separating it from the plateau of Southern Africa, a belt of pastoral or steppe country extends across Africa. This region has received the general name of the Sudan, and includes the countries on the Niger, around Lake Tchad, and E. to the elevated region of Abyssinia.

*Southern Africa.*—From Lake Tchad the country begins to rise till below the 10th degree of N. latitude, where the edge of the elevated plateau of high or Southern Africa begins. This division of the continent is, as far as known, completely surrounded, at a distance of 50 to 300 miles from the coast (which is usually low but rising inland), by what looks like ranges of mountains varying in breadth and height, but which are really the escarpment of a table-land, or series of table-lands, of considerable elevation and great diversity of surface and direction, having hollows filled with great lakes, rivalling those of America in extent, and terraces over which the rivers break themselves in falls and rapids. The S. division has, like the N., a desert region—the Kalahari desert—but it is of small extent compared to the Sahara. In some respects it resembles the Sahara, but possesses more vegetation. The mountains which inclose the S. table-land are mostly much higher on the E. than on the W., and the slope of the land and the flow of the principal rivers, with the exception of the Zambezi, is from E. to W. The E. edge of the plateau reaches its highest elevation and greatest extent in the mountainous country of Abyssinia, with heights of 10,000 to 14,000 or 16,000 feet. From this the sys-



tem extends N. in detached ranges or occasional elevations between the valley of the Nile and the Red Sea, with gradually diminishing height to the very delta of the Nile. The E. edge of the Abyssinian plateau presents a steep unbroken line of 7,000 feet in height for several hundred miles. This line of elevation extends S. toward Lakes Rudolf and Stefanie, and thence in a narrow belt and at a lower average level to the N. E. of the Victoria Nyanza; it then proceeds in a S. direction to Kilima-Njaro, beyond which the plateau merges into the Paré mountains in the neighborhood of the Pangani river. Immediately to the S. of Lake Rudolf, Mount Nyiro rises to a height of 10,000 feet; Mount Elgon, to the N. E. of Victoria Nyanza, 14,100 feet; Mount Kenia, 18,370 feet; and Kilima-Njaro, 19,600 feet; Mount Meru, to the W. of Kilima-Njaro, 14,000 feet. The general level of the plateau between Mount Kenia and the lakes is from 5,000 to 7,000 feet. To the W. of Victoria Nyanza, between Lakes Albert and Albert Edward, Mount Ruwenzori rises to a height of 18,000 feet, and the active volcanic Kirunga mountains, S. of Lake Albert Edward, to 13,000 feet. All these mountains are volcanic in origin, and between Kilima-Njaro and the lake signs of volcanic activity are still visible. The central plateau reaches its greatest average height, over 4,000 feet, in the region embracing Lakes Victoria Nyanza, Tanganyika, and Nyasa; it forms a broad belt reaching close to the E. coast, and in an equally broad belt extends from Lake Nyasa to the W. coast. Above this are numerous detached heights, like the Rubeho mountains, W. of Zanzibar, the Livingstone mountains around the N. of Lake Nyasa, and the Mlanje heights S. of that lake; Mount Mlanje being 9,680 feet. South of the Zambezi occur the Mashona and Matopopo highlands, rising in places to from 5,000 to 7,000 feet. Immediately to the S. of the Middle Limpopo a series of mountains begins which, under various names — Zoutpansberg, Libombo, Drakensberg, Compassberg, Schneeberg, etc.—extends along the E. and S. coast, and N. to some distance beyond Cape Town. In Natal these rise to 10,000 and 12,000 feet, and in Cape Colony to 7,000 and 8,000 feet, the interior plateau averaging about 4,000 feet, but falling to a lower level in the Kalahari desert. Between the Orange river and the Kunene, and the latter river and the Kongo, the escarpment continues, rising in places to 6,000 and 8,000 feet. The general level lowers considerably as the Kongo is reached. The low coast region extends some distance into the interior along this part of the W. coast, the descent from the interior plateau giving rise to the cataracts which so seriously interrupt navigation on the Lower Kongo. On both sides of the Middle Kongo extends a

considerable area which sinks from the generally high level of the interior to an average of only about 1,000 feet. From the Kongo and Kameruns the general level of the coast plateau is broken by the Crystal and other mountains rising to 3,000 and 4,000 feet, culminating in the Kameruns Peak, a volcanic mountain rising to 13,000 feet. On the S. of the Benue, in the Atlantika group, and between the Benue and the Niger, we find a broken mountain group with heights of from 6,000 to 10,000 feet; while in the interior N. of the Gulf of Guinea there is a broad plateau, beginning at various distances from the coast, extending across the Upper Niger, and rising to 2,000 and 3,000 feet, with irregular ranges rising at places to from 5,000 to 7,000 feet. The Kong mountains, in the region where the Niger has its sources, as a range do not exist. As the Middle Niger is approached the general level lowers to that of the Sahara, while N. the low coast region extends far into the interior till the Atlas is reached.

*Rivers.*—The Nile is the only great river of Africa which flows to the Mediterranean. It is now known to receive its waters primarily from the country drained by the great lakes the Victoria Nyanza, the Albert Nyanza, and the Albert Edward Nyanza, and especially from the Victoria Nyanza, which itself receives numerous streams. The Victoria Nile connects the Victoria and the Albert Nyanza, and on leaving the latter the river flows in a winding course, of which the direction is almost due N. without further lake expansion, to the Mediterranean. In descending from the lake elevations (of the Victoria 3,900, of the Albert Edward 3,200 feet, the latter connected by the Semliki river with the Albert 2,300 feet) it makes, both between the lakes and in its subsequent course, numerous falls. Those in Upper Egypt are known as the Cataracts. Between lat. 5° and 10° N., under the name of Bahr-el-Jebel, it receives numerous tributaries, mostly from the country to the S. and W. the principal on the left bank being the Bahr-el-Ghazal, on the right the Sobat. After this it takes the name of the White Nile, and receives through the Bahr-el-Azrek and Atbara, or Blue Nile and Black river, the drainage of Abyssinia. The Atbara brings the mud which forms so precious a deposit in Egypt. After this the Nile flows for 1,200 miles to the sea without receiving a tributary. Altogether it drains an area of more than 1,000,000 square miles. The Indian Ocean receives numerous African rivers, most of which are short, being the drainage merely of the external slopes of the escarpment of the interior plateau. Among the most considerable rivers on this coast are the Jub, which is formed by several streams rising in the border slopes near Abyssinia, is navigable with difficulty to Bardera, and enters the ocean at the



equator; the Webbe Shebeli, formed by streams rising on the S. E. slopes of Abyssinia, and losing itself in the sands on the coast near the mouth of the Jub; the Tana from Mount Kenia discharging at Witu; the Sabaki S. of the Tana; the Rufiji or Lufiji; the Rovuma, which flows from the mountains E. of Lake Nyasa; the Beira; and the Limpopo or Crocodile river, which enters the ocean N. of Delagoa bay. The only great river flowing from a distant point of the interior which breaks the mountain barrier of the E. is the Zambezi, which has its embouchure between the Beira and Rovuma. It is the fourth in size of the continent. It drains a large part of the great tract of pastoral country S. of the equatorial region. Several streams coming from the swampy plateau on the borders of Lunda and the Garenganze country unite to form the Zambezi, the principal being the Liba from the S. W. edge of the Garenganze country. In its middle course it is joined by the Kafue and Loangwe from the N. and the Shire from Lake Nyasa, and by the Chobe and some smaller streams from the S. Below the Chobe are the Victoria Falls, one of the greatest cataracts in the world, from which the river flows in a semicircular course to the ocean, breaking through the Lupata mountains, and discharging by several mouths, the most navigable of which is the Chinde. The river is navigable by vessels of some size to the Kebrabasa rapids beyond the Shire, but above that only by boats and canoes. The drainage area of the Zambezi is 514,000 square miles.

Of the Atlantic rivers, the Senegal, Gambia, and Niger have their origin in the mountains near the coast of Senegambia. The Senegal flows in a N. and W. direction, its volume varying much according to the season. In the rainy season it is navigable for 500 to 700 miles, in the dry season for about a fourth of that distance. The Gambia takes a winding course to the W., and is navigable for about 400 miles, nearly its whole extent. The greatest of these rivers, the Niger, rising in the inner slope of the same mountains, flows N. E. to Timbuctoo, whence it turns first E. and afterward S. E., receiving the Sokoto, to its junction with the Benue, which comes from the mountains S. of Lake Tchad. The upper part of the Niger is called the Joliba, and is flanked by several great swampy lakes; it afterward acquires the name of Quorra or Kawara. In the N. part of its course it touches on the great desert. It is navigable for light vessels above Timbuctoo. Between the Sokoto and the Benue it is interrupted by shoals and rocks to below Bussa. From the junction it flows due S. to the ocean, where it forms a wide alluvial delta, and enters by a number of mouths, the most distant of which are 200 miles

apart. The main channel is called the Nun. The drainage area of the Niger is 810,000 square miles. The Kongo, the second in extent of basin and the greatest in volume of the African rivers, flows from different slopes of the same water-partings as the Zambezi. Its identification with the Lualaba, the great stream discovered by Livingstone in the center of the continent, was established by Stanley in 1876-1877, this enterprising traveler having descended the river to the Atlantic from a point in the interior W. of Lake Tanganyika. The Lukuga, the outlet of Tanganyika discovered by Cameron, is a tributary of the Lualaba. The Chambeze, which rises in the mountains between Lakes Nyasa and Tanganyika, is the remotest source of the Kongo system. It falls into Lake Bangweolo, from which it issues under the name Luapula, and flows N. to Lake Mweru; from the N. side of this lake issues the Lualaba, which passes through a magnificent series of lake-like expansions and receives numerous tributaries. Below Stanley Falls it receives the Lomami, and above Stanley Pool the Kwa, which is formed by the junction of the Kasai-Sankuru system with the Lukualu or Kwango. Other tributaries come from the S., and in the N. it is fed by the Ubangi, which, under the name of the Wellé-Makua, comes from the water-parting between the Nile and Kongo systems. The total length of the Kongo is about 3,000 miles, and its drainage area 1,450,000 square miles. Unlike most of the African rivers, the mouth of the Kongo forms an estuary. It is estimated to pour into the ocean a larger body of water than the Mississippi. The Kwanza rises in the Mossamba mountains, and curves N. W. to the ocean. Like most African rivers, its upper course is interrupted by cataracts, and its mouth closed by a bar. The Kunene rises on the opposite side of the same watershed, and flows S. W. to the Atlantic. From it S. to the Orange river follows a dry belt, through which no considerable river flows to the sea. The Orange, though it rises near the E. coast, and flows nearly across the S. part of the continent, passes for the greater part of its course through a desert region, receiving no tributaries, and is a shallow stream. Its headwaters, the Vaal and the Nu Gariep, rise on opposite slopes of the Drakenberg mountains, and flow to their junction round opposite sides of the Orange River Colony. The Great Fish river, which drains Great Namaqualand, enters the Orange river near the termination of its course.

The rivers which reach the ocean do not account for the whole drainage of Africa. There are two great and numerous smaller tracts from which no large river reaches the sea. The two great areas of internal drainage correspond with the two great deserts. That of the N. desert is estimated at 4,000,000 square miles. As already indicated, it



is furrowed with water-courses in every direction, which lose themselves in the sand. The Bahr-el-Ghazal, which is usually dry, but intermittently flows out of Lake Tchad, terminates in a salt lagoon on the border of the desert to the N. of the lake. In the S. the Zuga or Botletle, which forms the outlet of Lake Ngami, in the Kalahari desert, loses itself in salt lagoons at greater or less distance, according to the supply of water. A region of inland drainage, with salt lagoons, also exists between the Victoria Nyanza and the coast range of mountains. In the low coast land E. of Abyssinia the Hawash river loses itself in the sands before reaching the sea; and the Webbe, as already stated, which flows S. from the Somali peninsula to near the equator, likewise terminates in a salt lagoon on the border of the ocean. The Omo flows into the N. end of Lake Rudolf.

*Lakes.*—The only lake of considerable extent N. of lat.  $5^{\circ}$  N. is Lake Tchad, an enormous flooded swamp. Lake Tana in Central Abyssinia, the salt Lake Asal in the E., and Lakes Dembel and Abayo in Gallaland, are comparatively small. Between  $5^{\circ}$  N. and  $15^{\circ}$  S. is a series of lakes forming one of the most striking features of the continent. Almost in a line, beginning in the S., are Lakes Nyasa, Tanganyika, Lifu, Albert Edward, Albert, all lying in more or less elongated rifts or gorges. The series is continued by Lakes Rudolf (salt) and Stefanie in the N. E., and according to some authorities, by the ancient lake now the Red Sea, and by the Dead Sea in Palestine. The great Lake Victoria, which touches the equator on the N., is of a different type, as is Lake Bangweolo (another flooded swamp) on the S. of Tanganyika, and Lake Mweru in the N. of Bangweolo. Lake Rikwa or Leopold, between Nyasa and Tanganyika, is partly of the rift type, while Lake Ngami in the Kalahari region is a swamp which sometimes dries up. Lake Leopold II. and Lake Malumba are attached to the Lower Kongo. Lake Dilolo is in the swampy region forming part of the watershed between the Kongo and Zambezi. There are numerous salt lagoons in the N. portion of the Sahara.

*Climate.*—The climate of Africa is mainly influenced by the fact that, except the countries on the N. and S. coasts, it lies almost entirely within the tropics. The equator, as already observed, cuts it nearly through the middle, so that it belongs in latitudinal, though unequally in longitudinal extension, to the N. and S. tropics. It is the only continent which extends unbroken from the N. to the S. tropics, and is consequently the hottest of all. The two sections N. and S. of the equator have, as has already been observed, in some respects a very considerable resemblance in their general features, the chief modifying

circumstances being the greater elevation and the smaller longitudinal extension of the S. division, which, by bringing it more within the influences of the ocean, tends to modify its climate.

In the belt immediately under the equator, both N. and S., vegetation is intense, and rain abundant. For about  $10^{\circ}$  N. and S. we find true tropical forests, mainly to the W. of the great lakes, on the Middle and Upper Kongo and its affluents, and along a belt of the W. coast in the Niger region. To the E. of the great lakes, where the rainfall is not so abundant, are considerable areas of poor steppe and scrub country, and generally over the tropical region the trees are scattered and the country more park-like than forestal. Animal life, from herds of elephants to innumerable swarms of insects, abounds in these luxuriant regions. To the N. and S. of the equatorial belt, as the rainfall diminishes, the forest region is succeeded by open pastoral and agricultural country. This pastoral belt extends, in the N., across the Sudan, from Senegambia to Abyssinia; on the S., from Angola and Benguela to the Zambezi. This is followed by the rainless regions of the Sahara on the N. and the Kalahari desert on the S., extending beyond the tropics, and bordering on the agricultural and pastoral countries of the N. and S. coasts, which lie entirely in the temperate zone.

The winds and rains in Africa are chiefly produced by the successive exposure of the various intertropical belts to the vertical rays of the sun. The monsoons of the Indian Ocean exercise the principal modifying influence. From March to September the S. W. monsoon blows from Africa to Asia, and during the remaining months the N. E. monsoon blows toward the African coast. The indraught of air charged with moisture, at the seasons when the sun is overhead, produces the rainy seasons within the tropics, and as the incessant rarefaction of the air by heat continually draws in fresh supplies, the rainfall is on the whole abundant, varying from 50 to 100 inches in the region between  $10^{\circ}$  N. and the Tropic of Capricorn. In a patch on the Gulf of Guinea the 100 inches is exceeded, though in Somaliland there are almost rainless patches. Near the tropics, to which the sun comes only once a year, there is only a single rainy season, while in the central part of the zone, which the sun traverses twice in his passage between the tropics, there are two distinct rainy seasons, a greater and a less, according as the wind is in a direction which brings more or less moisture, except in some places in the interior, where the two rainy seasons are so protracted as to blend into one, lasting, as in the Manyema country, from September to July, or in some other parts even longer. The rainy season usually begins soon after the sun has



reached his zenith, but on the E. coast the monsoon charged with the moisture of the Indian Ocean brings it earlier. In the deserts, as already observed, there is hardly any rain, and this applies also to Egypt, which, but for the Nile, would be no better than the Sahara. The chief cause of the rainlessness of the deserts is the direction of the winds, which causes the chief moisture-bearing currents to pass before reaching them over hot and thirsty regions which deprive them of their moisture, and especially the mountain screens which intercept the moisture of the winds both from N. E. and S. W. Another cause is the want of elevated regions to attract the moisture actually contained in the atmosphere, as in the higher regions of the desert periodical rains do occur. The high mountains of the E. plateau and the intervening tropical regions deprive the N. E. monsoon of all its moisture before it reaches the Kalahari desert. Hence the apparently anomalous circumstance that the greatest heat is found after the equatorial region is passed. The rapid radiation of heat in the desert causes a very great fall of temperature after the sun is down, so that sometimes frosts are generated, and this in some measure supplies the want of rain by condensing the moisture in dew. In the desert, too, scorching winds are generated, those of the N. afflicting Egypt and the countries on the Mediterranean coast. The hottest part of the Sahara is in Nubia, where the Arabs say the soil is like a fire, and the wind like a flame. The coasts of tropical Africa, especially the W. coast, where European settlements have been formed, have been found to have a deadly climate for Europeans.

*Geology, Minerals.*—The geology of Africa is still very little known. Very ancient crystalline rocks are found rising into mountain ranges and sometimes spread over large areas. Most of the rocks that overlie them belong to the older formations, so that the continent as a whole is supposed to be of very ancient date. The sands which cover so large an area are believed to be mainly of æolian origin, and not to have been formed by the action of water. The porous clay found so abundantly in West Africa is of comparatively recent date. The region around Tanganyika is of Jurassic origin. Around the great lakes are abundant evidences of enormous volcanic activity at no very remote date; and, as already mentioned, active volcanoes are not unknown. Tanganyika, according to recent views, may at one period have been connected with the sea. Salt is abundant, though often scarce from want of communication and working organization. Gold is found in abundance in Southern Africa from the Transvaal region to the Zambezi, and a number of very productive mines have been opened in the

Transvaal. Diamonds have been found in large numbers, and in apparently inexhaustible supply, on the Vaal river and its tributaries. In the S. central district, particularly the country of Katanga, iron and copper are found, and are worked in some districts in the countries bordering on the Lualaba. Copper is also found in Loanda, iron in Angola, and lead, tin, iron, and copper in Great Namaqualand; iron, copper, and coal are found in Natal,

*Vegetation.*—The center of Africa possesses, as already mentioned, an exuberant tropical vegetation. The open pastoral belt at the extremities of the tropics is distinguished by a rich and varied flora. A special characteristic of the vegetation of the S. extremity of Africa is the remarkable variety, size, and beauty of the heaths, some of which grow to 12 or 15 feet, and form miniature forests. Cycadaceæ and bulbous and orchidaceous plants, aloes and other succulent plants, also abound. The baobab or monkey-bread tree, first discovered by Adanson in Senegal, is found from the Sudan to Lake Ngami, and palms of one variety or another are diffused over almost every part of Africa. The date palm is the special characteristic of the desert, to which it is peculiarly adapted, and there it forms the principal means of subsistence. It is also cultivated as a garden plant in the N. coast regions. This district as well as Egypt has an ancient celebrity for its fertility in grain. Wheat and maize are cultivated, fruit trees also abound, and grooves of oranges and olives distinguish the landscape. The castor oil plant, the fig tree, the dwarf palm, and the lotus, formerly an important article of food, are here characteristic forms. The common oak, the cork oak, and the pine form the staple, and the cypress, myrtle, arbutus, and fragrant tree heaths the ornaments of the woods. The pastoral tropical belt presents a different order of vegetation. Besides the baobab, the cabbage palm, the oil palm, the wax palm, the shea butter tree, the cotton tree, the African oak, and the mangrove here prevail; rice and maize are cultivated; the principal fruits are the banana, papaw, custard apple, lemon, orange, and tamarind. India-rubber plants are found in various forms, both as trees and as climbing plants in abundance both in East and West Tropical Africa. The prevalent plants of this district are also found in the fertile parts of Nubia. To the N. E. of this region frankincense, myrrh, cinnamon, and cassia abound. The coffee plant is a native of the Southern Abyssinian region, and also of Western Tropical Africa, where it forms thick woods. This plant is supposed to have been transported from Africa to Arabia. Abyssinia, though coffee and spices are native products, possesses generally, from its elevation, the vegetation of a temperate region. The



swamps of the tropical region abound with papyrus. The cassava, yam, pigeon pea, and ground nut are cultivated as bread plants.

*Animals.*—The fauna of Africa is extensive and varied, and numerous species of mammals are peculiar to the continent. According to a common view of the geographical distribution of animals, the N. of Africa belongs to the Mediterranean sub-region, while the rest of the continent forms the Ethiopian region. Africa possesses numerous species of the order quadrumana (apes and monkeys), most of which are peculiar to it. They abound especially in the tropics. The most remarkable are the chimpanzee and the gorilla. The lion is the typical carnivore of Africa. Latterly he has been driven from the coast settlements to the interior, where he still reigns king of the forest. There are three varieties, the Barbary, Senegal, and Cape lions. The leopard and panther rank next to the lion among carnivora. Hyenas of more than one species, and jackals, are found all over Africa. Elephants in large herds abound in the forests of the tropical regions, and their tusks form a principal article of commerce. These are larger and heavier than those of Asiatic elephants. The elephant is not a domestic animal in Africa as it is in Asia. The rhinoceros is found, like the elephant, in Middle and Southern Africa. Hippopotami abound in many of the large rivers and the lakes. The zebra and quagga used to abound in Central and Southern Africa, but the latter is said to be now entirely extinct. Of antelopes, the most numerous and characteristic of the ruminating animals of Africa, at least 50 species are considered peculiar to this continent, of which 23 used to occur in Cape Colony. The giraffe is found in the interior, and is exclusively an African animal. Several species of wild buffaloes have been found in the interior, and the buffalo has been naturalized in the N. The camel, common in the N. as a beast of burden, has no doubt been introduced from Asia. The horse and the ass (onager) are natives of Barbary. The cattle of Abyssinia and Bornu have horns of immense size, but extremely light. In Barbary and the Cape of Good Hope the sheep are broad-tailed; in Egypt and Nubia they are long-legged and short-tailed. Goats are in some parts more numerous than sheep. The ibex breed extends to Abyssinia. Dogs are numerous, but cats rare, in Egypt and Barbary. The former in the N. towns serve as scavengers. Bears, wolves, and foxes are found only in the N. The birds of Northern Africa are almost identical with those of the S. of Europe and the Asiatic countries bordering on the Mediterranean. Many of the African birds are famed for the brilliancy of their plumage, such as the sun birds, bee eater, roller,

plaintain eater, parrots, and kingfishers. The ostrich is found nearly all over Africa, but especially in the desert. A remarkable bird of Southern Africa is the secretary bird or serpent eater, which renders great service to the inhabitants by killing serpents. Another peculiar bird of South Africa is the honey-guide cuckoo, which points out the nests of bees. The whale-headed stork, remarkable for its enormous beak, may also be mentioned. Owls, falcons, eagles, and vultures are numerous. Waterfowl are abundant on the lakes and rivers, and there are many species of quails and partridges. One species of gallinaceous bird, the Guinea fowl, has been domesticated in other countries. Reptiles, owing to the dryness of the climate, are comparatively few. The largest is the crocodile, which abounds in the great rivers and tropical lakes. There are several species of venomous serpents, including the horned viper and the African cobra. The chameleon is common. The rivers and coasts abound with fish of numerous species, and some of them of the most brilliant coloring. Insects are numerous. Among the more troublesome species are the locust, tsetse, and white ant.

*Inhabitants, Civilization, etc.*—There is a marked distinction between the races in the N. and E. of the great desert and those in the Central Sudan and the rest of Africa and the S. The main elements of the population of North Africa, including Egypt and Abyssinia, are Hamitic and Semitic, but in the N. the Hamite Berbers are mingled with peoples of the same race as those of prehistoric Southern Europe, and other types of various origins, and in the E. and S. E. with peoples of the negro type. The Semitic Arabs are found all over the N. region, and even in the Western Sahara and Central Sudan, and far down the E. coast as traders. The Somalis and Gallas are mainly Hamitic. In the Central Sudan and the whole of the country between the desert and the Gulf of Guinea the population is pure negro—people of the black, flat- or broad-nosed, thick-lipped type, with narrow heads, woolly hair, high cheek-bones, and prognathous jaws. Scattered among them are peoples of a probably Hamitic stock. Nearly the whole of the narrow S. section of Africa is inhabited by what are known as the Bantu races, of which the Zulu or Kaffir may be taken as the type. The languages of the Bantu peoples are all of the same structure, even though the physical type vary, some resembling the true negro, and others having prominent noses and comparatively thin lips. The Bushmen of South Africa are of a different type from the Bantu, probably the remains of an aboriginal population, while the Hottentots are apparently a mixture of Bushmen and Kaffirs. Scattered over Central Africa, mainly



in the forest regions, are pigmy tribes, who are generally supposed to be the remains of an aboriginal population. The bulk of the inhabitants of Madagascar are of Malay affinities. The total population is estimated at about 150,000,000.

As regards religion, a great proportion of the inhabitants are heathens of the lowest type. Mohammedanism possesses a large number of adherents in Northern Africa and is rapidly spreading in the Sudan. Christianity prevails chiefly among the Copts of Egypt, the Abyssinians, and the natives of Madagascar, the latter having been converted in recent times. Elsewhere the labors of the missionaries have also been attended with promising success. Over a great part of the continent, however, civilization is at a low ebb, and in the Kongo region cannibalism is extensively prevalent. Yet in various regions the natives who have not come in contact with a higher civilization show considerable skill in agriculture and various mechanical arts, as in weaving and metal working. Among articles exported from Africa are gold and diamonds, palm oil, ivory, wool, ostrich feathers, esparto, cotton, caoutchouc, etc. The total annual trade has been estimated at £100,000,000.

*Political Divisions.*—By recent arrangements, mainly since 1884, great areas in Africa have been allotted to Great Britain, France, Germany, Portugal, Belgium, and Italy, as coming within their respective spheres of influence, in addition to colonial possessions proper. The areas claimed by the various European powers in Africa may be roughly estimated as follows: France, 3,500,000 square miles; Great Britain, 2,500,000 square miles; Germany, 1,000,000 square miles; Portugal, 825,000 square miles; Kongo Free State, 900,000 square miles; Italy, 180,000 square miles; Spain, 154,000 square miles. The former British colonies of Cape Colony, Natal, Orange River Colony, and the Transvaal, all acquired since the war with the Boers, were federated in the Union of South Africa in 1910; and the Kongo Free State became wholly a Belgian possession in 1908. Although Egypt, like Tripoli, is nominally under Turkey, it is actually under British suzerainty. Abyssinia and Morocco are the chief native African independent States.

*History of Discovery.*—Africa, until within the last few years, was the least known of the great divisions of the globe, and the problems still to be solved are among the most interesting to the geographer of those which remain for future exploration. Fifty years ago the whole of Central Africa was a blank; it is now at least as well known as South America. The civilized nations of the ancient world approached Africa from the Mediterranean

and the Red Sea; there is reason to believe that till the introduction of the camel in the 7th century A. D. the desert was an insuperable barrier between the Mediterranean countries and the Central Sudan.

The name Africa is mythologically associated with Afer, a son of the Libyan Hercules. It was the name given by the Romans at first only to a small district of Africa in the immediate neighborhood of Carthage, and nearly corresponding with the Roman province formed on the destruction of Carthage. The Greeks called Africa Libya, and the Romans often used the same name. The first African exploring expedition on record is that mentioned by Herodotus as having been sent by Pharaoh Necho about the end of the 7th century B. C. to circumnavigate the continent. The navigators, who were Phœnicians, were absent three years, and according to report they accomplished their object. The story has been the subject of much controversy, and was for long generally discredited, but recent authorities of weight have pronounced in its favor. The next important voyage recorded is that of Hanno, a Carthaginian, down the W. coast, probably 50 or 100 years later. He passed a river with crocodiles and river horses, and probably reached the coast of Upper Guinea. Herodotus also mentions some young men of the tribe of the Nasamones (living near the Gulf of Sidra) crossing the desert in a W. direction, and coming to a great river where they saw crocodiles and black men, but it is doubtful if this could have been the Niger. There is no evidence that the Egyptians knew the Nile beyond the site of Khartum, though they may have sent ships as far as the coast of Somaliland by the Red Sea. Nero sent an expedition up the Nile which seems to have penetrated up the White Nile; and remains of Roman origin have been found some distance into the Sahara. From the navigators and traders that frequented the E. coast of Africa, Ptolemy may have learned that the Nile issued from two great lakes about the equator. Mohammedanism was carried into North Africa in the 7th century, and very rapidly spread to the Atlantic. By the 10th century the Arabs had crossed the desert, and between this and the 14th century Arab travelers visited the Central Sudan, the Niger, and other regions, and till comparatively recently they were the great authorities on much of Central Africa.

The first impulse to a more complete exploration of Africa was given by the Portuguese prince known as Henry the Navigator, who, in the early part of the 15th century, sent out a series of expeditions along the W. coast. These were continued after his death, so that in 1486 Bartholomeu Dias doubled the Cape, and in 1497 Vasco da Gama sailed up the E. coast as far as Mombasa, and thence to India. Thus for the first



time the main outline of the African coast was laid down. New settlements were planted on the E. and W. coast by Portuguese, French, English, Dutch, and Brandenburgers, but there is no authentic information that any European penetrated into the interior. Maps of the 16th to the 18th century were covered with lakes and rivers, but these were swept away as unauthentic by D'Anville in the middle of the 18th century, and the interior left a blank. An association for the exploration of Inner Africa was formed in London in 1788. Additions were made to geography under its auspices by Mungo Park, Hornemann, Burckhardt, and others.

Modern African exploration may be said to begin with Mungo Park, who reached the upper course of the Niger or Joliba, and whose efforts to explore the river to its mouth cost him his life (1795-1805). Dr. Lacerda, a Portuguese, about the same time reached the capital of Cazembe, W. of Lake Bangweolo, where he died. Hornemann, who traveled for the same society as Park, perished in the desert after sending home accounts of Bornu and the neighboring States. In 1802-1806 two Portuguese traders crossed the continent from Angola, through Cazembe's dominions, to the Portuguese possessions on the Zambezi.

In 1816 Captain Tuckey, in command of a British expedition, sailed up the Kongo, which he took to be the mouth of the Niger, for 280 miles. About the same time Major Peddie, and after his death Captain Campbell, led a party up the Senegal through the Fula or Fellatah territory, returning to Kakundy on the Nunez. In 1817 Mr. Bowditch explored the country of the Ashantis. In 1818 a French traveler, Gaspard Théodore Mollien, discovered the sources of the Senegal, Gambia, and Rio Grande. In 1819 Ritchie and Lyon traveled from Tripoli to Murzuk, and in 1821 Major Laing made some important journeys in the Mandingo district of Western Africa. In 1822-1824 extensive explorations were made in Northern and Western Africa by Major Denham, Captain Clapperton, and Dr. Oudney, the last of whom died on the way. The travelers proceeded from Tripoli by Murzuk to Lake Tchad. While Denham examined the S. and W. coasts of the lake, Clapperton proceeded W. through Bornu to Sokoto, the capital of the Fellatah country, on the Sokoto, an affluent of the Niger. Impressed with the importance of establishing political and commercial intercourse with this district, Clapperton organized another expedition for the purpose of reaching Sokoto from the W. coast. Setting out from Badagry, on the E. of Cape Coast Castle, on Dec. 7, 1825, and passing through the kingdom of Yoruba, he reached the Niger at Bussa. Here he crossed the river and traversed the kingdom of Nupe to Kano, capital of the

Haussa country, which he had previously visited, and from thence proceeded to Sokoto, in the neighborhood of which, after a short residence, he died. His servant, Richard Lander, returned to Kano, and attempted to proceed S. through the kingdom of Zegzeg, but was compelled by the natives to return to Darroro, from which he reached the coast.

W. Allen, a naval officer, about this time accompanied a mercantile expedition up the Niger, which he surveyed for a certain distance, and in another expedition in 1848 the same officer revised and corrected his survey. Major Laing, in 1826, crossed the desert from Tripoli to Timbuctoo, but he was killed on his return, and his papers lost. René Caillié, after living for some years on the Senegal coast learning the language, and initiating himself into the religion and manners of the Arabs, made in 1827-1828 a journey to Timbuctoo, and thence through the great desert to Morocco. Richard Lander, accompanied by his brother, leaving Badagry for Bussa in March, 1830, ascended the river Niger to Yauri, and descending from thence, reached the mouth called the Nun in November. In 1832 he traced other mouths of the river up to the main stream; and the identity of the great river, which passes under various names in different parts of its course, was thus established.

In the S. Livingstone, who was stationed as a missionary at Kolobeng in 1849, passed through the desert of Kalahari, reached the Zuga or Botletle, and after a circuitous route discovered its source in Lake Ngami. In 1851 he went N. again, proceeding from the Zuga in a more E. direction. In lat.  $17^{\circ} 25' S.$ , and between lon.  $24^{\circ} 30'$  and  $26^{\circ} 50' E.$ , he came upon numerous rivers flowing N., which were reported to be affluents of a larger river, the Zambezi.

In 1848 and 1849 Krapf and Rebmann, missionaries stationed near Mombasa, saw the Kilima-Njaro and Kenia mountains. In 1851 Francis Galton, starting from Walfisch bay, made an extensive survey of the Damaraland and Ovampo countries, in which he found high pastoral and agricultural table-lands. An expedition under the patronage of the British government started from Tripoli in 1850 to visit the Sahara and the regions around Lake Tchad. Richardson, the originator of the expedition, was joined by two Germans, Drs. Overweg and Barth. In crossing the desert from Murzuk to Ghat they found some interesting sculptures. From Ghat to Aïr they found the country wholly desert and uninhabited. On reaching Lake Tchad Richardson went to Kuka, capital of Bornu, Barth to Kano, Overweg to the native States of Mariadi and Guber. Barth and Overweg met again at Kuka in April, 1851, but in the meantime Richardson had died. Overweg explored the lake



and Barth proceeded on another journey S. to Massena, in the kingdom of Bagirmi. On his return the death of Overweg left him to prosecute the enterprise alone. He proceeded to Timbuctoo via Kano, and after collecting much information about the Niger and its tributaries over a great part of the course of which he traveled on his return to Kuka, he reached Tripoli in August, 1855. Dr. Vogel, who was sent to join Barth, was put to death at Wadai, and his papers were lost.

Dr. Livingstone began another journey from Kolobeng on Jan. 15, 1853. After staying a month at Linyanti, capital of the Makololo, he proceeded down the Chobe to Sesheke, and thence ascended the Leambye (Zambezi) to the junction of the Liba. After returning to Linyanti, and taking with him a party of Makololo, he again set out (Nov. 11, 1853), reached the Liba (Dec. 27), and proceeded to Lake Dilolo, where he found the watershed of the streams which flow N. and S. (feeders of the Kongo or the Zambezi) at a level of 4,000 feet above the sea. On his return journey he was confirmed in the belief that an elevated plateau here crosses the country, and forms the watershed of the whole continent. He next crossed the Cassabi river, and on April 4 he reached the banks of the Kwango, both these rivers being affluents of the Kongo. Crossing the Kwanza, he reached Loanda on May 31. On Sept. 20 he set out on his return journey, and following pretty nearly the route by which he had gone arrived at Linyanti. Starting from this place on Nov. 3, 1855, he reached the Zambezi, and proceeding down the river, and visiting its falls, called by him the Victoria Falls, arrived at Kilimane at its mouth on May 20, 1856, and sailed for England. Thus was accomplished by Dr. Livingstone the remarkable feat of crossing the entire continent from sea to sea—the first time, so far as is known, that this was done by any European. In 1858 Livingstone returned to resume his exploration of the Zambezi regions. Entering the Congolese mouth of the river in May, he ascended its tributary the Shire to Murchison Cataracts, visited Lake Shirwa and Lake Nyasa, traveled on or near the Zambezi to Victoria Falls, established the identity of the Leambye and the Zambezi, sailed up the Shire to Lake Nyasa, also sailed 156 miles up the Rovuma river, and returned to England in 1864.

Between 1856 and 1865 Paul du Chaillu traveled extensively on the W. coast, in the neighborhood of the river Ogoe (or Ogo-bai). In 1861–1862 Maj. (afterwards Sir) R. F. Burton also traveled on the W. coast. He ascended the Kameruns mountains, and confirmed some of the observations of Du Chaillu. A French expedition visited the delta of the Ogoe in 1864. Since then that

river has been very fully explored, the principal expeditions having been those of Walker, 1866, 1873; Lieutenant Aymes, 1867–1868; the Frenchmen Compiègne and Marche, 1872–1874; Dr. O. Lenz, 1876; and another French expedition under Savorgnan de Brazza, 1876, who took possession of a large stretch of territory for France. This territory now forms part of that of French Kongo, which had been traversed by various Frenchmen, including Brazza, Mizon, Le Maistre, Monteil, and others.

In 1866 Livingstone entered on his last great series of explorations, the main object of which was to settle the position of the watersheds in the interior of the continent S. of the equator, and to discover the source of the Nile. Landing at the mouth of the Rovuma he proceeded S. W. round the S. end of Lake Nyasa, and then traveling N., reached the S. end of Lake Tanganyika (discovered by Speke and Burton in 1858). He afterward visited Lakes Mweru and Bangweolo, in the basin of the Chambeze, the name given to a headwater of the Kongo. In 1869 he reached Ujiji, on Tanganyika, and crossed the lake, making extensive journeys in the Manyema country, and reached the Lualaba or Upper Kongo, but could not explore it for want of boats. Henry M. Stanley, who had been specially sent by the proprietor of the New York "Herald" to search for Livingstone, met him at Ujiji on his return from the Manyema country, relieved his necessities, and examined along with him the N. end of Lake Tanganyika. Livingstone afterward started on a fresh journey (in 1872) to determine the course of the Lualaba, intending to travel round the S. side of Lake Bangweolo, but, after suffering much from illness, he died on the shore of this lake on May 1, 1873.

In 1872 the Royal Geographical Society organized two expeditions to go in search of Livingstone. The one, under Lieutenant Grandy, sailed some distance up the Kongo; the other, under Lieutenant Cameron, started from Zanzibar for Tanganyika. On ascertaining the death of Livingstone he proceeded to Lake Tanganyika, where he secured Livingstone's map, and sent it to Zanzibar. He ascertained the height of the lake; found an outlet, the Lukuga, on the W. side; traversed the Manyema country; reached Nyangwe, Livingstone's farthest point on the Lualaba; proceeded S. up the E. side of the valley of Lomane to Kilemba in the Urua country; and reached Benguela, on the Atlantic coast, Nov. 4, 1875. The identity of the Kongo and Lualaba was at last settled by Stanley, who between October, 1876, and August, 1877, descended from Nyangwe on the latter river to the mouth of the former. After helping to establish the Kongo Free State (1879–1885) Stanley proceeded in 1887 with an expedi-



tion to relieve Emin Pasha, governor of Egypt's equatorial province. Following the Kongo and its tributary the Aruwimi, Stanley hewed his way through a vast forest, arrived at the Albert Nyanza, met Emin there, returned for his rear-guard and stores, and at last brought Emin and his followers to Bagamoyo, on the E. coast, in 1889. He also discovered Lake Albert Edward and the lofty mountain of Ruwenzori, on the Semliki, between that lake and Lake Albert. The Portuguese Maj. Serpa Pinto journeyed from Benguela to Natal in 1878-1879; the Germans Wissmann and Pogge crossed from St. Paul de Loanda to Zanzibar in 1881-1882; in 1879-1880 (after the death of his leader, Keith Johnston), Joseph Thomson crossed from the E. coast by the N. of Lake Nyasa to the E. of Tanganyika, and back to Zanzibar; again in 1883-1884 he explored the Masai country between the coast and Lake Victoria; Capello and Ivens went from Angola to Mozambique by way of Bangweolo in 1884-1885.

One of the most interesting problems connected with African geography was the tracing of the source of the Nile. Among the first of the famous explorers in this direction was James Bruce, who in 1770 reached the source of the Blue Nile or Bahr-el-Azrek, and imagined himself to have solved the great problem. But the real source of the Nile remained long unknown, the great lakes connected with its origin being hardly dreamed of till comparatively recent times. In 1858 Burton and Speke, crossing from Zanzibar, discovered Lake Tanganyika, and the same year Speke also reached the Victoria Nyanza, but did not ascertain that it gave rise to the Nile. Speke and Grant in 1862 reached the place where the Nile leaves the lake and followed part of its course to Karuma Falls. At Gondokoro they met Sir Samuel Baker, who proceeded to investigate the unexplored part, but did not fully succeed in his object. Baker in 1871-1873 returned to the scene of his explorations as the commander of an Egyptian force, and took possession of the country in the name of the Khedive, but added little to his previous geographical discoveries. He was succeeded in his command by Colonel Gordon, one of whose officers, Colonel Long, more fully traced the Nile between Karuma Falls and the Victoria Lake; while another, M. Gessi, first actually traced the Nile up to its outflow from the Albert Nyanza (1876).

Since 1883 the exploration of Africa has been carried out by a multitude of explorers. In the N. the French have pushed S. from Algeria, and French explorers, among whom M. Foureau is prominent, have added greatly to our knowledge of the Sahara. Dr. Junker devoted several years to exploring the country between the basin of the Nile and the Kongo. Mr. Stanley, in his great

journey across Africa, in 1876, added largely to our knowledge of Lake Victoria, and of Uganda, the country between Victoria and Lake Albert. Since the British occupation of Uganda, Colonel Lugard and many other officers have mapped the country between the coast and the lakes, Uganda itself, and the country to the W. Italian and British explorers have added to our knowledge of Abyssinia and to the desert between the Nile and the Red Sea. Lakes Rudolf and Stefanie have been discovered and explored by Count Teleki and Lieut. Von Höhnel from the S., while James, Donaldson Smith, Cavendish, Robeechi, Bottego, and others have explored Somaliland, and ascertained that the Omo flows into Lake Rudolf. Gregory has investigated Mount Kenia; Meyer has ascended Kilima-Njaro; Baumann and other German explorers have visited the region to the W. and S. of that mountain, round by the S. of Lake Victoria, and on to Lake Albert Edward. In 1894 Count Götzen crossed from E. to W., discovered Lake Kivu to the S. of Lake Albert Edward, and a lofty active volcano near its shores, coming out by the Kongo. Many other Germans have been busy in German East Africa, while in British Central Africa, Johnston, Sharpe, Joseph Thomson and others have filled in many blanks, and British naval officers have charted Lake Nyasa. German explorers have also traversed and mapped Damara-land and Namaqualand; Lugard has explored the Uganda region; Gibbons and others have traversed the Barotse country. The officials of the Kongo Free State have laid open the courses of the numerous rivers that feed the main stream; Hinde found the Lukuga flowing into the Lualaba; Grenfell and others established the connection of the Ubangi or Mobangi tributary on the N., with the Makua-Wellé higher up, which had been explored by Junker and others. Under the auspices of the Royal Niger Company Joseph Thomson and others further explored the Niger; while the Benue and its tributaries, and the German sphere in the S. have been actively explored by British, French, and German travelers. All three nationalities, moreover, have been busy in the vast area between the Guinea coast and the great bend of the Niger. Prominent among them was Binger, who contributed more than any single individual to our knowledge of this region. The French occupation of Timbuctoo has led to the navigation and exploration of the upper and middle river by gunboats; while a French expedition followed the river from Timbuctoo to its mouth. Monteil crossed from Senegal to Lake Tchad and traversed the desert to Tripoli. French expeditions have crossed from the Kongo to the Nile, and all the river systems are now mapped in their main features. It may indeed be said that the pioneer exploration of Africa has been completed, the most im-



portant blank being the region lying between Somaliland and the Upper Nile. What remains to be done is the filling up of the meshes between the vast network of explorers' routes, and this is a task which cannot be completed for many years.

*Commercial Conditions.*—The annual commerce of Africa amounts to over \$700,000,000, of which \$429,000,000 represents the value of the imports. Necessarily in so large an area with so many tribes and peoples who keep no records of their transactions, a considerable amount of commerce must pass without being recorded in any way.

The total imports at the ports where records are kept amounted in the latest available year to \$429,461,000, and the exports to \$263,907,000. Of the exports, a large share, especially those from the S., is gold and diamonds; in the tropical region, ivory, rubber, palm nuts and gums, and in the N. a fair share of the exports are products of agriculture, cotton, coffee, cacao, spices, dates, etc. The export figures of recent years are less than those of former years, owing to the hostilities in South Africa, which have both reduced production and increased local consumption.

The total recorded imports into Africa, aggregating in the latest available year \$429,461,000, were distributed as follows: Into British territory, \$157,575,000; French territory, \$92,004,000; Turkish territory, \$77,787,000; Portuguese territory, \$20,795,000; German territory, \$8,336,000 and into the Kongo Free State, \$4,722,000.

Railroad development in Africa has been rapid in the past few years and seems but the beginning of a great system which must contribute to the rapid development, civilization, and enlightenment of the "Dark Continent." Already railroads run N. from Cape Colony about 1,500 miles and S. from Cairo about 1,200 miles, thus completing 2,700 miles of the proposed "Cape to Cairo" railroad, while the intermediate distance is about 3,000 miles. At the N. numerous lines skirt the Mediterranean coast, especially in the French territory of Algeria and in Tunis, aggregating about 2,500 miles; while the Egyptian railroads are, including those under construction, about 1,500 miles in length. Those of Cape Colony are over 3,000 miles in length, and those of Portuguese East Africa and the Transvaal are another 1,000 miles in length. Including all of the railroads constructed or under actual construction, the total length of African railways is nearly 12,500 miles, or half the distance around the earth. A large proportion of the railways thus far constructed are owned by the several colonies or states which they traverse, about 2,000 miles of the Cape Colony system and nearly all of that of Egypt belonging to the state.

That the gold and diamond mines of South Africa have been and still are wonderfully profitable is beyond question. The Kimberley diamond mines, about 600 miles from Cape Town, now supply 98 per cent. of the diamonds of commerce, though their existence was unknown prior to 1867, and the mines have thus been in operation but about 30 years. It is estimated that \$350,000,000 worth of rough diamonds, worth double that sum after cutting, have been produced from the Kimberley mines since their opening in 1868-1869, and this enormous production would have been greatly increased but for the fact that the owners of the various mines there formed an agreement to limit the output so as not to materially exceed the world's annual consumption.

Equally wonderful and promising are the great Witwatersrand gold fields of South Africa, better known as the Johannesburg mines. Gold was discovered there in 1883, and in 1884 the value of the gold product was about \$50,000. It increased with startling rapidity, the product of 1888 being about \$5,000,000; that of 1890, \$10,000,000; 1892, over \$20,000,000; 1895, over \$40,000,000; and 1897 and 1898, about \$55,000,000. Work in these mines was practically suspended during the Boer war.

The gold production of the "Rand" since 1884 has been over \$300,000,000, and careful surveys of the field by experts show beyond question that the "gold in sight" probably amounts to \$3,500,000,000, while the large number of mines in adjacent territory, particularly those of Rhodesia, whose output was valued at over \$4,500,000 in 1901, gives promise that South Africa will for many years continue to be the largest gold-producing field of the world.

**African Methodist-Episcopal Church.** See METHODISTS.

**Africanus.** See SCIPIO.

**Agamedes** (aga-mē'des) and **Trophonius** (tro-fō'nē-us), two architects who designed the entrance of the temple of Delphi, for which they demanded of the god whatever gift was most advantageous for a man to receive. Three days after, they were found dead in their beds.

**Agamemnon** (ag-a-mem'non), king of Mycenæ and Argos, son of Atreus and Eriphyle, brother of Menelaus and commander-in-chief of the Grecian army at the siege of Troy. In the earliest and most credible authors, Homer and Hesiod, we find no trace of the long train of horrors which, according to later writers, laid waste the house of Pelops. Agamemnon and his brother were called Atridæ, from their father's name, according to the Grecian custom of giving to the son a patronymic name. He married Clytemnestra, sister of Helen. The Trojan war arose out of the abduction of Helen by



## Agami

Paris, son of Priam, King of Troy. It is commonly said that a number of the princes of Greece having been drawn together as suitors by the extraordinary beauty of Heien, Tyndarus exacted an oath from them that, on whomsoever the choice should fall, if the maid should be carried off, all



KILLING OF AGAMEMNON.

the rest should unite to recover her; and that, in virtue of this oath, the confederate princes assembled under the command of Agamemnon. They were long detained in the Bay of Aulis, in Bœotia, by a calm, occasioned by the anger of Diana, but finally arrived before Troy. During the siege of this town, protracted for 10 years, Agamemnon appears superior to the other chiefs in battle and in council, and maintains, under all circumstances, the dignity of a commander. The most memorable event of the siege of Troy is the quarrel of Agamemnon and Achilles, the subject of the "Iliad," in which the former placed himself very completely in the wrong. Returning from Troy, Agamemnon was treacherously murdered by his wife; who, during his absence, had formed an adulterous attachment with Ægisthus, son of the noted Thyestes. This catastrophe is the subject of the "Agamemnon" of Æschylus, one of the most sublime compositions in the range of the Grecian drama. Orestes, son of Agamemnon, then a child, was saved by the care of his tutor, and timely flight. After passing seven years in exile, he returned in secret, avenged his father's death by the slaughter of his mother and of Ægisthus, and recovered his paternal kingdom, which he ruled with honor.

**Agami**, a bird, called also the trumpeter from the sound which it emits. It is the *psophia crepitans*. It belongs to the family *gruidæ*, or cranes, and the sub-family *psophinæ*, or trumpeters. It is about the size of a large fowl, is kept in Guiana, of which it is a native, with poultry, which it is said to defend, and shows a strong attachment to the person by whom it is fed.

**Agaña** (ag-an'ya), the principal town of Guam, the largest of the Ladrone Islands,

## Agaricus

1,500 miles E. of Luzon, Philippines, and 1,300 miles S. of Yokohama. The Ladrone, or Marianne, group belonged to Spain; but, as a result of the war between the United States and Spain in 1898, the former took possession of the island of Guam, and, in 1899, established a naval station and seat of administration at Agana, with Capt. Richard P. Leary, U. S. N., as first governor.

**Aganippe** (ag-an-ip'ē), or **Aganippæ**, a celebrated fountain of Bœotia, at the foot of Mount Helicon. It flows into the Permessus, and is sacred to the Muses, who, from it, were called Aganippedes.

**Agape** (ag'ap-ē), a love feast, a kind of feast held by the primitive Christians in connection with the administration of the sacred communion. Either before or after the Lord's Supper — it is not completely decided which — the Christians sat down to a feast provided by the richer members, but to which all, however poor, who belonged to the Church, were invited. As piety declined, the agapæ began to cause scandal, and finally

they were condemned by the council of Laodicea and the 3d of Carthage, in the 4th century, and by that of Orleans in A. D. 541. It was, however, found hard to eradicate them, and



AN AGAPE.

finally the council in Trullo, A. D. 692, launched the penalty of excommunication against those who, in defiance of previous prohibitions, persisted in carrying them on.

**Agapemone** (ag-a-pem'ō-nē), the name given by the Rev. Henry James Prince, a clergyman who seceded from the English Church, to a religious society founded on the principle of a community of goods, which he established at Charlinch, near Taunton, England, in 1845. It once occupied a good deal of public attention, but now is seldom mentioned.

**Agapetus**, the name of two Popes: (1) from June, 535, to April, 536, festival day, Sept. 20; (2) from 946 to 955, a native of Rome.

**Agaricus** (ag-ar'ē-cus), a genus of plants, the typical one of the fungus or mushroom family, consisting of the species which possesses a fleshy pileus or cap, with a number of nearly parallel or radiating plates or gills on its lower side, bearing spores, the whole being supported upon a more or less lengthened stalk. More than 1,000 species are known. They may be separated into five natural divisions,



according as the color of the spores is white, pink, ferruginous, purple-brown, or black. There are many sub-genera. Some species are poisonous. It is difficult to identify these with the accuracy which the importance of the subject demands; but the following marks have been given: An agaric is poisonous, or at least suspicious, if it has a very thin cap compared with the thickness of the gills, if the stalk grows from one side of the cap, if the gills are of equal length, if the juice is milky, if it speedily decays into a dark, watery fluid, if the collar round it is like a spider's web. All these characteristics do not meet in the same individual, but the presence of one or more of them is enough to inspire caution. The eatable agarics are the *A. campestris*, or common mushroom—that often cultivated in gardens; the *A. Georgii*; the *A. pratensis*, or fairy-ring mushroom; the *A. personatus*, etc. The *A. canthurellus*, *piperatus*, etc., contain sugary matter, considered by Liebig to be mannite. The agaric of the olive is poisonous, but pickling and subsequent washing render it harmless, as has been ascertained by experience in the Cévennes. Similarly, the application of vinegar and salt deprives the poisonous *A. bulbosus* of its noxious qualities; but too much caution cannot be used in experimenting upon such dangerous articles of food. A curious circumstance about some agarics, such as the *A. Gardneri* of Brazil and the *A. olearius* of the South of Europe, is that they are luminous.

**Agasias** (ag-as'ē-as), of Ephesus, a Greek sculptor who flourished about 400 B. C. The celebrated statue in the Louvre Museum, called "The Gladiator," is his work. It is clear, however, that the statue represents not a gladiator, but a warrior, perhaps Achilles, contending with a mounted combatant. It was discovered in the ruins of a palace of the Roman emperors on the site of Antium.

**Agassiz, Alexander** (ä-gä-sē'), an American zoologist and geologist, son of J. L. R. Agassiz, born in Neuchâtel, Switzerland, Dec. 17, 1835. He came to the United States with his father in 1849; graduated from Harvard in 1855; and received the degree of B. S. from the Lawrence Scientific School in 1857. In 1859 he went to California as assistant on the United States Coast Survey. From 1860 to 1865 he was assistant curator of the Museum of Comparative Zoology at Harvard University; and, from 1866 to 1869, superintendent of the Calumet and Hecla mines, Lake Superior. On the death of his father in 1873, he was appointed curator of the Museum of Comparative Zoology, holding that position until he resigned in 1885. In 1900 he completed a series of deep sea explorations for

the United States government. His chief works are "List of Echinoderms" (1863); "Exploration of Lake Titicaca" (1875-1876); "Three Cruises of the Blake, a Contribution to American Thalassography" (1880). He died March 28, 1910.

**Agassiz, Jean Louis Rodolphe**, a Swiss naturalist; born in Motier, Switzerland, May 28, 1807. He was educated at home till the age of 11, and passed four years at the gymnasium of Bienne, from which he was sent to the Academy of Lausanne. He then studied in the universities of Zürich (1824-1826), Heidelberg, where he attended the Medical School (1826-1827), and at Munich. In the latter city he enjoyed the society and instruction of several eminent men, including Martius, Döllinger, Fuchs, and Oken. On the death of Spix, the zoölogist, he was selected by Martius to complete the zoölogical record of an Austro-Bavarian expedition to which Martius had been botanist. The result was a work containing the description and classification of the fishes which was published in 1829 (in Latin). Agassiz had not hitherto paid special attention to ichthyology, but from this time it became one of his leading pursuits. His parents having withdrawn his allowance, he applied to the publisher Cotta for assistance in his next book, which appeared in 1839 and 1840, under the title of "Histoire Naturelle des Poissons d'Eaux douces de l'Europe Centrale." From 1834 to 1844 he also published five volumes, illustrated by Dinkel, of "Recherches sur les Poissons Fossiles." About the time he began his preparation for these works he took simultaneously the degree of Doctor of Medicine at Munich and of Doctor of Philosophy at Erlangen. He also at this time began to project a new classification in ichthyology, based on four classes, distinguished by the characters of the scales, namely, ganoids, placoids, cycloids, and ctenoids, since Cuvier's system was not well adapted to fossil species.

The liberality of a clergyman, a friend of his father, enabled him to visit Paris, and here he made the acquaintance of Cuvier and Humboldt, the latter of whom in 1833 supplied him with the means to begin the publication of his work on fossil fishes. In 1834 Agassiz published the "Prodromus" of a work on Echinodermata, which was followed by other publications on the same subject. He also published in 1842-1846 a "Nomenclator Zoölogicus," containing an enumeration of all the genera of the animal kingdom, with etymologies and names and dates of the works of the authors by whom they were first named; and he prepared a "Bibliography of Zoölogy and Geology," which was afterward extended by Strickland and Jardine, and published by the Ray Society. In 1836 he began the study of glaciers, and after two visits to the Alps established in 1838 a hut on the glacier of the



Aar, which he visited every summer till 1845. In 1840 he published his "*Études sur les Glaciers*," which first gave him a popular fame throughout Europe. It was followed in 1847 by his "*Système Glaciaire*." He propounds in these the theory of a vastly extended ice area in former epochs. In 1846 he visited, together with Professor Buckland, the mountains of Scotland, where for the first time they found traces of glacier action. From 1838 Agassiz had held the appointment of Professor of Natural History at Neuchâtel. He was a member of nearly all the learned societies of Europe, and had received the degree of Doctor of Laws from Edinburgh and Dublin; but his professorship was poorly remunerated, and his costly publications had entailed a heavy debt, when in 1846 he went to the United States on a lecturing and exploring tour. The professorship of zoölogy and geology in Harvard College was offered him in 1847, and as he had previously been offered the use of the United States survey vessels for exploring purposes he accepted the offer. While at Harvard he wrote several volumes, some of which were of a popular nature, but most of them were devoted to scientific research.

Among his more important works were: "*Principles of Zoölogy*," in connection with Dr. A. Gould (1848); "*Lake Superior, its Physical Character*" (1850); "*Contributions to the Natural History of the United States*" (4 vols. 1857-1862); "*Zoölogie Générale*" (1854); "*Methods of Study in Natural History*" (1863). His contributions to the development of the principles of natural science in his special departments are very numerous and of high authority. In 1855 he was enabled by the liberality of Nathaniel Thayer to make, for the sake of his failing health, a long-contemplated voyage to Brazil. He was accompanied by his wife, who wrote an account of the voyage. In 1871 he visited the S. shores both of the E. and of the W. coast of North America. After some years of unsuccessful efforts to get a government marine station established, he was enabled by private munificence to fit up one on Penekese Island in Buzzards bay. Agassiz's last work was the organization of this establishment, of which he wrote an account in 1873 to the British Association. He died in Cambridge, Mass., Dec. 14, 1873. Agassiz held views on many important points in science differing from those which prevailed among the scientific men of the day. He adopted the opinion of a variety of human races, and his investigations in natural history led him to the conclusion that there have been not only successive but distinct local creations. He strongly opposed the theory of development, refusing to accept the doctrine of evolution. His love of generalization was great, and nearly all his

works were written with a more or less direct view to some theoretical object.

His widow, ELIZABETH CARY AGASSIZ, was born in Boston, Mass., in 1823, and married in 1850. She closely identified herself with her husband's scientific work, accompanying him on many of his travels, and supplementing his researches with her own literary work. Probably she will be best remembered for her early agitation for the collegiate education of women, and as the president of the Harvard Annex, now Radcliffe College, from its institution till November, 1899, when she resigned. Mrs. Agassiz published "*Louis Agassiz: His Life and Correspondence*," and was joint author, with Alexander Agassiz, of "*Seaside Studies in Natural History*." Died in 1907.

**Agassiz Association**, a society founded in the United States in 1879 to promote scientific study, and named in honor of Prof. J. Louis Agassiz. Its immediate popularity led to the formation of a general association in the following year, and this is now represented in all parts of the world, having over 1,000 chapters, and more than 10,000 members.

**Agassiz, Lake**, a former body of water, stretching from the plain of the Red River of the North in Minnesota and North Dakota to an undetermined distance in Canada. It belonged to the last glacial epoch, and was named by Upham in honor of the great Swiss geologist. From shore lines and deltas still well marked it is believed that it extended from 30 to 100 miles E. and W., and upward of 400 miles N. and S., with a depth ranging from 200 to 400 feet. The overflow of the lake is supposed to have passed into the Minnesota river through a channel about 50 feet deep, 50 or more miles long, and more than a mile wide, the outlines of which may still be traced readily. Lake Agassiz was formed, according to the theories of eminent geologists, by the retreating of the ice sheet of the last great glacial movement.

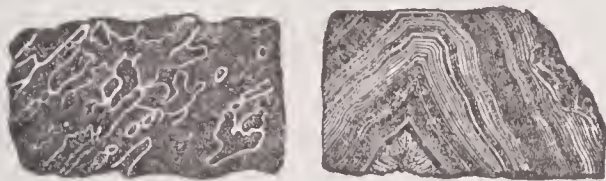
**Agassiz, Mount**, a remarkable mountain peak and extinct volcano, about 70 miles N. E. of Prescott, Ariz. It is more than 10,000 feet above sea-level, and belongs to the range or group of San Francisco mountains. As a place of summer resort it has numerous attractions—grand scenery, elevation, excellent water, and proximity to the Great Cañon of the Colorado, one of the greatest natural curiosities on the continent.

**Agate**, a mineral classed by Dana as one of the cryptocrystalline varieties of quartz, some of the other minerals falling under the same category being chalcedony, carnelian, onyx, hornstone, and jasper. Phillips and the earlier school of mineralogists had made quartz and chalcedony different minerals,



## Agatharchides

and placed agate under the latter species. The classifications differ but little; for Dana defines agate as a variegated chalcedony. He subdivides agates by their colors into



SPECIMENS OF AGATE.

those which are banded, those in clouds, and those whose hues are due to visible impurities. Under the first category is reckoned the eye agate, and under the third the moss agate, or mocha stone, and the dendritic agate. Other terms sometimes used are ribbon agate, brecciated agate, fortification agate, etc. Of these the most familiar is the fortification agate, or Scotch pebble, found in amygdaloid, and with layers and markings not unlike a fortification. Moss agate does not, as the name would lead one to infer, contain moss, the appearance of that form of vegetation being produced, in most cases at least, by an infiltration of mineral matter. The principal supply of the figured agates of commerce is from Oberstein, in the old Palatinate, about 30 miles E. of Treves, and 45 miles S. of Coblenz. When they were used as buttons, knife-handles, and other small objects, the trade was much more extensive than at present. They are found in many parts of Scotland, especially at the Hill of Kin-noul, near Perth, where there is an amygdaloidal trap very full of fine specimens. Large pieces of chalcedony are found in Brazil and Iceland, as well as in the Faroe islands.

**Agatharchides**, or **Agatharcides**, a Greek writer on geography, born at Cnidos, in Asia Minor; lived B. C. 250, and wrote numerous works, and, among them, one on the Erythræan Sea, of which some extracts have been preserved. He is the earliest extant writer who attributes the annual rise of the Nile to the periodical rains in the upper regions of that river.

**Agatha, St.**, a lady of Palermo, martyred by Quintilian, the pro-consul of Sicily, in the persecution of Decius, because she would not perform idolatrous worship, nor submit to his impure desires.

**Agathias** (a-gā'thi-as), a Greek poet and historian, about 536–581. He collected a "Cycle" of contemporary poems, in which were a few of his own compositions. We have still 101 of his "Epigrams," and the whole of his "History" of the years 553–558.

**Agathocles** (ag-ath'ō-klēz), a Syracusan of low extraction, who became ruler of a great part of Sicily. He was remarkable

## Agave

for beauty, strength, and capacity for enduring labor. In the outset of life, he belonged to a band of robbers; afterward he served as a private soldier, rose to the greatest honors, and made himself master of Syracuse. He conquered the greatest part of Sicily, B. C. 317. Being defeated at Himera by the Carthaginians, he carried the war into Africa, where, for four years, he extended his conquests over his enemy. He afterward passed into Italy and made himself master of Crotona. In his 72d year he was poisoned by his grandson Archagathus, B. C. 289, after a reign of 28 years of great prosperity mingled with the deepest adversity. His son-in-law, Pyrrhus, King of Epirus, inherited his influence in Sicily and Southern Italy.

**Agathon** (ag'a-thon), a Greek tragic poet (448–402 B. C.). He was a close friend of Euripides and of Plato; and the famous "Symposium" of Plato immortalizes the banquet given on the occasion of Agathon's dramatic triumph, 416 B. C.

**Agave** (ag-ā'vē), daughter of Cadmus and Hermione, married Echion, by whom she had Pentheus, who was torn to pieces by the Bacchanals. She is said to have killed her husband while celebrating the orgies of Bacchus. She received divine honors after death.



AGAVE AMERICANA (CENTURY PLANT).

**Agave**, an extensive genus of plants belonging to the natural order *amaryllidaceæ*. The species have large, fleshy leaves, with



teeth ending in spinous points. From the center of a circle of these leaves there rises, as the plant approaches maturity, a tall scape of flowers. The idea that the agave blossoms but once in a hundred years is a fable. What really happens is, that the plant, taking many years (10 to 70, it is thought) to come to maturity, flowers but once, and then dies. The best-known species is the *A. Americana*, or American aloe, called maguey by the Mexicans. Its hard and spiny leaves form impenetrable hedges. The fiber makes excellent cordage. The expressed juice is employed as a substitute for soap; also manufactured into a cider-like liquor, called pulque by the Mexicans. The plant originally belonged to North America, and is chiefly found in Mexico. It is now cultivated in the South of Europe. The *A. saponaria* is a powerful detergent, and its roots are used as a substitute for soap.

**Age**, any period of time attributed to something as the whole, or part, of its duration; as the age of man, the several ages of the world, the golden age.

*In Physiology*.—If the word age be used to denote one of the stages of human life, then physiology clearly distinguishes six of these: viz., the periods of infancy, of childhood, of boyhood or girlhood, of adolescence, of manhood or womanhood, and of old age. The period of infancy terminates at 2, when the first dentition is completed; that of childhood at 7 or 8, when the second dentition is finished; that of boyhood or girlhood at the commencement of puberty, in temperate climates from the 14th to the 16th year in the male, and from the 12th to the 14th in the female; that of adolescence extends to the 24th year in the male and the 20th in the female; that of manhood or womanhood stretches on till the advent of old age, which comes sooner or later, according to the original strength of the constitution in each individual case, and the habits which have been acquired during life. The precise time of human existence similarly varies.

*In Archæology*.—The Danish and Swedish antiquaries and naturalists, MM. Nilson, Steenstrup, Forchamber, Thomsen, Worsaae, and others, have divided the period during which man has existed on the earth into three—the age of stone, the age of bronze, and the age of iron. During the first-mentioned of these he is supposed to have had only stone for weapons, etc. Sir John Lubbock divides this into two—the palæolithic, or older, and the neolithic, or newer, stone period. At the commencement of the age of bronze that composite metal became known, and began to be manufactured into weapons and other instruments; while, when the age of iron came in, bronze began gradually to be superseded by

the last-mentioned metal. (Lyell's "The Antiquity of Man"; Lubbock's "Prehistoric Times.")

*In Law*, the time of competence to do certain acts. In the male sex, 14 is the age when partial discretion is supposed to be reached, while 21 is the period of full age. Under 7 no boy can be capitally punished; from 7 to 14 it is doubtful if he can; at 14 he may. At 12 a girl can contract a binding marriage; at 21, she is of full age. In mediæval times, when a girl reached 7, by feudal custom or law a lord might distrain his tenants for aid to marry, or, rather, betroth her; at 9, she was dowable; at 12, she could confirm any consent to marriage which she had previously given; at 14, she could take the management of her lands into her own hands; at 16, she ceased, as is still the law, to be under the control of her guardian; and at 21, she might alienate lands and tenements belonging to her in her own right. In the United States, both males and females are of full age at 21. The age at which minors may be punished or may marry varies in the several States.

*Ages of the World*.—We find the ages of the world mentioned by the earliest of the Greek poets. They compared the existence of mankind to the life of an individual, and the earliest period of the world to the tranquillity and happiness of youth. Hesiod speaks of five distinct ages: (1) The golden, or Saturnian age, when Saturn ruled the earth, is represented as having been that of perfect innocence and happiness. (2) The silver age, which he describes as licentious and wicked. (3) The brazen age; violent, savage, and warlike. (4) The heroic age, which seemed an approximation to a better state of things. (5) The iron age, when justice and honor had left the earth.

*Age of Animals*.—The duration of life in animals is generally between seven and eight times the period which elapses from birth till they become adult; but this rule, besides being vague and indefinite, is quite useless in practice, because it affords no scale of gradation which would enable us to ascertain the precise age of individuals, the only inquiry of real importance or of practical application to the interests of society. More certain and scientific principles are derived from observing the growth and decay of the teeth. Unhappily, the observations have not been till now extended further than to the most important domestic animals.

*The Horse*.—Its age is known principally by the appearance of the incisive teeth, or, as they are technically called, the nippers. Of these, there are six in each jaw, broad, thin, and trenchant in the foal, but with flat crowns, marked in the center with a



hollow disk, in the adult animal. The foal, or milk teeth, appear 15 days after birth; at the age of two years and a half, the middle pair drop, and are replaced by the corresponding permanent teeth; at three years and a half, the two next, one on each side, fall, and are likewise replaced; and at the age of four years and a half, the two external incisors of the first set drop, and give room to the corresponding pair of permanent teeth. All these permanent nippers, as we have already observed, are flattened on the crown, or upper surface, and marked in the center with a circular pit, or hollow, which is gradually defaced in proportion as the tooth wears down to a level with its bottom. By the degree of this detrition, or wearing of the teeth, the age of the animal is determined, till the eighth year, at which period the marks are generally effaced; but it is to be observed that the external incisors, as appearing a year or two after the intermediate, preserve their original form proportionally for a longer period. After the eighth year, the age of the horse may be still determined for a few years longer by the appearance and comparative length of the canine teeth, or tushes. These, it is true, are sometimes wanting, particularly in the lower jaw, and in mares are rarely developed at all. Those of the under jaw appear at the age of three years and a half, and the upper at four; till six they are sharp-pointed, and at 10 they appear blunt and long; but after this period there are no further means of judging of the horse's age, excepting from the comparative size, bluntness, and discolored appearance of the tushes.

*Oxen, Sheep, Goats, etc.*—The age of the horned cattle is indicated more readily by the growth of horns than by the detrition and succession of the teeth. Their horns consist of a hollow sheath of horn, which covers a bony core of the skull, and grows from the root, when it receives each year an additional knob or ring, the number of which is a sure indication of the animal's age. In the cow kind, the horns appear to grow uniformly during the first three years of the animal's life; consequently, up to that age they are perfectly smooth and without wrinkles, but afterward each succeeding year adds a ring to the root of the horn, so that the age is determined by allowing three years for the point, or smooth part of the horn, and one for each of the rings. In sheep and goats, the smooth, or top part, counts but for one year, as the horns of these animals show their first knob, or ring, in the second year of their age. The age of other classes of animals cannot be determined by any general rule. In birds, it may be sometimes done by observing the form and wear of the bill; and some pretend to distinguish the age of fishes by the

appearance of their scales, but their methods are founded upon mere hypothesis, and entitled to no confidence.

*Age of Plants.*—Plants, like animals, are subject to the laws of mortality, and, in many cases, have the period of their existence determined by nature with as much exactness as that of an insect. It is principally to annual and biennial plants that a precise period of duration is fixed. The remainder of the more perfect part of the vegetable kingdom, whether herbaceous, or shrubby, or arborescent, consist of plants which may be classed under two principal modes of growth. One of these modes is to increase, when young, in diameter, rather than in length, until a certain magnitude is obtained, and then to shoot up a stem, the diameter of which is never materially altered. The addition of new matter to a trunk of this kind takes place by the insinuation of longitudinal fibers into the inside of the wood near the center; on which account such trees are called endogenous, or monocotyledons. The other mode is, from the beginning, to increase simultaneously in length and diameter, but principally in length. The addition of new matter to a trunk of this kind takes place by the insinuation of longitudinal fibers into a space beneath the bark, and on the outside of the wood, near the circumference; on which account such trees are called exogenous, or dicotyledons.

There is scarcely any well attested evidence of an endogenous plant having acquired any considerable age, and, in fact, the mode of growth of such trees as palms seems to preclude the possibility of their existing beyond a definite period of no great extent. The diameter to which their trunk finally attains is very nearly gained before they begin to lengthen, and afterward all the new woody matter, which every successive leaf necessarily produces during its development, is insinuated into the center. The consequence of this is, that the woody matter previously existing in the center is displaced and forced outward toward the circumference; as this action is constantly in progress, the circumference, which in the beginning was soft, becomes gradually harder and harder by the pressure from within outward, till at last it is not susceptible of any further compression. After this has occurred, the central parts will gradually solidify by the incessant introduction by the leaves of new wood, which thrusts outward the older wood, till at last the whole stem must become equally hard, and no longer capable of giving way for the reception of new matter. As soon as this occurs, the tree will perish; because its vitality is dependent upon the full action of all the functions of the leaves, and the cessation of one is the cessation of all.



## Ageda

In exogenous trees, as in the oak, it is quite the reverse; to their existence no limited duration can be assigned; on the contrary, there is nothing physically impossible in the notion that some individuals now existing may even have been silent witnesses of the Noachian deluge. In consequence, first, of the new woody matter which is constantly formed by the leaves of such trees being insinuated beneath the bark, near the circumference of their trunk; and, second, of the bark itself being capable of indefinite distension, no compression is exercised by the new parts upon those previously formed; on the contrary, the bark is incessantly giving way to make room for the wood beneath it, while the latter is, in consequence, only glued, as it were, to what succeeds it, without its own vital powers being in any degree impaired by compression.

It is in the newly formed wood that the greatest degree of vitality resides; in the old wood, near the center, life, in time, becomes extinct; but as each successive layer possesses an existence in a great degree independent of that which preceded it, the death of the central part of an exogenous tree is by no means connected with a diminution of vitality in the circumference. The last cylinder having its own independent vitality, it will be apparent that, under circumstances constantly favorable to growth, individuals of this kind may continue to exist to the end of time. The way by which the age of exogenous trees may be computed is by cutting out a portion of their circumference, and counting the number of concentric rings that are visible; the woody cylinder of one year being divided from the succeeding one by a denser substance, which marks distinctly the line of separation of the two years. In consequence of the extreme inequality in thickness of the annual layers of wood on opposite sides of a stem, a person judging of the whole age of a tree by the examination of the layers of the stunted side only would commit errors to the amount of 60 per cent., and more. It is by no means impossible that the great age of 5,000 years and more, assigned by Adanson to the baobab tree of Africa, and by the younger De Candolle to the deciduous cypress of Mexico, may be connected with errors of this nature.

**Ageda** (ag-á'da), the name of a plain, 90 miles from Buda, where the Jewish rabbis held a meeting, in 1650, to debate whether the Messiah had come; the question was decided in the negative.

**Agen** (ä-zhoi'), a town of France, capital of the Department of Lot-et-Garonne, on the right bank of the Garonne, on the railway from Bordeaux to Toulouse. Its situation, though rather unhealthy, makes it the *entrepot* of the commerce between Bordeaux and Toulouse. Environs beautiful. Agen

## Agis

was a prætorian city under the Roman emperors. Pop. about 22,000.

**Agent**, in law, one person who acts for another, called the principal. If a person acts as agent without authority, the subsequent ratification of the act will make it binding on the principal just as if he had originally directed it. When an agent acts within the scope of his employment, he may bind his principal, and the principal is liable for any fraudulent acts or wrong-doings of the agent so acting. If the agent, having power to bind his principal, does so expressly, he is not liable; but if he exceeds his authority, he becomes personally responsible. The agent is bound to obey the instructions of the principal, and, if, in violating them, he binds the principal to a third person, he is personally liable to make compensation. He cannot deal in his principal's affairs to his own profit. Upon the law of agency is based, to a large degree, the law of partnership.

**Agesander** (aj-es-an'der), a famous sculptor of Rhodes, who, in the time of Vespasian, made a representation of the Laocoon's history, which now passes for the finest relic of all ancient sculpture. The Laocoon was discovered at Rome, in 1506, and afterward deposited in the Farnese palace, where it still remains.

**Agesilaus** (aj-es-ē-lā'us), King of Sparta (397-360 B. C.), was elevated to the throne chiefly by the exertions of Lysander. He was one of the most brilliant soldiers of antiquity. Being called upon by the Ionians to assist them against Artaxerxes, he commenced a splendid campaign in Asia; but was compelled by the Corinthian War, in which several of the Grecian States were allied against Sparta, to leave his conquest over the Persians incomplete, and return to Greece. At Coronea (394 B. C.), he gained a victory over the allied forces, and in 378 the war was concluded by a treaty of peace in favor of Sparta. Afterward, in the Theban War, though hard pressed by Pelopidas and Epaminondas, and defeated at Mantinea (362), he bravely and ably defended his country. He fought a campaign in Egypt, and, returning, died in his 84th year.

**Agis** (āj'is), the name of several kings of Sparta, of whom the most noted was Agis IV. He came to the throne in 244 B. C., when the State of Sparta had fallen into a ruinous condition through long-continued war. The riches of the State were in the hands of a few persons, while a great majority of the people were in extreme indigence. Agis, therefore, in accordance with the old laws of the State, proposed the increase of the number of citizens by the admission of a certain number of Helots and aliens, to be followed by the redistribution of landed estates by lottery. But insuper-



able difficulties were thrown in the way; the people were persuaded that his schemes were inimical to the welfare of the State; and Agis was put to death, by strangulation (241 B. C.).

**Agincourt**, now **Azincourt**, a small village in the center of the French department of Pas-de-Calais, celebrated for a bloody battle between the English and French, Oct. 25, 1415. The internal distractions of France, under the imbecile, Charles VI., had encouraged England to attempt to make good her ancient claims. Henry V., of England, had landed at Harfleur, had taken that fortress, and was marching to Calais, in order to go into winterquarters. But a French army, vastly superior in number, intercepted the English march to Calais, near the village of Agincourt. The invading army, weakened in numbers, and suffering from want of provisions, was still 14,000 strong; the French, under the Constable d'Albret, numbered 50,000, or more. The battle lasted three hours, and was a signal victory for the English, due mainly to the archers. As many as 10,000 Frenchmen are said to have fallen, among whom were the Constable, three dukes, and 90 barons. Five princes, among them the Dukes of Orleans and Bourbon, were taken prisoners. The English lost 1,600 killed.

**Aglaia** (ag-lā'ya), the youngest of the three Graces, called also Pasiphæ.

In astronomy, one of the groups of small planets, revolving between Jupiter and Mars.

In botany, a genus of dicotyledonous plants, order *melicææ*. The flowers of *aglaia odorata* are used for perfuming certain varieties of tea.

**Agnadello** (an-ya-del'lo), a village of North Italy, 10 miles E. of Lodi, near which Louis XII., of France, completely defeated the Venetians, on May 14, 1509, and the Duke of Vendome gained a victory over Prince Eugene, in 1705.

**Agnano** (an-yä'no), till 1870, a small lake, 3 miles W. of Naples, about 60 feet in depth, and without visible outlet. As it caused malaria, it has been drained. The surrounding country is volcanic and mountainous. On the right lies the Grotta del Cane, and on the left are found the sulphurous vapor baths of San Germano.

**Agnes, St.**, a holy woman, who suffered martyrdom at the time of the persecution of the Christians in the reign of the Emperor Diocletian. Having acknowledged herself a Christian, and taken the vows of virginity at the age of 13, she was besieged by many lovers. On her refusal to listen to them, or to renounce Christianity, she was first tortured and then exposed to dishonor. Being saved by a miracle, she was beheaded. Her emblem is a lamb, and her calendar day, Jan. 21.

**Agnesi, Maria Gaetana** (an-yä'zē), a woman remarkable for her varied attainments, was born at Milan, in 1718. In her ninth year, she could converse in Latin, and soon acquired a mastery of Greek, Hebrew, French, Spanish, and German. Her father invited parties of learned men to his house, with whom, in spite of her retiring disposition, Maria disputed on philosophical points. Of her discourses on these occasions, her father published specimens, called "Propositiones Philosophicæ" (1738). After her 20th year, she devoted herself to the study of mathematics, wrote an unpublished treatise on "Conic Sections," and published her "Istituzioni Analitiche" (1748). The latter was a work of permanent value, and was translated into French and English. When her father was disabled by infirmity, she took his place as Professor of Mathematics, in the University of Bologna, by the appointment of Pope Benedict XIV. After her father's death, in 1752, she made theology her study, and ultimately entered a convent at Milan, where, in 1799, she died, at the age of 81.

**Agnes Sorel.** See SOREL.

**Agnew, Cornelius Rea**, an American physician, born in New York, Aug. 8, 1830; Professor of Diseases of the Eye and Ear in New York College of Physicians and Surgeons. He was a graduate of Columbia College, and later studied in Europe; was surgeon-general of the State of New York at the beginning of the Civil War, when he became medical director of the New York State Volunteer Hospital. As member of the United States Sanitary Commission, he contributed largely to its success. In 1868, he founded the Brooklyn Eye and Ear Hospital. He was interested in the public schools of New York; became founder of the Columbia College School of Mines, and, in 1874, one of the trustees of the college. His writings are chiefly monographs on diseases of the eye and ear. He died April 8, 1888.

**Agnew, David Hayes**, an American surgeon and medical writer, born Nov. 24, 1818; for many years Professor of Surgery at the University of Pennsylvania. He was also the operator in several important cases, notably that of President Garfield. He published "Practical Anatomy" (1867); "Anatomy and Its Relation to Medicine and Surgery;" "Principles and Practice of Surgery" (1878), etc. He died March 22, 1892.

**Agno** (ag'nō), an important river in the N. W. part of Luzon, Philippine Islands. It is about 90 miles in length, describing a circuitous course, parallel with a range of coast mountains, and emptying into Lingayen Gulf. The town of Lingayen is at the mouth of the river, which is accessible by railway from Manila.



## Agnolo

**Agnolo, Baccio di** (an'yō-lō), an Italian architect and sculptor, born in Florence about 1460; a friend of Michel Angelo. He was originally a carpenter, and carved the choir seats in Santa Maria Novella, and the woodwork in the ceiling of the council hall of the chapel of the Palazzo Vecchio. He laid the marble flooring of the church of Santa Maria dei Fiori, of which he was chief builder, between 1506 and 1529. His principal buildings are the Palazzo Bartolomeo, the Palazzo Pecori-Giraldi, the Palazzo Lanfredini, many villas in Florence, and the towers of San Spirito and San Miniato.

**Agnosticism**, a school of thought which believes that, beyond what man can know by his senses or feel by his higher affections, nothing can be known. Facts, or, supposed facts, both of the lower and the higher life, are accepted, but all inferences deduced from these facts as to the existence of an unseen world, or of beings higher than man, are considered unsatisfactory, and are ignored. Agnostics, positivists, and secularists have much in common, and many people exist to whom anyone of the three names might be indifferently applied.

**Agosta**, or **Augusta**, a small town of Sicily, in Val di Noto, with an excellent harbor. In 1763 it was mostly swallowed up by an earthquake, but has been rebuilt. It was off this port that De Ruyter, the famous Dutch admiral, in command of the united Dutch and Spanish fleet, April 22, 1676, was defeated by the French, under Duquesne, and received his death wound.

**Agoult** (ä-gö'), **Marie Catherine Sophie de Flavigny, Comtesse d'**, a French author and socialist, born at Frankfort-on-Main, Dec. 31, 1805; in sympathy with the revolutionists of 1848. After separation from her husband, she became the mistress of the famous pianist, Franz Liszt, by whom she had a son and two daughters. Her daughter, Claire Christine, born 1830, married the author, Guy de Charnacé, and wrote under the pseudonym of DE SAULT. Blandine married Emile Olivier; Cosima married first Hans von Bülow, and afterward Wagner. Under the pen-name of DANIEL STERN, Mme. d'Agoult published "Nelida" (1847); "Moral and Political Sketches" (1849); "History of the Revolution of 1848" (1851); "Three Days of the Life of Marie Stuart" (1856), and "History of the Beginnings of the Republic in the Netherlands, 1581-1625" (1872), which was granted a prize by the French Academy. Posthumously were published her "Souvenirs," in which she recounted the scenes of her youth, and, especially, of her meeting with Goethe. She died at Paris, March 5, 1876.

## Agra

**Agoust, Captain de**, an officer of the Swiss Guards, who, on May 4, 1788, marched the Parliament of Paris out of the Palais de Justice and carried off the key.

**Agouti**, a South American animal, of the family *hystrioidæ*, order *rodentia*. The agoutis live for the most part upon the surface of the ground, not climbing nor digging to any depth; and they commonly sit upon their haunches, when at rest, holding their food between their forepaws, in the manner of squirrels.

By eating the roots of the sugar-cane, they are often the cause of great injury to the planters. The ears are short, and the tail rudimentary.

The animal is nearly 2 feet

long. It is found in Guiana, Brazil, Paraguay, and some of the Antilles. It feeds voraciously on vegetable food, especially preferring various kinds of nuts. One of the other species of agouti is the acouchy.



AGOUTI.

**Agows**, a remarkable people of Abyssinia, inhabiting a territory to the E. of the sources of the Bahr-el-Azrek (Blue river), or Abyssinian Nile. Extent 60 miles long and 30 broad. This district is fertile in the highest degree. It produces large quantities of honey, and raises remarkably fine cattle, with which it almost exclusively supplies Gondar, the capital. There is another tribe called Tcheretz Agows on the northern bank of the Tæasse.

**Agra.** (1) A former division of British India, now a part of the United Provinces of Agra and Oudh; area, 83,198 square miles; pop. (1901), 34,858,705. (2) A district consisting of a level plain diversified by sandstone hills. The soil is barren and sandy, and, through the failure of rains, famines frequently occur; area, 1,850 square miles; pop. (1901), 1,060,528. (3) The capital of Agra district, on the right bank of the Jumna, 139 miles S. E. of Delhi, by rail, and 841 miles N. W. of Calcutta. The ancient walls embraced an area of 11 square miles, of which about one-half is now occupied. The houses are mostly built of red sandstone, and, on the whole, Agra is the handsomest city in upper India. Some of the public buildings, monuments of the house of Timur, are on a scale of striking magnificence. Among these are the fortress, built by Akbar, within the walls of which are the palace and audience-hall of Shah Jehan, the Moti Masjid, or pearl mosque,



and the Jama Masjid, or great mosque. Still more celebrated is the white marble Taj Mahal, situated without the city, about a mile to the east of the fort. The city is considered especially sacred through Vishnu's incarnation there as Parasu Rama. Of British edifices, the principal are the Government house, the Government College, three missionary colleges, the English church, and the barracks. The climate, during the hot and rainy seasons (April to September), is very injurious to Europeans; but the average health of the city is equal to that of any other station in the North-western Provinces. The principal articles of trade are cotton, tobacco, salt, grain, and sugar. There are manufactures of shoes, pipe stems, and gold lace, and of inlaid mosaic work, for which Agra is famous. Sikander Lodi, King of the Afghans (1488-1517), made it his residence. In 1526, it was captured by Baber, but again came into the hands of the Afghans. In 1539, Akbar the Great made it his capital. Shah Jehan adorned it with wonderful buildings. Aurungzebe removed his residence to Delhi; and, after his death, the city was pillaged successively by Jats, Persians, Afghans, and Makrats, until, in 1784, it surrendered to Scinda, and, in 1803, to Lord Lake. During the Indian mutiny, in 1857, it was a place of refuge for the Europeans. It is a very important railway center, and has many claims to be regarded as the commercial capital of the Northwest. Pop. (1901) 188,300.

**Agram** (Croatian, Zagreb), capital of the Austrian Province of Croatia and Slavonia, lies at the foot of a richly wooded range of mountains, about 2 miles from the Save, and 142 miles N. E. of Fiume by rail. It is divided into three parts — the upper town, built upon two eminences; the lower town; and the episcopal town. The cathedral, dating partly from the 11th century, is one of the finest Gothic buildings in Austria. Ninety per cent. of the inhabitants are Croats, who carry on a trade in wine, wood, and corn, and manufacture tobacco, leather, and linen. Repeated shocks of earthquake, in November, 1880, destroyed most of the public buildings, and overthrew 200 houses. Agram possesses a university, founded in 1874, with 40 lecturers and 400 students, and a public library. Pop. (1900) 61,002.

**Agrarian**, as adjective (1) general, pertaining to fields or lands; (2) special, pertaining to laws or customs, or political agitation in connection with the ownership or tenure of land.

The agrarian laws, in the ancient Roman republic, were laws of which the most important were those carried by C. Licinius Stolo, when tribune of the people, in B. C. 367. The second rogation, among other enactments, provided (1) that no one should

occupy more than 500 *jugera* (by one calculation, about 280, and by another, 333, English acres) of the public lands, or have more than 100 large, and 500 small, cattle grazing upon them; (2) that such portion of the public lands above 500 *jugera* as was in possession of individuals should be divided among all the plebeians, in lots of seven *jugera*, as property; (3) that the occupiers of public land were bound to employ free laborers, in a certain fixed proportion to the extent of their occupation. When, at a later period, efforts were made to revive the Licinian rogations, such opposition was excited that the two Gracchi lost their lives in consequence, and this, with their other projects, proved abortive. It is important to note that the land with which the Licinian, or agrarian, laws dealt was public land, belonging to the State, and not, as is popularly supposed, private property.

**Agrarian Party**, a political organization in Germany, representing the interests of the landlords (in political life). The first steps toward the formation of the party were taken by an assembly, called together at Breslau, in May, 1869, by M. A. Nienendorf (died 1878), and Elsner von Gronow, but the theory had already been formulated by Johann Karl Rodbertus. The organ of the party was "Die Deutsche Landeszeitung," edited by Nienendorf. In February, 1876, a constitutional assembly of agrarian reformers was opened, and adopted the official name of "Steuer und Wirtschaftreformer." Their programme was especially devoted to the abolition of taxes on land, buildings and trades. At first, especial emphasis was laid on free trade, but this object fell more and more into the background after 1879. The Agrarian Party took an important share in opposing commercial relations with the United States, especially in food stuffs.

**Agreement**, a mutual bargain, contract, or covenant. Taken in its most extended sense, it comprehends a large proportion of the transactions of civilized man in the mutual intercourse of society. In a more limited sense, it is the mutual assent to do a thing; the effect of this assent, or the instrument itself, showing what has been agreed. Every state has particular laws on this important matter. It may, however, be noticed as general rule: (1) That the assent is the essence of an agreement, and that the parties must be in situations to testify their free assent to it. Thus lunatics, infants, and, in certain cases, married women, are, for obvious reasons, deemed incapable of binding themselves by any engagement. (2) That the subject of agreement must not be tainted with illegality; for it would be evidently repugnant to common sense that the law should be called to enforce performance of any act which it has



expressly forbidden, or which would be contrary to its general policy. (3) In order to secure the aid of the law in carrying it into effect, an agreement must have certain qualities mutually beneficial to the parties, or must be entered into with certain prescribed solemnities. Courts of justice cannot be called upon to take cognizance of idle or inconsiderate promises. An agreement must either be contracted by a formal instrument in writing, sealed and openly acknowledged by the party who has bound itself to it; or, if contracted in a less formal manner, by word or otherwise, it must appear that the parties derive from it reciprocal benefit. Upon this principle, a promise to make a voluntary gift can never be enforced; but there is a continuing right in the party promising, to retract his promise or donation, until the gift is actually completed. An agreement takes the name of deed, or specialty contract, when put in writing under seal, but not when put in writing for a memorandum.

**Agricola, Cnæus Julius** (ag-rik'ō-la), Roman statesman and general, born in 37 A. D. He went to Britain in 77 A. D., strengthened the Roman power, and extended it to the Scotch Highlands. He was in command of the army in Britain for seven years, successfully subduing and pacifying the inhabitants. He built chains of forts between the Solway and the Tyne, and between the Clyde and Forth. Numerous traces of his works exist in many parts of Great Britain. His success made Domitian jealous of him, and he retired from public life in 84. His life, written by his son-in-law, Tacitus, is considered to be one of the best biographies in literature. He died in 93.

**Agricola, John**, a polemical writer of celebrity, born at Eisleben, Saxony, in 1492; died at Berlin, in 1566. From being the friend and scholar, he became an antagonist, of Martin Luther. He entered into a dispute with Melancthon, advocating the doctrine of faith in opposition to the works of the law, whence the sect of which he became leader received the name of Antinomians.

**Agricola, Rudolphus**, the foremost scholar of the "New Learning," in Germany, was born near Groningen, in Friesland, Aug. 23, 1443. His real name, ROELOF HUYSMANN (husbandman), he Latinized into Agricola; and from his native place he was also called Frisius, or Rudolf of Groningen. From Groningen he passed to Louvain, then to Paris, and then to Italy, where, during the years 1473-1480, he attended the lectures of the most celebrated men of his age, and where he entered into a close friendship with Dalberg, afterward Bishop of Worms. On his return home, he endeavored, in connection with several of his former co-disciples and friends, to promote

a taste for literature and eloquence. Several cities of Holland vainly strove with each other to obtain his presence, but not even the brilliant overtures made to him by the Emperor Maximilian, to whose court he had repaired in connection with affairs of the town of Groningen, could induce him to renounce his independence. At length yielding (1483) to the solicitations of Dalberg, he established himself in the Palatinate, where he sojourned alternately at Heidelberg and Worms, dividing his time between private studies and public lectures, and enjoying high popularity. He distinguished himself also as a musician and painter. With Dalberg, he revisited Italy



RUDOLPHUS AGRICOLA.

(1484), and, shortly after his return, died at Heidelberg, Oct. 28, 1485. Most of his works were collected by Alard, of Amsterdam (2 vols., Cologne, 1539).

**Agricultural Chemistry.** Agricultural chemistry treats of the composition and functions of soils and fertilizers, and studies the properties of agricultural products, and their relations to nutrition and the technical arts. Little was known a hundred years ago of the real relations of chemistry to agriculture. Since farming has been practised as an art, the value of certain fertilizers, such as those produced in the barnyard, has been recognized, but the principles upon which their utilization depends were not understood (see MANURE). One of the first publications on agricultural chemistry was entitled "Natural and Chemical Elements of Agriculture," translated from the Latin of Count Gustavus Adolphus Gyllenborg by John Mills, and published in London in 1770. The real beginning of agricultural chemistry is found in a series of lectures by Sir Humphry Davy (*q. v.*) before the Royal Agricul-



tural Society of England, published in 1813. It was not, however, until thirty years later that agricultural chemistry received its first great impetus in the investigations and publications of Liebig (*q. v.*). His work, entitled "Chemistry in its Application to Agriculture and Physiology," in 1840, marked a complete change in the theories of chemistry in their application to agriculture. Liebig developed the "mineral" theory of the nutrition of plants, as opposed to the old "humus" or "organic" theory (see VEGETABLE PHYSIOLOGY). This laid the foundations for the inauguration and development of one of the great chemical industries, namely, that of the manufacture of commercial fertilizers; and the discovery that bones and rocks containing phosphorus could be utilized for plant food, opened a way for the development of agriculture before unknown (see PHOSPHATE). An illustration of what has been done in this line is shown by the phosphate industry of the United States. Vast quantities of phosphates have been discovered in the United States in South Carolina, Florida and Tennessee, and in smaller deposits in other parts of the country. The magnitude of this industry at the present time is illustrated by the following table, showing the amount of phosphate rock mined for the manufacture of fertilizers in the principal countries of the world during 1902:

|                                     | Quantity:<br>(Metric tons) | Value:      |
|-------------------------------------|----------------------------|-------------|
| Algeria .....                       | 305,174                    | \$1,220,696 |
| Belgium .....                       | 135,850                    | 297,848     |
| Canada .....                        | 776                        | 4,969       |
| France .....                        | 543,900                    | 2,480,454   |
| Redonda (British<br>West Indies)... | 132                        | 791         |
| Spain .....                         | 1,150                      | 4,600       |
| Tunis .....                         | 264,930                    | 1,075,616   |
| United Kingdom..                    | 87                         | 532         |
| Total .....                         | 1,251,999                  | \$5,085,506 |
| United States.....                  | 1,514,254                  | 4,693,444   |

From the above table it is seen that the total quantity of phosphate rock produced in the United States is greater than in all the rest of the world combined. These investigations of Liebig also pointed the way to the discovery of vast deposits of potash existing near Stassfurt, in Germany, and to the exploitation and utilization of guano deposits, and of the deposits of the vast quantities of sodium nitrate existing in Chile and in some other arid countries. These fruitful investigations in agricultural chemistry have made possible the great advances of agriculture in the last fifty years, the distinctive feature of which has been the passing away of extensive and unscientific methods of culture, and the substitution therefor of intensive and scientific farming. Since practically all the arable lands in the world, except in the tropics, have been brought under cultivation, it is evident that an increasing food supply from those lands can come only from scientific agricul-

ture increasing the yield. These improved methods must come chiefly from agricultural chemistry. The era of Liebig led to the establishment in all civilized countries of agricultural experiment stations, the development of which has been a characteristic illustration of the progress of agricultural chemistry during the past forty years. One of the most famous of these stations was established by Sir John Lawes at Rothamsted, England, where for more than sixty years methodical experiments in agricultural chemistry have been conducted. In Germany large numbers of agricultural experiment stations are found, and smaller numbers in France, Austria and Russia. In the United States, including the insular possessions, there are fifty-nine experiment stations, one for each State and Territory, while Alabama has three, as have also Louisiana and Connecticut; Hawaii, Missouri and New York have two each. The preponderating influence of chemistry in experimental work is illustrated by these agricultural experiment stations, as shown in the number of the directors of these stations who are chemists. In round numbers, forty per cent. of the directors are chemists, and in Germany this number is very much larger.

The great influence of chemistry on the agricultural experiment stations of this country is measured not alone by the number of professional chemists found in the various directorates, but also in a comparison of this number with that of other scientific men holding similar positions. Very few of the other sciences are represented among the directors of stations, and no one of them can compare in the number of representatives with the science of chemistry. Among the working forces of the stations, chemists also predominate. There are twice as many chemists employed in the stations as there are men engaged in any other professional scientific work. Statistics show that the number of chemists employed in the agricultural experiment stations of the United States is one hundred and fifty-seven, while the number of botanists is fifty, and the number of entomologists forty-two. The number of employees belonging to other branches of science is very much less than that of the botanists and entomologists, and the total number of scientific men employed in all other branches of scientific work in the stations does not greatly exceed, if, indeed, it be equal to, the number of those employed in chemical research alone. The state of agricultural education in the United States and in Europe, as well as the experimental work, shows the dominant influence of agricultural chemistry. Each State and Territory in this country has an agricultural college, in which are taught the principles of chemistry as applied to agriculture. These efforts at increasing agricultural



knowledge are supported not only by the Federal Government, but also by the States. For the support of the agricultural experiment stations for the fiscal year beginning July 1, 1905, the Congress of the United States has appropriated \$794,660. Each agricultural college in the country should thus receive \$25,000. The appropriation by the several States for the support of this work is estimated to be about the same as that given by the Federal Government. During the past quarter of a century the principles of agricultural chemistry have been applied very extensively to the science of nutrition, especially of farm animals, and, more recently, of man. These investigations have been carried out chiefly under the auspices of the agricultural experiment stations of the several States, and of the Department of Agriculture (see AGRICULTURE, DEPARTMENT OF). The results of these investigations have placed nutrition upon a strictly scientific basis, and have not only added to the knowledge of this subject, but also made possible the introduction of economical principles which enable the farmer to maintain the animals of his farm at less cost and in better condition than ever before.

A very common idea of agricultural chemistry is that it consists solely of analytical processes applied to soils and fertilizers. This is a most erroneous conception. All the great problems connected with the nutrition and clothing of the human race are to be solved chiefly by agricultural chemistry. This may well be illustrated in a most marked way by the steps which have been made in the last few years toward the utilization of atmospheric nitrogen for plant food. It is known that nitrogen is available for plant food only in the form of nitric acid, and while the air contains vast quantities of nitrogen, in a free state, no part of this can be used by plants until it is oxidized. The development of electricity has placed in the hands of the chemist a most valuable means of oxidizing nitrogen. Large quantities of nitric acid are produced by the direct oxidation of the nitrogen of the atmosphere. It is true that at the present time this process is not commercially possible because of the expense attendant upon it. There is every reason to believe, however, that the time is not distant when nitric acid made in this way will be cheap enough to warrant its use for plant food. The discovery of Hellriegel in 1886 of the existence of organisms on the roots of leguminous plants which possess the faculty of oxidizing atmospheric nitrogen, gave a tremendous impetus to our knowledge of this important process. Later, Nobbe and Hiltner devised a means for the manufacture and use of cultures for the inoculation of leguminous plants. This culture was sold under the name of "Nitragin."

Improved methods for the manufacture and distribution of these organisms have been developed within the last two years by Moore, of the Department of Agriculture, promising renewed aid to the farmer in securing this cheap and efficient fertilizing power. Other investigations have shown that there is a possibility of developing the organisms which convert nitrogen into nitric acid without the aid of leguminous plants, and a culture under the name of "Alinit" has been offered in Germany for this purpose. It is thus seen that agricultural chemistry, along many lines, is increasing the store of plant food which the world must utilize for its nutriment and clothing. In chemical technology, also, the science of agricultural chemistry is highly beneficial. It has paved the way for the manufacture of starch, glucose, wine, beer, cider and the distilled liquors; it assists in tanning and the production of tanning materials, in the manufacture of fertilizers, smokeless powders, fiber products, and, in general, in the utilization of agricultural products for technical purposes.

The foregoing sketch of the relations of chemical research to the progress of agriculture during the past hundred years presents an outline view of the status of this industry. The true composition of the soil and its relations to plant growth are now known. The methods of utilizing plant food and of conserving it for the coming years have been fully established. The principles of plant growth and the chemical changes attending it are understood. The laws of animal nutrition have been experimentally elucidated, and by their application great economy in the use of nutrients is effected. The methods whereby organic nitrogen is prepared for plant food have been revealed, and some of the ways in which atmospheric nitrogen enters into organic combination are marked out. The application of the principles of chemical technology to the elaboration of raw agricultural products has added a new value to the fruits of the farm, opened up new avenues of prosperity, and developed new staple crops. The closing of the century sees in this country an endowment for agricultural research which excites the admiration of the whole civilized world, and a study of the personnel of the scientific corps shows that fully half the amount expended for strictly scientific investigations has been for chemical studies. We find chemistry intimately associated with nearly every line of agricultural progress, and pointing the way to still greater advancement. See AGRICULTURE.

H. W. WILEY.

**Agricultural Colleges**, educational institutions, chiefly under government patronage, for the promotion of scientific farming. The investigations of Liebig demonstrated the perfect practicability of restoring fertility



to exhausted soils, and also of rendering seemingly barren soils productive by intelligent study of the special requirements of special soils. The various German States proceeded to give the widest practical application to the principles thus established by Liebig, founding schools for scientific agricultural training, which have steadily increased in number and attained great efficiency. Other European countries have followed the lead of Germany, with advantageous results. In England, a Royal Agricultural College was opened in 1845, and similar institutions have been added since. In 1862, the United States Congress passed a so-called land grant act, by which land scrip, representing 30,000 acres for every Senator and Representative, was issued to the States and Territories, the object being to provide a special fund for the creation of State and Territorial agricultural colleges. The land granted to the States by the act of 1862 amounted to somewhat more than 10,000,000 acres, which by 1900 had produced a permanent fund of \$10,262,944, with lands still unsold of the estimated value of \$4,062,850, the entire proceeds being in round numbers somewhat over \$14,250,000. To this have been added other land-grant funds amounting to \$1,441,577; other permanent funds, \$14,442,194; farms and grounds, \$5,543,108; buildings, \$16,274,000; apparatus, \$1,955,859; machinery, \$1,373,696; libraries, \$1,854,942; and miscellaneous equipment, \$1,997,690, making a grand total of permanent plant of the value of \$58,944,137. On this basis 65 institutions have been established. In 1899 they had a total of 35,956 students, with 2,893 professors and instructors, and a total income of \$5,994,037, exclusive of the sums received from the United States for agricultural experiment stations. Three of the land-grant colleges in Southern States (Mississippi, North Carolina, and South Carolina) have recently established courses of study in textile industry.

The Act of 1862 was supplemented by a second (Aug. 30, 1890), so that under both acts, each State and Territory having an agricultural college receives an appropriation annually from the United States treasury for its support. The past few years have witnessed the establishment of short courses of study in agriculture, dairying, mechanic arts, household economy, etc., for persons who cannot take a regular course.

The foregoing figures and statement of results furnish most striking and conclusive evidence that the policy of Congress, begun by the Act of 1862 and continued by that of 1890, has met a great public need, and that instead of encouraging inaction or indifference on the part of the States it has, on the contrary, stimulated them to a degree of activity far in advance of that

of Congress. While the amount received from the government by the States and Territories during the school year 1899-1900 was \$1,844,177, they appropriated a total of \$2,916,837 toward the maintenance and support of the land-grant colleges. Here let it be recorded that the late Justin S. Morrill, long United States Senator from Vermont, was the "father" of this system of technical education in the United States.

**Agricultural Experiment Station**, an institution devoted to investigation in the theory and practice of agriculture. In the United States and its insular possessions there were, in 1905, 59 such stations. The Office of Experiment Stations in the Department of Agriculture exercises a general supervision over the operations of the stations, and directly conducts those in Alaska and the insular possessions. Accounts of the work accomplished are given in the periodical "Experiment Station Work," and in the "Farmers' Bulletins" of the Department. Under the Hatch Act of 1887, the Congress appropriated for the year beginning July 1, 1905, the sum of \$794,660 for the benefit of these institutions. Aid is likewise given by the respective states. See also AGRICULTURAL CHEMISTRY.

**Agriculture**, the art of cultivating the ground, whether by pasturage, by tillage, or by gardening. In many countries the process of human economical and social development has been from the savage state to hunting and fishing, from these to the pastoral state, from it again to agriculture, properly so called, and thence, finally, to commerce and manufactures; though even in the most advanced countries every one of the stages now mentioned, excepting only the first, and, in part, the second, still exist and flourish. The tillage of the soil has existed from a remote period of antiquity, and experience has from time to time improved the processes adopted and the instruments in use; but it is not till a very recent period that the necessity of basing the occupation of the farmer on physical and other science has been even partially recognized. Now a division is made into theoretical and practical agriculture, the former investigating the scientific principles on which the cultivation of the soil should be conducted, and the best methods of carrying them out; and the latter actually doing so in practice.

The soil used for agricultural purposes is mainly derived from subjacent rocks, which cannot be properly understood without some knowledge of geology, while a study of the dip and strike of the rocks will also be of use in determining the most suitable directions for drains and places for wells. The composition of the soil, manures, etc., requires for its determination agricultural chemistry. The weather cannot be properly

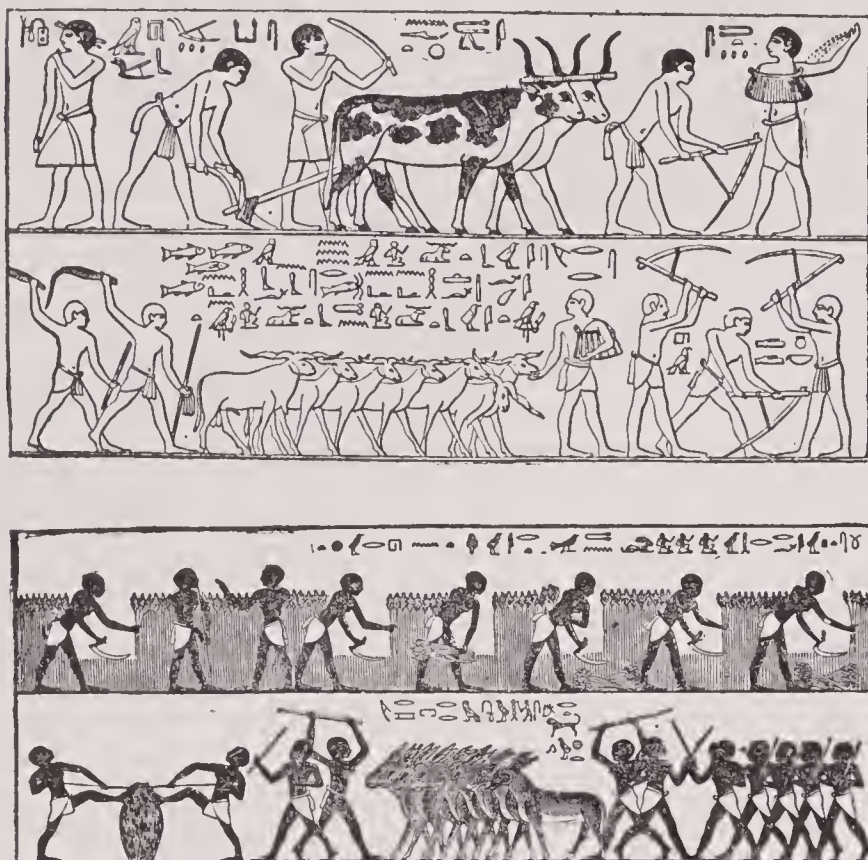


understood without meteorology. The plants cultivated, the weeds requiring extirpation, the fungous growths which often do extensive and mysterious damage, fall under the province of botany; the domestic animals, and the wild mammals, birds and insects which prey on the produce of the field, under that of zoology. The complex machines and even the simplest implements are constructed upon principles revealed by

countries and ages, history records no instance of any civilization attained without noteworthy progress in agriculture. The relationship of agriculture to population expansion is one of the vital questions for economists. It appears that, in times so remote that their antiquity is only conjecturable, an excellent system of agriculture supported, in the valleys of the Nile and Euphrates, populations at least as dense as any existing to-day. The same agricultural perfection, attended by much the same exceptional conditions of the population which distinguished the oldest civilizations of the world, is still conspicuously characteristic of such Oriental countries as retain any national vitality, especially India, China and Japan. For instance, Japan contains more inhabitants than the United Kingdom, and supports them without taking any food products from abroad (actually, indeed, exporting considerable quantities of rice), whereas England imports food stuffs to the value of hundreds of millions of dollars.

In the Middle Ages, agriculture was almost wholly disregarded throughout Europe, and, consequently, civilization was generally at a low ebb. On the other hand, the era of the Saracens in Spain is memorable for civilization, and particularly for its admirable agriculture. Without exception, all the European nations that enjoy eminence to day possess carefully de-

veloped agricultural systems, while in Spain, the one noticeably backward country, agriculture languishes. It is proverbial that the wealth of France is not in her luxurious capital, but in her provincial acres. Belgium and Holland, the richest regions of Europe in proportion to area, with populations correspondingly dense, owe their pre-eminence to the elaborate cultivation. The collapse of the Moham-  
medan power finds one of its chief ex-



ANCIENT EGYPTIAN AGRICULTURE.

From Reliefs on the Tomb of Ti (Fifth Dynasty) at Sakharah, Egypt.

natural philosophy; farm buildings cannot be properly planned or constructed without a knowledge of architecture. Rents can be understood only by the student of political economy. Finally, farm laborers cannot be governed or rendered loyal and trustworthy unless their superior knows the human heart, and acts on the Christian principle of doing to those under him as he would wish them, if his or their relative positions were reversed, to do to him. Notwithstanding the enormous expansion of the manufacturing industries in the 19th century, agriculture is still the greatest of the occupations of man. Mulhall calculates that it employs about 80,000,000 adult persons (not reckoning India and China); that its invested capital exceeds \$110,000,000,000; and that its annual products have a value of \$20,000,000,000. According to the same authority, both the capital invested and the value of the products have doubled since 1840. In the United States about two-fifths of the population are engaged in agriculture.

*Historical and General Aspects.*—In all



PEASANTS PLOWING, 13TH CENTURY.

planations in the indolence of the Turk and his neglect of the soil. European Turkey, having an area greater than England's, a



## Agriculture

magnificent climate, and a most fertile soil, maintains a population scarcely one-sixth that of England, and its annual products are even more insignificant in comparison.

The first mention of agriculture is found in the writings of Moses. From them we learn that Cain was a "tiller of the ground;" that Abel sacrificed the "firstlings of his flock;" and that Noah "began to be a husbandman and planted a vineyard." The Chinese, Japanese, Chaldeans, Egyptians, and Phœnicians appear to have held husbandry in high estimation. The Egyptians were so sensible of its blessings that they ascribed its invention to superhuman agency, and even carried their gratitude to such an excess as to worship the ox, for his services as a laborer. The Carthagenians carried the art of agriculture to a higher degree than other nations, their contemporaries. Mago, one of their most famous generals, wrote no less than 28 books on agricultural topics, which, according to Columella, were translated into Latin by an express decree of the Roman Senate. Hesiod, the Greek writer, supposed to be contemporary with Homer, wrote a poem on agriculture, entitled "Weeks and Days," which was so denominated because husbandry requires an exact observance of times and seasons. Other Greek writers wrote on rural economy, and Xenophon, among the number, but their works have been lost in the lapse of ages. Columella, who flourished in the reign of the Emperor Claudius, wrote 12 books on husbandry, which constituted a complete treatise on rural affairs. Pliny ascribes the invention of manures to the Greek King Augeas, and Theophrastus not only mentions six kinds of manures, but declares that a mixture of soils produces the same effects as manures. Cato, the Roman censor, equally celebrated as a statesman, orator, and general, derived his highest and most durable honors from having written a voluminous work on agriculture. In the "Georgics" of Vergil, the majesty of verse and the harmony of numbers add dignity and grace to the most useful of all topics. Varro, Pliny, and Palladius were likewise among the distinguished Romans who wrote on agricultural subjects.

It is interesting to note here that irrigation had an influential advocate as long ago as the time of Vergil, who in his "Georgics" advises husbandmen to "bring down the waters of a river upon the sown corn, and, when the field is parched and the plants drying, convey it from the brow of a hill in channels." To the credit of the Romans let it be remembered that, unlike many conquerors, instead of desolating they improved the countries which they subdued, and first of all in agriculture.

**Recent Progress.**—From the details of primitive agricultural methods given in an-

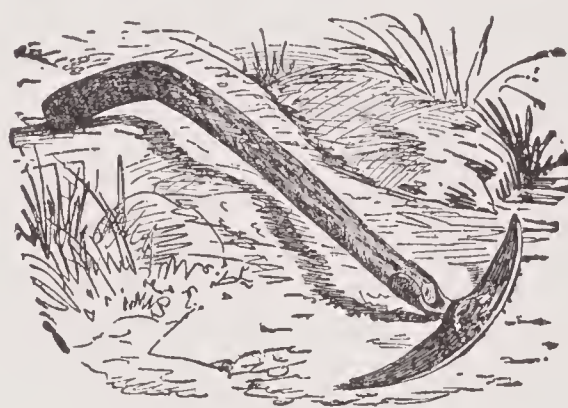
## Agriculture

cient writings and represented in monumental inscriptions, it is evident that not till the 19th century had anything very material been done toward the creation of a distinc-



OLD ROMAN PLOW.

tive agricultural science. The original arts of husbandry, practiced ages ago, have simply been adapted, with little improvement



IRON HOE FROM KORDOFAN, AFRICA.

till very lately, to modify conditions. Most of the mechanical appliances to which our ancestors were restricted—the plow,



LOANGO NEGRESS AT FIELD-WORK.

roller, hoe, sickle—are found pictured in the Egyptian inscriptions and paintings. It is also known that the Egyptians were familiar with the advantages of rotation in



crops, and that they were exceedingly intelligent and systematic in the administration of estates and the regulation of all rural concerns.

Within the last hundred years, however, the foundations of an entirely new agriculture have been securely laid. The two active agencies in this change have been chemical science and invention. Chemical science, as applied to agriculture, is based on very simple elements. The arable surface soil becomes exhausted if grain is sown upon it in successive years, this exhaustion being occasioned by the removal of the mineral substances necessary to the life of the grain. By the system of rotation, a cereal crop is followed by a so-called green crop, the roots of which penetrate deep into the subsoil and extract from it a fresh supply of the needful minerals; thus the vigor of the surface soil is renewed and it again produces an abundant grain crop.

The fundamentals of the new rural economy are to secure maximum productiveness on the agricultural lands, as a whole, by a comprehensive utilization of a great variety of fertilizers, and, by studying the needs of the soil, to apply to them the particular fertilizers best adapted to their nature. The demonstrations of experimental chemistry in these directions have been so effective that agricultural science has become one of the leading subjects of practical investigation, receiving the actual encouragement of all civilized governments. The energetic spirit stimulated by the latest teachings of chemical science has reflected constant advance in all other departments of scientific agriculture, such as drainage, irrigation, the improvement of breeds and plants, meteorology, etc.

*Agricultural Interests and the Government.*—The growth of agriculture and the evolution of enlightened governmental administration have uniformly gone hand in hand. The great distinguishing characteristic of the Dark Ages in Europe was the crushing oppression of the rural population. The lifting of the arbitrary burdens resting on the agricultural class has in all countries marked the beginning of the era of enlarged civil liberty and of diffused intelligence. The marvelous progress of the United States is above all the result of the rapid absorption of lands by its own native citizens and by industrious immigrants from Europe. From the earliest period the Federal Government, having enormous tracts of unoccupied lands at its disposal, pursued an extremely liberal policy to encourage settlement (see DOMAIN, PUBLIC). Thus, in a brief time, every section of the country was peopled and the foundations of a great commonwealth were laid. With the vigorous revival of enterprise and thrift after the Civil War, and the steady advance of immigration, the

epoch of abundant, fertile lands obtainable for a nominal price was brought to its close; and the intense rivalry witnessed at the opening of Oklahoma Territory was a demonstration of the practical termination of the era of settlement. In a new country, the soil of which has been accessible to all, the farmers have not been prompt to turn their attention to the strictly scientific aspects of agriculture, yet the government has manifested appreciation of the spirit of the age and the needs of the future by its generous provisions for the founding of agricultural colleges, and by its admirable system of agricultural experiment stations. The latter, like the agricultural colleges, are modeled upon the technical institutions originated in Europe for scientific investigation concerning all the branches of agriculture. The Federal Government makes an annual grant for experiment station purposes to each State and Territory in which an agricultural college is in operation, and some of the States also contribute to the support of the stations. The Department of Agriculture of the National Government is excellently equipped for the promotion of agricultural interests in both practical and experimental aspects. Its Weather Bureau, Bureau of Animal Industries, and various divisions, are constantly performing work of much value, and a great variety of useful information is systematically disseminated.

*Productions of the United States.*—A most striking illustration of the value of the agricultural industries of the United States is found in the following summary of the exports during the fiscal year ending June 30, 1901: Products of agriculture, \$943,811,020; manufactures, \$412,155,066; mining, \$37,985,333; forests, \$54,317,294; fisheries, \$7,683,353; and miscellaneous, \$4,510,740; total, \$1,460,462,806. The share of agricultural products in this great aggregate was 64.62 per cent. During the fiscal year the value of agricultural products exported exceeded that of the preceding year by \$107,952,897, the chief increase being in cotton (\$71,840,706) and wheat (\$23,534,663). The aggregate of the year 1910 was the largest ever reached by agricultural products, \$8,926,000,000.

The production and value of the principal crops in the calendar year 1910 were as follows: Corn, 3,125,713,000 bushels, farm value, \$1,523,968,000; all wheat, 695,443,000 bushels, value, \$621,443,000; rye, 33,039,000 bushels, value, \$23,840,000; oats, 1,126,765,000 bushels, value \$384,716,000; barley, 162,227,000 bushels, value \$93,785,000; buckwheat, 17,239,000 bushels, value \$11,321,000; potatoes, 338,811,000 bushels, value \$187,985,000; hay, 60,978,000 tons, value \$747,769,000; tobacco, 984,349,000 pounds, value \$91,459,000; flaxseed, 14,116,000 bushels, value \$32,554,000; and rice (rough),



24,510,000 bushels, value \$16,624,000. The cotton crop in the year ending Aug. 31, 1910, was 11,426,000 bales (500 pounds each), value \$900,000,000, and cotton exports in 1910 aggregated \$530,000,000 in value.

**Agriculture, A Century of Progress in.** Marvelous as are the discoveries of the century in the domains of science, manufacture, and commerce, they by no means eclipse the contemporary achievements in agriculture. Antedating every other industry of the race, the barometer of the world's progress during all the ages of the past, dozing with other arts, of peace, of times, and peoples long departed, agriculture has awakened with a start, and in great leaps and bounds placed herself in the front ranks of the century's progress.

The division of labor in agriculture has, as in other productive occupations, become a feature of the age. Although the farmer should still be somewhat of an "all around man," he no longer requires to be a plowwright, farm implement maker, harness maker, woodman, etc.; but may devote his entire attention to the more immediate demands of his vocation.

But farming itself has come very extensively under the influence of this division of labor, and each successful husbandman devotes his attention to a particular branch, rather than attempt the cultivation of every farm product needed for home consumption. One is a wool grower, another breeds horses, or raises beef, or devotes his attention to dairying, or market gardening, or fruit growing, or some other specialty. Often a single crop, as tobacco, onions, potatoes or wheat, receives his principal efforts.

Among a great variety of new and improved methods in tillage and soil improvements belonging to the century, tile drainage and sub-surface irrigation by means of pipes are instances of marked advance over old practices.

Ensilage of forage has been a long stride in the economical preparation and conservation of cattle food. By its means, not only is it possible to furnish farm animals with a palatable and succulent food at all seasons, but an important saving of forage, and of labor in securing it is effected. The introduction of silage as a cattle food marks the dawn of an intensive husbandry hitherto unknown, making it possible to increase greatly the number of animals kept on a given area, and correspondingly to increase the food supply for the human family.

The winter feeding of farm animals is no longer the task of a century ago, but has become a simple problem. Indeed, so easy has winter feeding become, that pasturage, the blessing of our fathers, has by comparison become difficult, and feeders are becoming keenly alive to the needs of a bet-

ter system of summer feeding than pasturage alone affords.

Ever since the Patriarch Jacob outwitted his father-in-law in the division of their flocks and herds by the use of "peeled rods," the art of breeding has been more or less faithfully pursued. If we may judge of the results, however, this century has witnessed more progress in many directions than the three thousand years preceding.

Practically all the improved breeds of swine belong to the more recent period. Sheep have undergone a marked transition in fleshing properties, and certain breeds have made no less conspicuous gains in the quality of their fleece. A sheep producing 52 pounds of wool in 13 months was unheard of a generation ago.

The beef breeds of cattle would hardly recognize their ancestors of a century ago as of the same race, while dairy cows of that time would forget their cud in contemplation of a Pieterje II., with a record of over 30,000 pounds of milk in a single year.

As instances of remarkable development in horses within the century may be mentioned the American trotter and the Kentucky gaited saddler. In the former instance the unnatural trot and pace, by selection, breeding, development, and training, have acquired the speed of a mile in 2 minutes  $3\frac{1}{4}$  seconds and 1 minute  $59\frac{1}{4}$  seconds, respectively, with a long list of performers of miles faster than 2:10. The perfection of a breed of horses taking each of five different gaits at a word from their riders, which every Kentucky gaited saddler must do, is another monument to the agricultural skill of the age.

In the diversity of talents used by husbandmen, those of the chemist play an important role. Evidence of this is found in the Wolff-Lehmann and other feeding standards. By patient study extending over a long period of time and a large number of animals, tables have been arranged showing the food requirements of all common domestic animals, in all ordinary conditions of use. The chemical composition of feeding stuffs has been accurately determined. The percentages of nutrients — albuminoids, fat and carbohydrates (starch, sugar, fiber, etc.) — digested by animals have been worked out and recorded. Numerous tests have been made to determine the most advantageous amounts and proportions of these nutrients for each of the various purposes for which animals are kept.

These results, compiled, arranged, and published, give the feeder information of inestimable value in the profitable pursuit of his vocation. These studies and investigations have not only proved of great advantage in feeding animals, but have resulted at the same time in the discovery



of principles of human nutrition having an important bearing on man's subsistence.

Great strides have been made in methods of preventing and overcoming animal diseases, deserving of far more extended mention than it is possible here to make. The discoveries of Dr. Koch, resulting in the preparation of tuberculin as a diagnostic for consumption in cattle; the inoculation of cattle, rendering them immune from Texas fever heretofore considered fatal to all improved breeds; the successful potassium iodide treatment for milk fever; and a host of other discoveries have marked the century in veterinary achievements.

The occupation of the drover has passed away with the advent of railroad transportation of farm animals. While this belongs to the subject of commerce, it is of incalculable importance to agriculture as well. A very large share of the developments of husbandry may be ascribed to the opening up of the country by the grand facilities for transportation that now annihilate both time and space. Interstate and transoceanic traffic in live stock have recently been greatly improved by mechanical and scientific efforts, until our cattle travel with a degree of safety and comfort not experienced by our human ancestors of a century gone.

It is said that among the early town records of Hadley, Mass., is an entry to the effect that the cows gave so little milk through the winter that the babies had to take cider as a substitute. Could the mothers of those babies come to Hadley now and observe the methods whereby winter has become the principal dairy season in the region, would they not feel that their lives were lived too soon?

Contrast the tedious and laborious setting of milk in shallow crocks for two days, then removing the cream with a piece of perforated tin, allowing it to sour in the kitchen, acquiring the aroma of boiled dinners in transit, churning with a dash churn and kneading by hand, with the new process of converting fresh milk into "butter for breakfast in a minute and a half."

Coöperative butter and cheese making has transferred this work from the kitchen of the busy housewife to the factory of the expert to the great advantage of the product and satisfaction of the wearied housewife.

Perhaps the most interesting achievement of all is the discovery of organic ferments which ripen or sour cream in butter making, and the study of the specific effects of each of more than a hundred different species of these organisms upon the quality of butter. A practical side of this study is found in the present practice of selecting pure cultures of bacteria for cream ripening, thus avoiding those forms producing bad flavors and other undesirable qualities.

In several large establishments milk is now being modified by changing the propor-

tions of its constituents to make it closely resemble human milk, and for other specific purposes in the feeding of infants, and it has even been made without the intervention of the cow.

One of the most signal achievements in the agriculture of this century was the displacement of so much hand labor by improved machinery, operated by horse, steam or other power. The 19th century in the United States witnessed more progress in this department than has the whole world in all time preceding.

A liberal education in the past consisted mainly of the study of things of the past, of which the history and literature of the ancients formed the major portion. While we would not disparage the training that developed the master minds of former generations, we can but contemplate with satisfaction the emphasis placed on the study of things of the present and the eager reaching out into the realms of the unknown future.

Agriculture is so emphatically a study of the present time that even yet few have begun to grasp its import; nay, there is a general misconception of its nature and scope. The science of agriculture is not, as is commonly supposed, a peculiar adaptation of the arts of milking cows, planting corn, hoeing potatoes, or following the plow. On the contrary, it has drawn liberally on the results of all modern scientific research.

During the past forty years agricultural colleges have sprung up in each of our United States, doing work calculated to make the 20th-century agriculture far superior to that of the past.

Hand in hand with this educational work, investigations have been extended into all the varied fields of husbandry. Insects are yielding up their life's history, revealing facts suggestive of methods of protecting our interests against their ravages. Microscopic organisms reveal a power in nature till now undreamed of, disclosing among their numbers our warm friends and our most deadly foes. It has become possible to measure in heat and motion the energy in every pound of food fed to our animals. The calorimeter faithfully measures every gram of gas exhaled from balance between the intake and outgo, and notes the expenditure of energy in every movement of body or limb. Even the eccentricities of the weather are not allowed to pass unnoted. Forecasts of storms advise the haymaker to be on his guard, and frosts are not allowed to spring upon the ungathered crop unannounced.

These and hosts of other things mark the 19th as emphatically a century of progress in agriculture. The seed it received from its predecessor has grown and borne fruit a hundredfold.

FRED S. COOLEY.

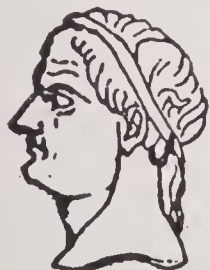


**Agriculture, Department of**, an executive department of the United States Government established by Congress in 1889 to gather and disseminate information concerning the agricultural industry. Its operations are conducted by the Weather Bureau; the Bureaus of Animal and Plant Industry, of Chemistry, Soils, and Entomology, of Biological Survey and Forestry; and the offices of Experiment Stations and Public Roads. It maintains a herbarium, museum, laboratory, propagating gardens, and other adjuncts, and issues daily, monthly, and annual publications.

**Agrigentum** (ag-rē-jen'tum), the modern Girgenti, a town on the S. coast of Sicily, founded by a colony from Gela in 582 B. C., and in the earlier ages one of the most important places in the island. In its palmy days, about the end of the 5th century B. C., it is said to have contained 200,000 inhabitants, and its territory extended right across Sicily. After being at first free, and then subject to tyrants (one of whom was Phalaris), it was utterly demolished by the Carthaginians in 405 B. C., and never quite recovered its importance. In the course of the Punic Wars it was compelled to submit to the Romans. From 827 to 1086 B. C. it was in the possession of the Saracens, from whom it was conquered by Count Roger Guiscard. The modern Girgenti still shows numerous and splendid ruins, of which the best preserved is the Temple of Concord. The largest temple was that of Jupiter, 340 feet long, which was never finished, and of which only some fragments remain. Other ruins are the temples of Juno, of Hercules and Æsculapius. Empedocles was born here.

**Agrippa, Camillo** (ag-rip'pa), a celebrated architect of Milan in the 16th century, who, under the pontificate of Gregory XIII., accomplished the removal of a vast obelisk to St. Peter's square.

**Agrippa, Cornelius**, born at Cologne, 1486; author of two treatises on the "Vanity of the Sciences," and on "Occult Philosophy," printed at Lyons, 1550. The monkish fables—of Agrippa's black poodle, of his magic mirror, and of his over-curious pupil, who was rent in pieces by demons—have given place to a just estimate of his character as an earnest searcher after truth, who fain would have unlocked nature's mysteries had he only held the right key. He died in 1535.



AGRIPPA II

**Agrippa II., Herod**, tetrarch of Abilene, Galilee, Iturea and Trachonitis, born about 27 A. D. During his reign he enlarged Cæsarea Philippi and named it *Neronias*, in honor of Nero. He also beautified Jerusalem and Berytus, making the latter his capital. Maintained in his power by the Ro-

mans, he remained faithful to their interests, and tried to dissuade the Jews from rebelling. After the fall of Jerusalem he retired to Rome, where he died in 100 A. D. Before him the Apostle Paul made his memorable defense (Acts xxvi.).

**Agrippa, Menenius**, consul of Rome, 503 B. C. He is celebrated for having appeased a commotion among the Romans by the political fable of the belly and the members. Died at an advanced age, very poor, but universally esteemed for his wisdom and integrity.

**Agrippa, Menenius Vipsanius**, consul, a Roman who, though not of high birth, rose to an exalted position through his own talents. He was a fellow-student of Octavian at Apollonia in Illyria, and was one of his closest friends and most trusted counselors throughout his life. As a general, he laid the foundation for the sole dominion of Octavian, commanded his fleet in the battle of Actium (31 B. C.), and did good service in Gaul, Spain, Syria and Pannonia. He was generous, upright, and a friend to the arts; Rome owed to him the restoration and construction of several aqueducts and the Pantheon, besides other public works of ornament and utility.

**Agrippina**, the elder, daughter of M. Vipsanius Agrippa and of Julia, the daughter of Augustus, born about 12 B. C. She married Cæsar Germanicus, whom she accompanied in his military expeditions. On the death of the latter at Antioch, 19 A. D., she returned to Rome. Tiberius, jealous of the affection of the people for Agrippina, banished her to a small island, where she died of hunger, in 33 A. D.

**Agrippina**, the younger, daughter of the foregoing, and mother of Nero. After losing two husbands, she married her uncle, the



AGRIPPINA, THE YOUNGER

Emperor Claudius, whom she poisoned in 54, to make way for her son Nero, who caused



## Aguardiente

her to be assassinated, and exhibited to the Senate a list of all the crimes of which she had been guilty.

**Aguardiente**, a popular spirituous beverage of Spain and Portugal, a kind of coarse brandy, made from red wine, from the refuse of the grapes left in the wine press, etc., and generally flavored with anise. The same name is also given to a Mexican alcoholic drink distilled from the fermented juice of the agave.

**Aguas Calientes** (ag'waz kal-yān'taz), a town of Mexico, capital of a Central State of the same name, with an area of 2,900 square miles, stands on a plain 6,000 feet above the sea level, 270 miles N. W. of the City of Mexico. The town is favorably situated for trade, and is on the Mexican Central railway. It is surrounded by fine gardens, and contains some handsome public buildings. The environs abound in hot springs, from which the town takes its name. Pop. (1910), 44,800.

**Ague**, an intermittent fever, in whatever stage of its progress or whatever its type. A person about to be seized by it generally feels somewhat indisposed for about a fortnight previously. Then he is seized with a shivering fit, which ushers in the cold stage of the disease. This passes at length into a hot stage, and it again into one characterized by great perspiration, which carries off the disorder for a time. The three leading types of ague are the quotidian, with an interval of 24 hours; the tertian, with one of 48 hours; and the quartan, with one of 72 hours. The remedy is quinine or some other anti-periodic. Marsh miasma, or the effluvia arising from stagnant water, and marshy ground, when acted upon by heat, are the most frequent causes of this fever. Persons exposed to a climate in which ague prevails endemically may most effectually preserve themselves by carefully avoiding sudden changes of temperature, and the night and morning air, and by the constant use of flannel clothing. The first object in the treatment of this disease is a change of residence, without which the best remedies will often prove ineffectual. One peculiarity of this fever is its great susceptibility of a renewal from very slight causes, as from the prevalence of an easterly wind, even without the repetition of the original exciting cause.

**Aguesseau, Henri François d'** (äg-ās-ō'), pronounced by Voltaire the most learned magistrate that France ever possessed, was born at Limoges in 1668. As *procureur-général* of the Parliament, he effected many improvements in the laws and in the administration of justice; and he displayed great benevolence during the famine of 1709. A steady defender of the rights of the people and of the Gallican Church, he successfully

## Aguinaldo

opposed the decrees of Louis XIV. During the regency of the Duke of Orleans, he became Chancellor of France; but in 1718 he fell into disgrace by opposing Law's fatal system of finance. In 1720 he was reinstated, in 1722 was again dismissed, and did not resume the office of Chancellor till 1737. He resigned in 1750, and died Feb. 9, 1751.

**Aguilar, Grace** (ä-gē-lär'), an English novelist, born at Hackney, June 2, 1816; was the daughter of Jewish parents of Spanish origin. Her first books were in defense of the Jewish religion: "The Spirit of Judaism" (1842); "The Jewish Faith" (1846); and "Women of Israel" (1846). She is now best known by her domestic and sentimental novels, only one of which, "Home Influence" (1847), appeared in her lifetime. Among others are "The Vale of Cedars" (1850), and "The Days of Bruce" (1852). She died in Frankfort-on-the-Main, Sept. 16, 1847.

**Aguilar de la Frontera**, a town of Spain, province of Cordova, Andalusia; 26 miles S. by E. from Cordova. It has three good squares and several handsome public buildings, and in the time of the Moors was defended by a strong castle. The inhabitants are employed in agriculture, stock-raising, manufacturing, and in quarrying lime, gypsum, and freestone. Pop. (1887) 12,447.

**Aguilas**, a flourishing seaport of Southern Spain, in the province of Murcia, about 37 miles to the S. W. of Cartagena, with copper and lead smelting works. It carries on considerable trade in ores, etc. Pop. (1900), 15,868.

**Aguinaldo, Emilio**, a leader of the insurgents in the Philippine insurrection of 1896, and their chief in the Spanish-American War of 1898. A Chinese mestizo (of Chinese and Tagalog parentage), he was born in Imus, in the province of Cavité, in Luzon, in 1870. His father was a planter and he received his early education at the College of St. Jean de Lateran and the University of St. Tomas in Manila. Later he became the protégé of a Jesuit priest, and was for a time a student in the medical department of the Pontifical University of Manila. In 1888, he had some trouble with the authorities and went to Hong Kong. Young Aguinaldo there became interested in military affairs and gained a knowledge of warfare. He learned something of the English, French and Chinese languages, together with various native tongues. He achieved a reputation for intelligence, ability, shrewdness and diplomacy, and had a personal magnetism which gave him influence among his countrymen. On the outbreak of the rebellion against Spanish authority, in 1896, Aguinaldo became a commanding figure with the insurgents. He was at the head of the



diplomatic party, which succeeded in making terms with the Spanish Government, the latter paying a large sum to the Philippine leaders to lay down their arms. Aguinaldo quarreled with his associates in Hong Kong over the division of this money, and went to Singapore, where he came in contact with the United States consul, shortly before the breaking out of the war between the United States and Spain. On the representations of the consul Commodore Dewey telegraphed to have Aguinaldo sent to him. The insurgent leader arrived at Cavité shortly after the battle of Manila Bay. Aguinaldo was given opportunity to organize the Filipinos against the Spanish authority; but no promises were made to him and the insurgents were never officially recognized by the Americans. Friction early arose and the Americans protested against the cruel treatment of Spanish prisoners by the Filipinos. The strain became serious at the capture of Manila, the insurgents claiming the right to sack the city, which the Americans denied. On June 12, 1898, Aguinaldo organized a so-called Filipino Republic, with himself as president, but very soon proclaimed himself dictator. He protested against the Spanish-American treaty of peace, which ceded the Philippine Islands to the United States, and claimed the independence of the islands. He organized an extensive conspiracy among the native population of Manila, and ordered the complete massacre of the Americans, together with the entire European population of the city, while yet at peace with them. The plot was discovered in time and failed. The intention of Aguinaldo to oppose by force the American occupation had been growing increasingly evident, and, on the evening of Feb. 4, 1899, his forces attacked the American lines in the suburbs of Manila. The news of this overt action caused the prompt ratification of the Spanish-American treaty by the United States Senate. Aguinaldo made a determined resistance to the Americans, and the rainy season soon prevented the latter from following up their uniform successes in the open field; but early in 1900 the organized insurrection, which was chiefly confined to the Tagalog nationality, was broken up, Aguinaldo driven into hiding, and his correspondence, order books, etc., were captured by General Funston, who captured Aguinaldo himself, March 23, 1901. **RAMON REYES LALA.**

**Agulhas** (ag-öl'äs), **Cape**, the most Southern point of Africa, lies about 100 miles E. S. E. of the Cape of Good Hope, in lat. 34° 49' S., long. 20° 0' 40" E. The point is very dangerous for ships; fogs are frequent, the currents are uncertain, and there are many rocks to seaward. In 1849, a light-house was erected on the point. The Agulhas bank extends along the whole Southern

coast of Africa, from near Natal to Saldanha Bay. It has an average breadth of 40 miles, but is difficult of navigation. The waters abound in fish. Agulhas (Portuguese) means needles.

**Ahab**, son of Omri, seventh king of the separate kingdom of Israel. He was married to Jezebel, whose wickedness instigated him to the commission of such acts of cruelty and idolatry that he surpassed all his predecessors in impiety. He was slain by an arrow in a war with the Syrians, and his blood was licked by the dogs on the spot where he had caused Naboth to be murdered, about B. C. 876.

**Ahaggar, Hoggar, or Hogar**, a mountainous region of the Sahara, S. of Algeria, with some fertile valleys, inhabited by the Tuarega. It rises in terraces to a height of nearly 7,000 feet, and some of its heights are covered with snow for a number of weeks each year. Figs, vines, dates, etc., are cultivated in parts.

**Ahasuerus**, in Scripture history, a King of Persia, the husband of Esther, to whom the Scriptures ascribe a singular deliverance of the Jews from extirpation, which they commemorate to this day by an annual feast, that of Purim. Different opinions have been entertained as to which of the Kings of Persia mentioned in other historical books may be the Ahasuerus of the Bible. He is probably the same as Xerxes. **AHASUERUS** is also a Scripture name for Cambyes, son of Cyrus (Ezra iv: 6), and for Astyages, King of the Medes (Dan. ix: 1).

**Ahaz**, the 12th King of Judah, succeeded his father Jotham, 742 B. C. Forsaking the true religion, he gave himself up so completely to idolatry that he is said to have caused his own son to pass through the fire to Moloch, and plundered the temple to obtain presents for Tiglath-pileser, King of Assyria, whose assistance he desired to obtain. His powerful ally freed him from his most formidable foes by invading Syria, taking Damascus, killing Rezin, the king, transporting the inhabitants to Kir, thus putting an end to the Syrian kingdom of Damascus, and by stripping Israel of the whole country E. of the Jordan. After a reign of 16 years Ahaz died and was buried in Jerusalem, but not among the sepulchers of the kings.

**Ahlquist, August Engelbert** (äl'qvist), a Finnish poet and philologist, born at Kuopio, Aug. 7, 1826. He was appointed Professor of Finnish Language and Literature at the University of Helsingfors in 1862. His collected poems appeared under the title "Sparks" (4th ed., 1881); besides which he wrote several grammatical and philological works, and translated Schiller and others into Finnish. He died at Helsingfors, Nov. 20, 1880.



**Ahlwardt, Theodor Wilhelm** (äl'värt), a German Orientalist, born at Greifwald, July 4, 1828. He is the first living authority on old Arabic poetry. His chief works are "On the Poetry and Poetics of the Arabians" (1856); "The Divans of the Six Ancient Arabic Poets" (1870).

**Ahmed** (äch'medt) or **Achmed-Khan**, founder of the kingdom of the Afghans or Duráni, born about 1724; in 1738 he was taken by Nadir Shah into his bodyguard and accompanied him on his expeditions as his "asaberdar," or staff carrier. When Nadir Shah was assassinated in 1747 Ahmed returned to Afghanistan and was made ruler of that country, taking the title of "Durr Durrân," "Pearl of Pearls," from which his people called themselves Duráni. He conquered Ghazni, Kabul, Jelalabad and compelled the rulers of the Punjab to pay him tribute. In 1745-1750 he took Herat and Nishapur and subjected Khorasan and Seistan. In 1752 he extended his empire to Kashmir, and in 1756, and again in 1760, he plundered Delhi. He left his son Timur Shah dominions which extended from Khorasan to Sirhind and from the Oxus to the Indian Ocean. He died about 1773.

**Ahmedabad** (better Ahmadabad), chief town of a district in Guzerat, India, second among the cities of the Province of Bombay, is 50 miles N. E. of the head of the Gulf of Cambay. It was built in the year 1412 by Ahmed Shah, and finally came under the power of the British in 1818. It was formerly one of the largest and most magnificent cities in the East. Its architectural relics are gorgeous, even in the midst of decay, and illustrate the combination of Saracenic with Hindu forms, mainly of the Jain type. The Jama Masjid, or great mosque, rises from the center of the city, and is adorned by two superbly decorated minarets. There is likewise an ivory mosque, so called because, although built of white marble, it is lined with ivory, and inlaid with a profusion of gems. There are some 12 other mosques and six famous tombs. The modern Jain temple is of singular beauty. The prosperity of the place was almost wholly destroyed by the rapacity of the Mahrattas, but it has largely recovered, and is still famous for its manufacture of rich fabrics of silk and cotton, brocades, and articles of gold, silver, steel, and enamel. The pottery is very superior; and paper of various sorts is largely manufactured, chiefly from jute. Pop. (1901), 185,889. The DISTRICT, mainly a great alluvial plain, has an area of 3,821 square miles and a population (1901) of 795,967, of whom about a tenth are Mohammedans.

**Ahn, Johann Franz**, a German grammarian, born Dec. 15, 1796. At first he en-

tered mercantile life, but soon began to study mathematics and modern languages. From 1824 till 1826 he taught in the Gymnasium of Aix, his native city. He then founded a private school there which he kept up till 1843. Then for 20 years he was in charge of the modern language department of the Gymnasium and *real schule* at Neuss. He developed new and popular methods of teaching languages and was author of various grammars. He died Aug. 21, 1865.

**Ahriman**, a Persian deity, the demon or principle of evil, the principle of good being Oromasdes, or Ormuzd.

**Ai**, a species of sloth, the *bradypus tri-dactylus* of Linnæus. As its name imports, it has but three toes, or rather nails, on each foot, in this respect differing from the unau (*bradypus didactylus* of Linnæus), which has but two. It is of the order edentata, or toothless mammals. It is the only known species of its class which has as many as nine cervical vertebræ, seven being the normal number. It is about the size of a cat. The tail is very short. The limbs also are short, but exceedingly muscular. It clings with extraordinary tenacity to the branches of trees. It is pre-eminent even among sloths for sluggishness. Its apathy is on a par with its inertness. Its practice is to strip a tree completely bare before it can prevail upon itself to put forth the exertion requisite to enable it to roll itself into a ball, fall to the ground, and climb another tree. It inhabits America, from Brazil to Mexico.

**Aicard, Jean** (ä-kär), a French poet, born in Toulon, Feb. 4, 1848. His "Poems of Provence" (1874), and "The Child's Song" (1876), were both crowned by the Academy. Noteworthy among his other works are "Miette and Noré" (1880), an idyl in Provençal, which caused him to be ranked with Mistral, the modern troubadour; "On the Border of the Desert" (1888), poems, enthusiastic traveling impressions from Algiers; "Father Lebonnard" (1890), a drama; "The King of Camargue" (1890), a novel of Provence.

**Aid-de-camp, Aide-de-camp**, or sometimes simply **Aid** or **Aide**, an officer who receives the orders of a general and communicates them. His functions are exercised while battles are in progress as well as in more tranquil times.

**Aidé, Hamilton** (ä-ē-dä'), an English novelist and poet, born in Paris, France, in 1830. He was educated at Bonn, and became an officer in the British army. His poems include "Eleanore and Other Poems" (1856); "The Romance of the Scarlet Leaf, and Other Chronicles and Reminiscences" (1856), a masterly description of Russian family life; "The Child-



## Aiken

hood of Bragoff, the Grandson" (1858), a sequel to the former.

**Aiken**, town and county-seat of Aiken co., S. C.; on the South Carolina and Georgia and the Carolina and Cumberland Gap railroads; 17 miles E. of Augusta, Ga. It is a noted winter health resort, especially for consumptives; contains Aiken Institute, the Scofield Normal School, and the Immanuel Training and High School; and has a State bank, several newspapers, manufacturing, and large cotton trade. Pop. (1890) 2,362; (1900) 3,414.

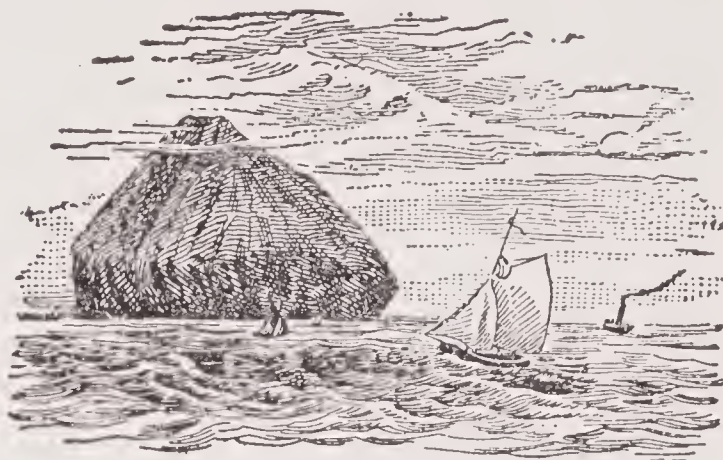
**Aikin, Lucy**, an English poet and historical writer (1781-1864); daughter of John Aikin (1747-1822), a physician and author, from whom she received a thorough classical education; subsequently devoted herself to the study of English history and literature. Her works include "Epistles on Women" (1810); "Lorimer" (1814), a tale; "Memoirs of the Court of Elizabeth" (1818); "Memoirs of the Court of James I." (1822); "Memoirs of the Court and Reign of Charles I." (1833); "Life of Addison" (1843).

**Ailanthus, Aliantus, or Alianthus**, a genus of plants belonging to the order of *simarubaceæ*. The glandulosa, called tree of heaven or Chinese sumach, a native of Mongolia and Japan, has very large, unequally pinnate leaves and unpleasant-smelling flowers. In Japan it affords nourishment to a fine silkworm. The silk produced is coarser, but more durable than mulberry silk. It was first brought to the United States in 1784. Some of the largest ailanthus trees in America, according to Downing, are found in Rhode Island, where they were introduced from China under the name of the tillon tree. During the first half-dozen years it outstrips almost any other deciduous tree in vigor of growth, and leading stems grow 12 or 15 feet in a single season. In four or five years, therefore, it forms a bulky head, but after that period it advances more slowly. In the United States it is planted purely for ornament; but in Europe its wood has been applied to cabinet work, for which, from its close grain and bright, satin-like luster, it is well adapted. The male and female flowers are borne on separate trees, and both sexes are now common, especially in New York. The male forms the finer ornamental tree, the female being rather low, and spreading in its head. The ailanthus is well adapted to produce a good effect on the lawn, either singly or grouped; as its fine long foliage catches the light well and contrasts strikingly with that of the round-leaved trees. It has a troublesome habit of producing suckers, however, which must exclude it from every place but a heavy sward,

## Ainsworth

where the surface of the ground is never stirred by cultivation.

**Ailsa Craig**, a rocky islet of Ayrshire, 10 miles W. by N. of Girvan. Rising abruptly out of the sea to a height of 1,114 feet, it is about 2 miles in circumference. The rock is a mass of trap, assuming in some places a distinctly columnar form. On the N. W. perpendicular cliffs rise to a height of from 200 to 300 feet; on the other sides, the Craig descends to the sea with a steep slope. Till the erection of a lighthouse (1883-1886),



AILSA CRAIG.

the only inhabitants were goats, rabbits, and wild fowl, solan geese, in particular, breeding in the cliffs in countless numbers. About 200 feet from the summit are some springs, and on the ledge of a crag on the eastern front are the remains of an ancient stronghold. In 1831 the Earl of Cassillis, the proprietor of Ailsa Craig, was raised to the dignity of Marquis of Ailsa.

**Aimard, Gustave** (ā-mär'), a French novelist (1818-1883). He came to the United States as a boy and spent a number of years among the Indians; and afterward traveled through Spain, Turkey and the Caucasus, returning to Paris in 1848. His stories, in imitation of Cooper's Indian tales, although abounding in improbabilities, hold the attention of the reader: "The Trappers of Arkansas" (1858); "The Great Chief of the Aucas" (1858); "The Pirates of the Prairie" (1859); "The White Scalpers" (1873).

**Ainsworth, William Francis**, an English geologist; born in Exeter, England, Nov. 9, 1807. He was educated in London, Paris, Brussels, and Edinburgh, and in 1827 qualified as L. R. C. S. On returning from a tour in France, during which he prosecuted geological investigations in the Auvergne and Pyrenees mountains, he became coeditor of the "Edinburgh Journal of Natural and Geographical Science." In 1832 he went to Sunderland in order to study the cholera epidemic which had broken out, and during that and the following year he served as surgeon in various cholera hospitals. In 1835 he joined Colonel Chesney's Euphrates



expedition as surgeon and geologist, and shortly after his return in 1837 he published "Researches in Assyria, Babylonia, and Chaldaea." During the next eight years he carried out further investigations in Asia Minor and Kurdistan on behalf of the Royal Geographical Society and the Society for Promoting Christian Knowledge; and of these he published several records. His "Travels in Asia Minor, Mesopotamia and Armenia" appeared in 1842, and two years later he published a description of the route of the Greeks under Xenophon after the battle of Cunaxa under the title, "Travels in the Track of the Ten Thousand." In 1888 his "Personal Narrative of the Euphrates Expedition" appeared. Other works of his are the "Euphrates Valley Route to India," and "Claims of the Oriental Christians." He was associated with many of the most important learned societies, both in Great Britain and on the Continent. The founding of the West London Hospital was largely due to him. He died Nov. 27, 1896.

**Ainsworth, William Harrison**, an English novelist; born in Manchester, Feb. 4, 1805. His father, a successful solicitor, intended him for the same profession, and after giving him a sound education at the grammar school of his native town, had him articulated in his 16th year to a leading solicitor there. On his father's death, three years later, he went to London to finish his legal education. His bent was, however, toward literature, and the striking success of his first important novel, "Rookwood" (1834), decided his profession. His following story, "Crichton" (1837), was equally successful; but the popularity of both was greatly exceeded by that of "Jack Sheppard" (1839), of which eight different dramatic versions were soon produced on the stage. About 40 other novels, dealing mainly with the history and traditions of England, several indeed with those of his native county, Lancaster, appeared in rapid succession. We can only mention a few of the more important: "The Tower of London" (1840); "Guy Fawkes" (1841); "Old St. Paul's" (1841); "Windsor Castle" (1843); "St. James', or the Court of Queen Anne" (1844); "The Lancashire Witches" (1848); "The Star Chamber" (1854); "The Flitch of Bacon" (1854); "Mervyn Clitheroe," a semi-autobiographical tale (1857); "Cardinal Pole, or the Days of Philip and Mary" (1863); "The Spanish Match, or Charles Stuart in Madrid" (1865); "The Constable de Bourbon" (1866); "Boscobel" (1872); "The Good Old Times" (1873); "Merry England, or Nobles and Serfs" (1874); "Stanley Brereton" (1881); etc. In 1840 he became editor of "Bentley's Magazine." From 1842 to 1853 he published "Ainsworth's Maga-

zine," and for a number of years he edited the "New Monthly Magazine." He died in Ryegate, Jan. 3, 1882.

**Air**, the gaseous substance which fills the atmosphere surrounding our planet. It is elastic, and is destitute of taste, color and smell. It contains by weight, oxygen, 23.10 parts, and of nitrogen, 76.90; and by volume, of oxygen, 20.90, and of nitrogen, 79.10; or of 10,000 parts, there are, in perfectly dry air, of nitrogen, 7,912; oxygen, 2,080; carbonic acid, 4; carbureted hydrogen, 4, with a trace of ammonia. But air never is dry; it has always in it a varying amount of watery vapor. When exhaled from the lungs, it is saturated with moisture, and contains about 4.35 parts of carbonic acid. Besides the above-named gases, recent investigations conducted by Lord Rayleigh and Professor Ramsay of England prove that air contains at least four heretofore undetected elements, named, respectively, argon, crypton, metargon, and neon.

The density of air being fixed at the round number 1,000, it is made the standard with which the specific gravity of other substances is compared. If water be made unity, then the specific gravity of dry air is .0012759. At 62° Fahr. it is 810 times lighter than water, and 11,000 times lighter than mercury. At the surface of the sea, the mean pressure is sufficient to balance a column of mercury 30 inches, or one of water 34 feet. in height.

Air, in music, is a piece composed of a certain number of melodious phrases, united in a regular symmetrical form, and terminating in the key in which it began. As employed in music, the origin of the word is unknown. Air is the most important of the constituents of music. A composition may be replete with learned and ingenious harmony, may abound in fugue, in imitation, and all the contrivances of science, but without good melody, will never appeal to the heart, and seldom afford any gratification to the ear.

**Air-Brake.** See BRAKE, AIR.

**Air-Gun**, an instrument designed to propel balls by the elastic force of condensed air. A strong metal globe is formed, furnished with a small hole and a valve opening inward. Into this hole a condensing syringe is screwed. When, by means of this apparatus, the condensation has been brought to the requisite point of intensity, the globe is detached from the syringe and screwed at the breech of a gun, so constructed that the valve may be opened by means of a trigger. A ball is then inserted in the barrel near the breech, so fitting it as to render it air-tight, and, the trigger being pulled, the elasticity of the condensed air impels it with considerable force. A piece of simple mechanism may supply the barrel with



ball after ball, and thus make reloading of the gun after a discharge easy and very rapid.

**Air-Pump**, an instrument invented by Otto von Guericke of Magdeburg, in 1650. It was designed to exhaust the air from a receiver, but in reality it can do no more than reduce it to a high degree of rarefaction. The air-pump now generally in use is a considerable improvement on that of Guericke. A bell-formed receiver of glass is made to rest on a horizontal plate of thick glass ground perfectly smooth. In the center of that plate, under the receiver, is an opening into a tube which, passing for some distance horizontally, ultimately branches at right angles into two portions, entering two upright cylinders of glass. The cylinders are firmly cemented to the glass plate, and within them are two pistons fitting them so closely as to be air-tight. Each piston is worked by a rack and pinion, turned by a handle; while each cylinder is fitted with a valve, so contrived that, when the piston is raised, communication is opened between the cylinder and the receiver, which communication is again closed as the piston falls. It is evident that when anyone commences to work the machine, the air in the cylinders will be immediately expelled the first upward motion that they are made to take. The valve will then fly open, and the air from the receiver will fill both the cylinders as well as itself, though, of course, now in a somewhat rarefied state. As the same process is again and again repeated, the air will become increasingly rarefied, though, as stated above, an actual vacuum never can result from the action now described.

Bianchi's air-pump is an improvement on the common one. It is made of iron, and has but one cylinder. It can be made larger than the common machine, and produces a so-called vacuum more quickly. It is described in Ganot's "Physics," Atkinson's translation.

Sprengel's air-pump is a form of air-pump of a totally different kind from the ordinary one. It depends on the principle of converting the space to be exhausted into a Torricellian vacuum.

**Air-Pump Gauge**, a gauge for testing the extent to which the air has been exhausted in the receiver of an air-pump. It consists of a glass tube bent like a siphon. One leg is closed, as in a barometer, the other open. It is placed under a small bell jar communicating by a stop cock with the receiver, and the more nearly the mercury stands at the same level the more nearly has a vacuum been produced.

**Air-Pump of Steam-Engine**, the pump which draws the condensed steam, with the air commingled with it, and the condensed

water from the condenser, and casts them into the hot well.

**Air-Ships.** See AERONAUTICS.

**Air-Thermometer**, an instrument designed to measure the degrees of heat by the expansion of air. When used to measure small differences of temperature, it is a capillary tube with a bulb at the upper end, and with its lower end plugged into a colored liquid in a bottle. The air in the bulb at the top is heated, so as to cause a portion of it to be expelled, leaving the colored liquid free to rise a certain distance in the tube. An alteration of temperature will then make the remainder of the air in the tube to expand or contract with the effect of making the liquid correspondingly fall or rise in the tube. Within certain limits it is a delicate thermometer, and was the first form of that instrument as invented, in 1590, by Santorio, a physician of Padua. It can measure only the lower temperatures. When employed to note higher degrees of heat, a bent capillary tube is substituted for the straight one. It agrees with the mercurial thermometer up to  $260^{\circ}$ , but above that point mercury expands relatively more than air. The differential thermometer is a modification of the air-thermometer.

**Airy, Sir George Biddell**, an English astronomer-royal; born in Alnwick, July 27, 1801. After an education at various schools, he entered Trinity College, Cambridge, in 1819, where he was graduated in 1823. In 1826 he was appointed Lucasian Professor of Mathematics at Cambridge, a chair once held by Newton, and he was the first actual director of the Cambridge Observatory, holding in connection with this post the Plumian Professorship of Astronomy. In 1835 he succeeded Pond as director of the Greenwich Observatory, and retained this office till 1881, when he retired on a pension. His work was very varied in character. He initiated at Greenwich the plan of immediately and completely reducing observations; introduced the regular observation of magnetic phenomena, and of sun-spots by photography; invented new instruments for lunar observations; and arranged the British observations in all parts of the world of the transit of Venus in 1874. His chief works were "Mathematical Traacts" (1826); "Ipswich Lectures on Astronomy" (1849); "Undulatory Theory of Optics" (1866); "Treatise of Sound" (1869); and "Treatise on Magnetism" (1870); besides which he wrote numerous articles on historical as well as scientific subjects for various periodicals. He died in Greenwich, Jan. 2, 1892.

**Aivazovsky, Gavriel Konstantinovitch** (i-va-zōf'skē), an Armenian-Russian Orientalist, born at Theodosia, in the Crimea, May 22, 1812. He received his education at San Lazzaro, near Venice; became Professor of Languages; was prefect at the Armenian Col-



lege at Paris; and published a "Short History of Russia" (1836), and a "History of the Ottoman Empire." His brother, IVAN KONSTANTINOVITCH AIVAZOVSKY, born at Theodosia in 1817, devoted himself to art, and, in 1847, was appointed court painter at St. Petersburg. In 1890 he exhibited 28 large marines in Paris. Among his best known works are "Winter in Russia" (1857); "Crimean Coast" (1867); "Tempest on the Black Sea" (1878); "Tempest on the Mediterranean" (1879). He died May 10, 1900.

**Aix-la-Chapelle** (āx'lä-shäp-el') (German Aachen), the capital of a district in Rhenish Prussia, is situated in a fertile hollow, surrounded by heights, and watered by the Würm, 39 miles W. by S. of Cologne. Pop. (1905), 144,095, of whom not 7 per cent. are Protestants. Aix-la-Chapelle is the center of a valuable coal district, and of numerous thriving manufactories, especially for spinning and weaving woolen fabrics, and for needle and pin-making. There are also immense manufactures of machinery, bells, glass buttons, chemicals and cigars. As a principal station on the Belgian-Rhenish railways, Aix is an important center of trade. The city is rich in historical associations. It emerges from historical obscurity about the time of Pepin; and Charlemagne founded its world-wide celebrity. Whether it was his birthplace is doubtful, but in 814 it became his grave. In 796 he had rebuilt the imperial palace, as well as the chapel in which Pepin had celebrated Christmas in 765. The present town-house was built in 1353 on the ruins of the palace; the chapel, after being destroyed by the Normans, was rebuilt by Otho III. in 983, and forms the nucleus of the cathedral. This ancient cathedral is in the form of an octagon, which, with various additions round it, forms on the outside a sixteen-sided figure. In the middle of the octagon, a stone, with the inscription "Carolo Magno," marks the site of the grave of Charlemagne. In 1215 Frederick II. caused the remains of the emperor to be inclosed in a costly shrine. In the newer part of the building are kept the so-called "great relics," which, once in seven years, are shown to the people in the month of July, and which attracted thousands of strangers in 1888. Much has of late years been done to restore this venerable pile. The columns brought by Charlemagne from the palace of the Exarch at Ravenna, to decorate the interior of the octagon, had been carried off by the French; but most of them were restored at the Peace of Paris, and replaced in 1846. The town-house, adorning the market place, is flanked by two towers older than itself, which suffered much by fire in 1883. Its coronation hall, 162 feet long by 60 wide, in which 35 German emperors and 11 empresses have cele-

brated their coronation banquet, has been restored to its original form, and the walls have been decorated with frescoes of scenes from the life of Charlemagne. Before the town-house stands a beautiful fountain, with a bronze statue of Charlemagne. As a town, Aix-la-Chapelle has recently been much improved. It now possesses broad streets, many fine public buildings, tasteful churches and luxurious hotels; and, from being a quiet old city of historical interest, has become a busy center of manufacturing industry.

The name of the place is derived from the springs, for which it has been always famous. Aa or Aachen is derived from *aach*, an old German word for water; the French *Aix* is the Latin *aquæ*, while the *Chapelle* in the French name is the chapel of the palace. Charlemagne granted extraordinary privileges to this city. The citizens were exempted, in all parts of the empire, from personal and military service, from imprisonment, and from all taxes. In the Middle Ages, this free imperial city contained more than 100,000 inhabitants. The emperors were crowned in Aix-la-Chapelle from Louis the Pious to Ferdinand I. (813-1531). Seventeen imperial diets and 11 provincial councils were held within its walls. The removal of the coronations to Frankfort, the religious contests of the 16th and 17th centuries, a great fire which in 1656 consumed 4,000 houses, combined with other causes to bring into decay this once flourishing community. In 1793, and again in 1794, Aix-la-Chapelle was occupied by the French. By the treaties concluded at Campo Formio and Lunéville, it was formally ceded to France, until in 1815 it fell to Prussia.

The mineral springs of Aix-la-Chapelle, of which six are hot and two cold, were known in the time of Charlemagne, and have been frequented since as early as 1170. The temperature of the hot springs varies from 111° to 136° Fahr. They all chiefly act on the liver, and on the mucous surfaces of the skin, and are therefore efficacious in cases of gout, rheumatism, cutaneous diseases, etc. The cold springs are chalybeate, and not so copious.

*Treaties of Peace and Congress of Aix-la-Chapelle.*—The first Peace of Aix-la-Chapelle (1668) ended the war carried on between France and Spain for the possession of the Spanish Netherlands. The second Peace of Aix-la-Chapelle (1748) concluded the war respecting the succession of Maria Theresa to the empire. In general, the possessions of the several States remained as before the war. Austria ceded Parma and Placentia to the Spanish Infante, Philip; and the possession of Silesia was guaranteed to Prussia. The privilege of the *Assiento* was anew confirmed to England for four



years, and the Pretender was expelled from France.

The Congress of Aix-la-Chapelle was held in 1818, for regulating the affairs of Europe after the war. It began on Sept. 30, and ended on Nov. 21. Its principal object was the withdrawal from France of the army of occupation, 150,000 strong, as well as the receiving of France again into the alliance of the great powers. The Emperors of Russia and Austria and the King of Prussia were present in person. The plenipotentiaries were Metternich, Castlereagh and Wellington, Hardenberg and Bernstorff, Nesselrode and Capo d'Istrias, with Richelieu on the part of France. The five great powers assembled signed a protocol announcing a policy known as that of the "Holy Alliance."

**Aix-les-Bains** (āx'lā-ban'), a town of France, in Haute Savoie, on the E. side of Lake Bourget, 8 miles N. by E. of Chambéry, celebrated for its sulphuretted hot springs, of the temperature of 112° to 117°, at an altitude of 823 feet above sea level. They were in vogue among the Romans, and are still extensively resorted to. Pop. 8,120.

**Ajaccio** (ä-yäch'yō), the chief town of the island of Corsica, which forms a Department of France. Its harbor, to the N. of the gulf of the same name, on the western coast of the island and at the confluence of the rivers Terignano and Restonico, is rendered unsafe by projecting rocks. It is the handsomest city of Corsica, and the birthplace of Napoleon I., whose house is still to be seen. Pop. (1901), 21,779.

**Ajalon**, said to be the modern Yālo, a village a little to the N. of the Jaffa road, about 14 miles W. N. W. of Jerusalem; was the town rendered memorable by Joshua's victory over the five Canaanitish kings, and still more so by the extraordinary circumstance of the miraculously lengthened day.

**Ajassaluck**, the Turkish name for a village on or near the site of the ancient Ephesus. The whole place seems to have been built from the ruins of Ephesian grandeur. Tamerlane encamped here, after having subdued Smyrna, in 1402.

**Ajax**, the name of two heroes of the Trojan War. (1) Ajax, son of Telamon, King of Salamis, was next in warlike prowess to Achilles. His chief exploits, recorded in the "Iliad," are his duel with Hector (7th book), and his obstinate defense of the ships in the protracted battle described in the 13th, 14th, 15th, 16th, and 17th books. Blunt in manners, rugged in temper, and somewhat obtuse in intellect, his strength and stubborn courage made him a most valuable soldier, but no favorite; and his confidence in these qualities induced him to despise divine aid, by which he roused the anger of Pallas, the author of his subsequent misfortunes. After Achilles' death,

the armor of that hero was to be given as a prize to him who had deserved best of the Greeks. Ajax and Ulysses alone advanced their claims, and the assembled princes awarded the splendid prize to Ulysses. Ajax was so much mortified at this that he went mad, and in his fury attacked the herds and flocks of the camp, mistaking them for the Grecian leaders by whom he thought himself so deeply injured. On recovering his senses, and seeing to what excesses he had been transported, he slew himself. (2) Ajax, son of Oileus, remarkable for swiftness of foot and skill in using the bow and javelin. His notoriety is chiefly derived from events subsequent to the close of the "Iliad." When the Greeks had entered Troy, Ulysses accused Ajax of having violated Cassan-



AJAX AND ACHILLES.

dra in the temple of Pallas. He exculpated himself with an oath; but the anger of the goddess at last overtook him, and he perished in the waves of the sea.

**Akbah**, a Saracen conqueror in the first period of the Hegira, who overran Africa from Cairo to the Atlantic Ocean, and founded Cairoan, in the interior of Africa, to check the barbarians and secure a place of refuge to the families of the Saracens. He perished in a revolt of the Greeks and Africans.

**Akbar** (äch'bar) [*i. e.*, "the Great," his proper name being Jelal-ed-din-Mohammed], Mogul Emperor of India, the greatest Asiatic monarch of modern times. His father, Humayun, was deprived of the throne by usurpers, and had to retire for refuge into Persia; and it was on the way thither, in the town of Amarkot, that Akbar was born in 1542. Humayun recovered the throne of Delhi after an exile of 12 years; but died within a year. The young prince at first committed the administration to a regent-minister, Beiram; but, finding his authority degenerating into tyranny, he shook it off at the age of 18, and took the power into his own hands. At this time only a few of the many provinces once subdued by the Mongol invaders were actually subject to the throne of Delhi; in 10 or 12 years, Akbar's empire embraced the whole of India N. of the Vindhya mountains, but in Southern India he was less successful. He conquered and conciliated all the independent Moham-



medan and Hindu princes of Northern India from Kashmir to Behar; and, although a great conqueror, was yet a greater ruler. The wisdom, vigor and humanity with which he organized and administered his vast dominions are unexampled in the East. He promoted commerce by constructing roads, establishing a uniform system of weights and measures, and a vigorous police. He exercised the utmost vigilance over his viceroy of provinces and other officers to see that no extortion was practiced, and that justice was impartially administered to all classes of his subjects. For the adjustment of taxation, the lands were accurately measured and the statistics taken, not only of the population, but of the resources of each province. For a born Mohammedan, the tolerance with which he treated other religions was wonderful. He gave the Hindus freedom of worship, though he prohibited cruel ordeals and the burning of widows. He was fond of inquiries as to religious beliefs; and Portuguese missionaries from Goa were sent at his request to give him an account of the Christian faith. He even attempted to promulgate a new religion of his own, an eclectic kind of deism or natural religion; but it never took root. Literature received the greatest encouragement. Schools were established for the education both of Hindus and Mohammedans; and numbers of Hindu works were translated from Sanskrit into Persian. Abul-Fazl, the able minister of Akbar, has left a valuable history of his master's reign, entitled "Akbar-nameh." After a memorable reign of nearly 50 years, Akbar died in 1605, and was buried in a noble mausoleum at Sikandra, near Agra.

**A Kempis, Thomas,** See KEMPIS.

**Akenside, Mark,** an English poet; born in Newcastle-upon-Tyne, Nov. 9, 1721. He was sent by his father to the University of Edinburgh to qualify himself for the Presbyterian ministry, but chose the study of medicine instead. After three years' residence at Edinburgh he went to London, and in 1744 became Doctor of Physic. In a thesis which he published on receiving his degree, "De Ortu et Incremento Fœtus Humani," he proposed a new theory, which has been since confirmed and received. In the same year he published the "Pleasures of Imagination," and in the following year a collection of odes, and the "Epistle to Curio," a satire on Pulteney. After having unsuccessfully attempted the practice of his profession at Northampton and Hampstead, he was invited to London, where he became a fellow of the Royal Society, was admitted into the College of Physicians, and in 1755 read the Gulstonian lectures in anatomy, and in 1756 the Croonian lectures. He was also appointed first assistant and afterward head physician to

St. Thomas' Hospital. While at London he published several medical essays. He died in London, June 23, 1770.

**Akers, Benjamin Paul,** an American sculptor, born in 1825; studied in Florence and was especially noted for the rapidity of his work. His best known statues are "Una and the Lion," "Elizabeth of Hungary," "Morning," "Evening," "Diana and Endymion," "Paolo and Francesca," and "The Dead Pearl Diver." He died in May, 1861.

**Akron,** a city of Ohio, county-seat of Summit co.; situated in the N. E. part of the State, on a range of hills overlooking the Cuyahoga river, here quite an insignificant stream, on the Ohio canal, and the Baltimore and Ohio, Erie, Pennsylvania, and other railroads, 31 miles S. of Cleveland, and 125 miles N. E. of Columbus. A number of fresh-water lakes in its vicinity are accessible by electric roads and have become favored summer resorts. The city covers an area exceeding 11½ square miles, and its population in 1907 was estimated at over 52,000. Its principal buildings are those of the Federal government, high school, Carnegie Free Library, Methodist Episcopal Church, Colonial Theater, and Grand Opera House. Buchtel College (Universalist) is located here.

*Trade and Industry.*—The city carries on a brisk trade in grain and other agricultural products, but it is chiefly important as an industrial center. The Ohio canal rises here by a series of 21 locks, the surplus of which furnishes power for many industries. Fuel is supplied by the coal fields in the neighborhood and by the natural gas brought down in pipes from West Virginia. Beds of fire clay near by furnish material for the making of brick and tiles, as well as pottery, terra cotta, and other products. The leading industry is the manufacture of rubber and elastic goods, employing over one-third the total number of wage-earners. In 1905 this industry was carried on in thirteen establishments, with \$8,931,000 of capital and 3,750 wage-earners (exclusive of salaried officials and clerks), who received \$1,897,000 in wages, used materials valued at \$8,561,000, and turned out a product valued at \$13,397,000. Printing and publishing, including newspapers and periodicals, was carried on in 12 establishments, with \$2,479,000 of capital and 970 wage-earners, who received \$523,000 in wages, used materials valued at \$655,000, and turned out a product valued at \$2,835,000. Pottery, terra cotta, and fire clay products were manufactured in 18 establishments, with \$2,520,000 of capital and 1,299 wage-earners, who received \$644,000 in wages, used materials valued at \$406,000, and turned out a product valued at \$1,718,000. The foundries and machine shops



numbered 20, with \$2,924,000 of capital and 832 wage-earners, who received \$488,000 in wages, used materials valued at \$1,360,000, and turned out a prodnet valued at \$2,368,000. Other important industries are flour and grist, food preparations, carriage and wagon materials, malt liquors, lumber and planing mill products, stoves and furnaces, electrical machinery, etc. The growth of the industrial activity of Akron since 1890 is shown in the following:

| Year | Number of Establishments | Capital      | Wage-Earners | Wages       | Cost of Materials Used | Value of Products |
|------|--------------------------|--------------|--------------|-------------|------------------------|-------------------|
| 1890 | 350                      | \$14,237,000 | 5,803        | \$2,693,000 | \$6,928,000            | \$12,551,000      |
| 1900 | 431                      | 24,199,000   | 9,030        | 3,971,000   | 13,474,000             | 23,610,000        |

The special United States Census of Manufactures for 1905 was confined to the true factory industries, to the exclusion of hand trades and neighborhood industries. The figures for 1905, compared with the corresponding figures for 1900, are as follows:

| Year               | Number of Establishments | Capital      | Wage-Earners | Wages       | Cost of Materials Used | Value of Products |
|--------------------|--------------------------|--------------|--------------|-------------|------------------------|-------------------|
| 1900               | 178                      | \$23,725,000 | 8,259        | \$3,615,000 | \$12,720,000           | \$22,016,000      |
| 1905               | 187                      | 29,188,000   | 9,817        | 4,986,000   | 20,647,000             | 34,004,000        |
| Per cent. Increase | 5.1                      | 23.0         | 18.9         | 37.9        | 62.3                   | 54.5              |

In 1906 there were three National banks with an aggregate capital of \$650,000 surplus and profits, \$426,000, and total resources and liabilities, \$6,247,000. In the same year the clearing house transactions aggregated \$30,056,000, against \$27,071,000 in 1905.

*Administration, History, and Population.*—The city is governed in accordance with the municipal code of Ohio. There are a mayor, elected for a term of two years, a council consisting of two members from each ward, boards of public service, safety, and education, a treasurer, solicitor, and auditor. The members of the board of public safety are appointed by the mayor, all the other boards and officers mentioned being elective. The board of education has complete and independent control of the public school system, including the power of taxation for school purposes. The municipal expenditure is about \$1,000,000 annually, about one-fifth of which goes to the public schools. There is a municipal hospital.

The place was settled in 1818, but its growth dates from 1825, when the water

power of the canal locks began to be utilized by large flour mills. It was incorporated as a village in 1836, and as a city in 1871. John Brown once lived here, and his house is still standing. Pop. (1850) 3,266; (1870) 10,006; (1880) 16,512; (1890) 27,601; (1900) 42,728; Fed. est. (1906) 50,738. In 1900 the population consisted of 21,383 males and 21,345 females. The foreign born numbered 7,127, making 16.7 per cent. of the total, the principal elements being 3,227 Germans, 1,517 English, Scotch, and Welsh, and 641 Irish. Negroes numbered 525. Pop. (1910), 69,067.

**Akshehr** (Turk. *White Town*), a city of Asiatic Turkey, in the vilâyet of Koniah, Asia Minor. It is situated a few miles to the S. of the salt lake of the same name, at the foot of the Sultan-Dagh, in a fruitful valley, 68 miles N. W. of Koniah. It manufactures carpets and is connected by railroad with Koniah, Smyrna, and Constantinople. In ancient times it was called Philomelion and was on the highway from Ephesus to the E. Pop. 15,000.

**Aksu**, a town of Chinese Turkestan, 260 miles N. E. from Yarkand, on an affluent of the Tarim, and at the southern base of the Thian-shan mountains. It was formerly the capital of a separate khanate; in 1867 it became a part of the State of Eastern Turkestan, under Yakub Beg, but was conquered again by China in 1877. It is celebrated for its manufactures of cotton cloth and saddlery, and is much resorted to by caravans, as an *entrepôt* of commerce between Russia, Tartary, and China. Pop., 20,000, besides a Chinese garrison as numerous.

**Akyab**, a town of Burma, the chief seaport of Aracan, is situated on the eastern side of the island of Akyab, at the mouth of the Kuladan river, 190 miles S. E. of Calcutta. In 1826, being then a mere fishing village, it was chosen for the chief station of the Province, and now is a great rice port; a well-built place, with broad and regular streets, good public buildings, and a high-school. Savage Island shelters the harbor. Pop. (1901) 31,687.

**Alabama**, a State in the South Central Division of the North American Union; bounded by Tennessee, Georgia, Florida, Mississippi, and the Gulf of Mexico; gross area, 52,250 square miles; admitted into the Union, Dec. 14, 1819; seceded, Jan. 11, 1861; readmitted, June 25, 1868; number of counties, 66; pop. (1890) 1,513,017; (1900) 1,828,697; (1910), 2,138,093; capital, Montgomery.

*Topography.*—The surface is highest in the N. E., where the Blue Ridge range of the Appalachian mountains enters the State. South of this the surface is almost level, and consists of plains forming a gentle de-



clivity toward the Gulf. The State comprises four distinctive belts, the cereal, mineral, cotton, and timber; the first covering 8 counties, the second, 28, the third, 17, and the fourth, the remainder. Among the valleys, those of the Tennessee, the Warrior, and the Coosa, are the most important. The principal rivers are the Alabama, Tennessee, Mobile, Tombigbee, Black Warrior, and Chattahoochee. A number of others, rising in Alabama, have their outlets in Florida. Bays comprise the Grand, Bon Secours, Perdido, and Mobile, the last being one of the most important in the country.

*Geology.*—All of the formations of the Appalachian region are found in this State, which has three geological divisions: (1) the Northern, showing sub-carboniferous rock masses and coal measures; (2) the Middle, metamorphic and calcareous rocks, silurian sediments, and coal measures; and (3) the Southern, drift beds over cretaceous and tertiary rocks.

*Mineralogy.*—The State has large wealth in its mineral resources, which include coal, iron, asbestos, asphalt, pottery and porcelain clays, marble, granite, phosphates, natural gas, gold, silver, and copper. The most valuable of these at present are coal and iron. In the calendar year 1899, the State ranked fifth in the production of coal, with an output of 7,593,416 short tons, valued at \$8,256,462; and (1898) third in the production of iron ore, with an output of 2,401,748 long tons, valued at \$1,632,208. The coal was all bituminous, and the iron was red and brown hematite.

*Soil.*—In the S. part of the State the soil is a light alluvial and diluvial; in the central, the cotton belt, limestone and chalk lands predominate; and in the N. part, which contains the Tennessee valley, are exceedingly rich mineral lands. Besides the agricultural, mineral, and grazing lands, there are large tracts of valuable yellow pine forests.

*Agriculture.*—The most valuable productions are cotton and corn, the yield in the crop years 1899–1900 being 1,176,042 gross bales, and 33,015,120 bushels, respectively. Other crops that are grown to advantage are wheat, oats, rye, potatoes, and hay. Excluding cotton, the value of these crops in 1899 was \$17,446,689, and the value of all farm animals was \$21,656,211. According to the census of 1890, the State had 157,772 farms, comprising 19,853,000 acres, and worth, with buildings and improvements, \$111,051,390.

*Manufactures.*—According to the United States census of 1900 there were in the State 5,602 manufacturing establishments, employing \$70,370,081 capital and 55,432 persons; paying \$17,299,090 for wages and \$46,151,026 for materials; output, \$82,793,804. The industries were: Iron and steel

(\$17,392,483); lumber (\$12,867,551); cotton goods (\$8,153,136); foundry and machine shop products (\$5,482,441); railroad cars (\$4,172,192); coke \$3,726,433); flour and grist (\$3,310,757); cotton-seed oil and cake (\$2,985,890); fertilizers (\$2,068,162); cotton ginning (\$1,218,283).

*Banking.*—In 1899, there were 27 national banks in operation, having \$3,205,000 in capital, \$1,309,220 in outstanding circulation, and \$2,750,445 in reserve. There were also 19 state banks, with \$938,200 in capital, \$2,212,777 in deposits, and \$3,794,112 in resources. The exchanges at the United States clearing-house at Birmingham aggregated \$30,215,716 in the year ending Sept. 30, 1899.

*Commerce.*—In the fiscal year 1899–1900, the imports of merchandise at the port of Mobile aggregated in value \$2,883,934, and the exports, \$13,206,334. There was also imported gold and silver coin and bullion to the value of \$15,045.

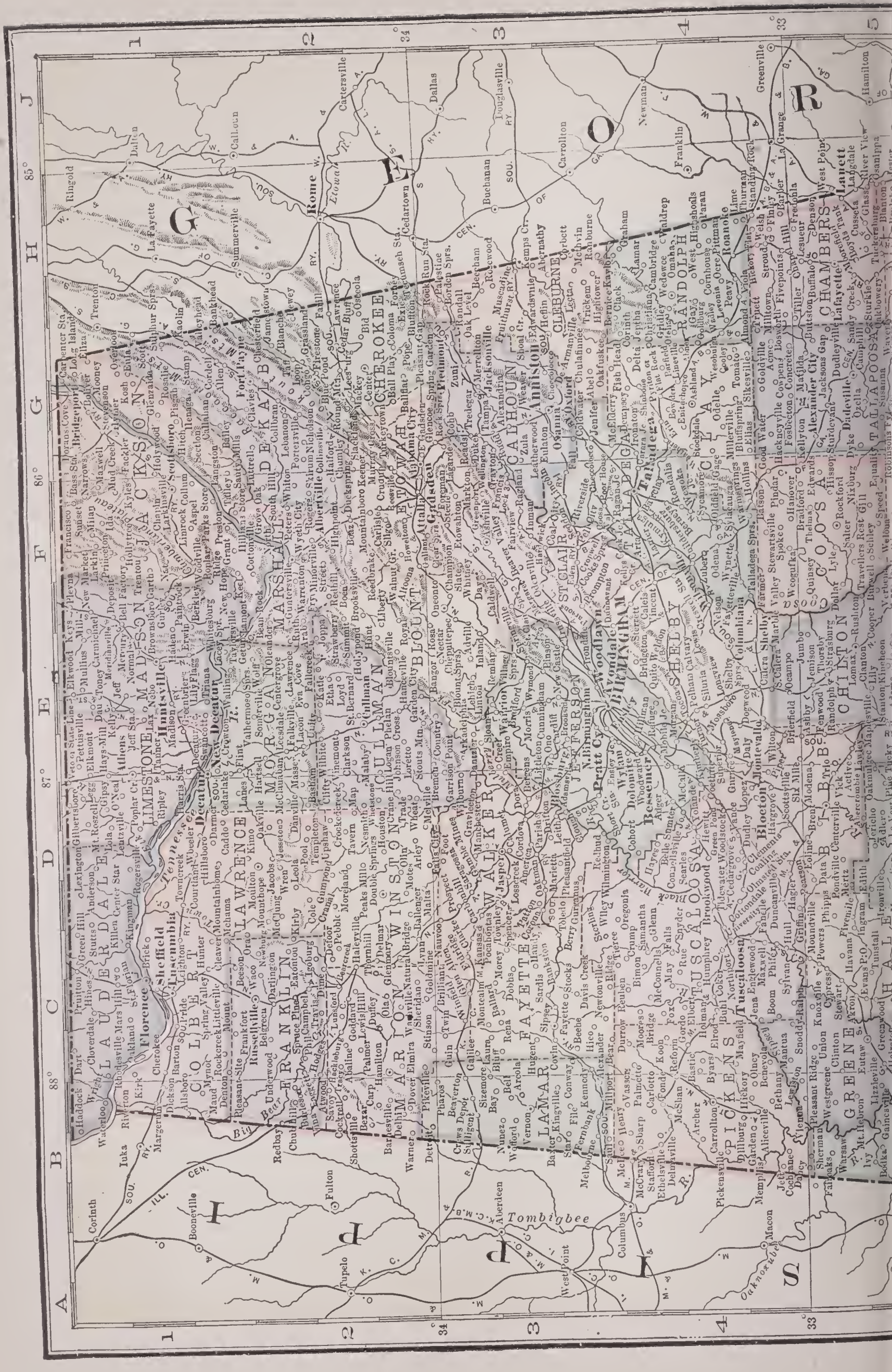
*Education.*—In 1898, the school population was estimated at 621,600, of whom nearly 350,000 were enrolled in the public schools, and over 222,000 were in daily attendance. There were over 7,000 public schools, white and colored pupils being taught separately; 7,500 teachers; public school property valued at \$1,500,000; receipts of the year, \$800,273; and expenditures, the same. For higher instruction, there were 48 public high schools; 66 private secondary schools; 6 public and 3 private normal schools; 9 universities and colleges for men and for both sexes; 9 colleges for women; and a State Agricultural and Mechanical College at Auburn. The principal universities and colleges are the University of Alabama (opened 1831; non-sectarian); the Tuskegee Normal and Industrial Institute (1881); Blount College (1890; non-sectarian); Howard College (1841; Baptist); Southern University (1859; Methodist Episcopal, South); Lafayette College (1885; non-sectarian); Lineville College (1890; non-sectarian); St. Bernard College (1892; Roman Catholic); Alabama Baptist Colored University (1878; Baptist); Bailey Springs University (1893; non-sectarian); Judson Female Institute (1839; Baptist); Isbell College (1849; Presbyterian); Athens Female College (1842; Methodist Episcopal, South); and the Alabama Conference Female College (1855; Methodist Episcopal).

*Churches.*—The strongest denominations numerically in the State are the Baptist; Methodist Episcopal, South; Roman Catholic; Methodist Episcopal; and the Protestant Episcopal. All denominations reported in 1890: Organizations, 6,383; churches and halls, 6,400; members, 559,171; and value of church property, \$6,768,477. In

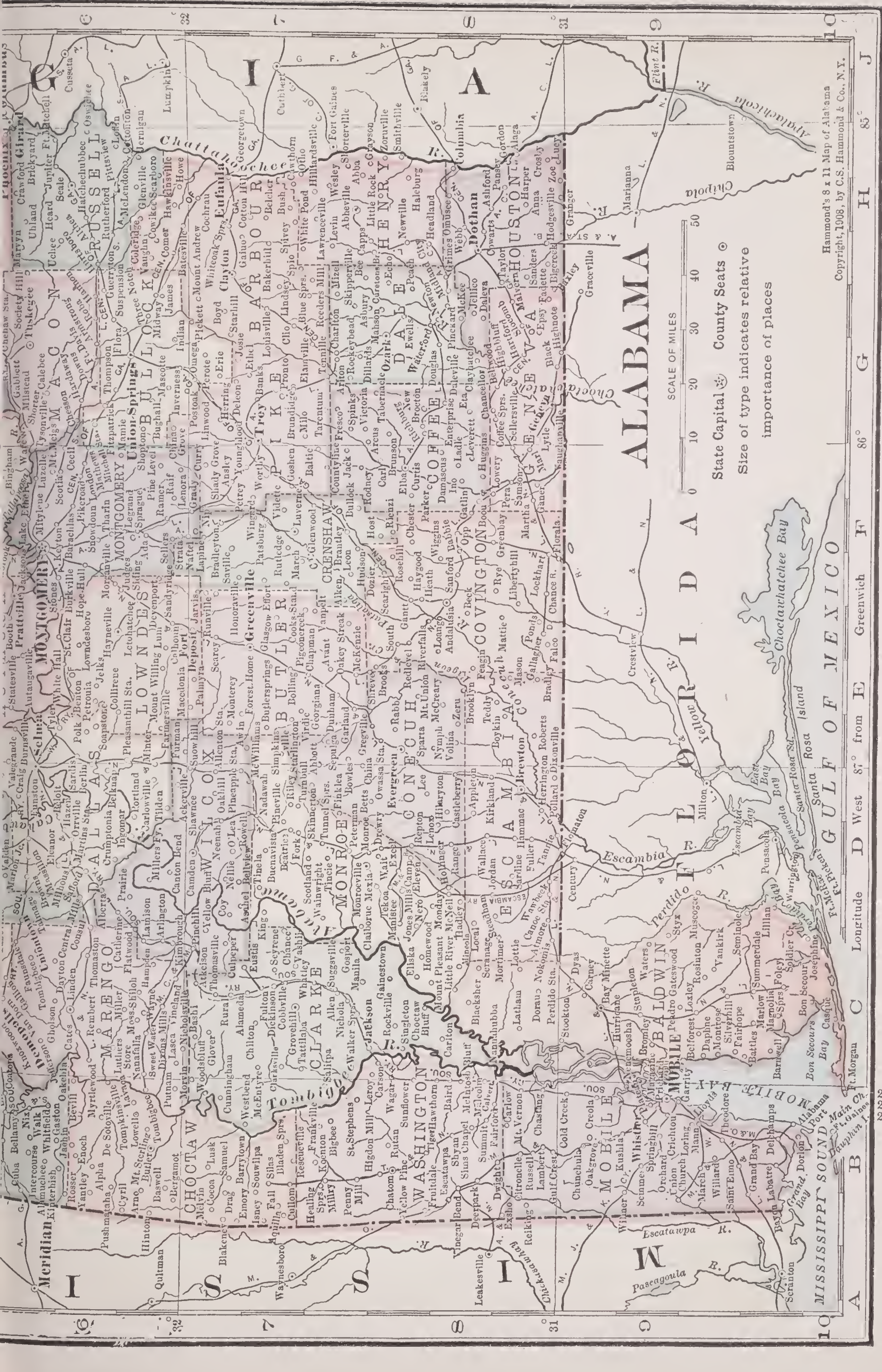












# ALABAMA

SCALE OF MILES  
0 10 20 30 40 50

State Capital Ⓢ County Seats ○  
Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Alabama  
Copyright, 1908, by C.S. Hammond & Co., N.Y.

Longitude D West 87° from E Greenwich H 86° J 85°







## Alabama

1899, there were 4,000 evangelical Sunday schools, with 24,750 officers and teachers and 215,000 scholars.

**Railroads.**—The total length of railroads within the State, Jan. 1, 1900, was 4,047.59 miles, of which 141.35 miles were constructed during the previous year. Recent developments in the coal, iron, and manufacturing industries have greatly stimulated railroad construction and extension.

**Post-offices and Periodicals.**—In 1899 there were about 2,400 post-offices of all grades, and 232 periodicals, of which 21 were dailies and 187 weeklies.

**Finances.**—The assessed valuation of all taxable property in 1899 was \$258,960,487, and the total bonded debt, March 1, 1900, was \$9,357,600.

**State Government.**—The governor is elected for a term of two years, and receives a salary of \$3,000 per annum. Legislative sessions are held biennially and are limited to 50 days each. The Legislature has 33 members in the Senate and 100 in the House, each of whom receives \$4 per day and mileage. There are 9 representatives in Congress. In politics, the State is strongly Democratic.

**History.**—Alabama was first settled by Bienville, in 1702. The region N. of 31°, which belonged to France, was ceded to Great Britain in 1763, transferred to the United States in 1783, and attached to South Carolina and Georgia till 1802, when it was organized as the Mississippi Territory. The region S. of 31°, which belonged to Spain, was seized and joined to Mississippi Territory in 1812, and with Florida was purchased from Spain in 1819. The great Creek Indian war of 1813–1814 was waged within the present limits of the State. After Alabama was admitted to the Union, it became one of the strongest slave-holding States in the Union. It was one of the first of the Southern States to favor secession, and Montgomery, its capital, became the first capital of the Southern Confederacy. During the Civil War its soil and waters were the scenes of memorable conflicts, especially the Federal naval operations against MOBILE (q. v.). Since the war, the State has had an era of uniform prosperity.

**Alabama,** a river in the State of Alabama, formed by the confluence of the Coosa and Tallapoosa above Montgomery, and uniting with the Tombigbee to form the Mobile river; tortuous in its course; 312 miles long, navigable its entire length for small vessels, and for 60 miles of its lower course for vessels of 6 feet draft.

**Alabama Claims,** a series of claims made in 1871 by the United States against the English Government for damages done to shipping during the Civil War, after a formal discussion between the two governments in 1865, and fruitless conventions for their

## Alabama

settlement in 1868 and 1869. These damages were inflicted chiefly by the “Alabama,” an armed vessel of the Confederate States, which was fitted out in a British port and permitted to sail in violation of existing international law. A tribunal, created in 1871 to pass upon these claims, held its sessions in Geneva, Switzerland, during the year 1872, and awarded the United States the sum of \$15,500,000 in gold, in satisfaction of all claims at issue. The Geneva tribunal was important as establishing an example of arbitration in place of war in the settlement of international differences, which, in this case, barely averted a war, and in defining the attitude of neutrals toward nations at war.

**Alabama Polytechnic Institute,** a co-educational (non-sectarian) institution in Auburn, Ala., organized in 1872; has grounds and buildings valued at over \$330,000; scientific apparatus, \$75,000; income, \$190,000; volumes in the library, 23,000; professors and instructors, 70; students, 730; and number of graduates since organization, 1,200.

**Alabama, The,** a Confederate cruiser which devastated American shipping during the Civil War. She was a bark-rigged steamer of 1,040 tons, built under secret instructions at Birkenhead, England. Her destination was suspected by the United States minister, but when orders for her detention were finally obtained, she had departed (July 31, 1862). She made for the Azores, where she was equipped and manned by an English crew, under the command of Capt. Raphael Semmes, of Maryland. She then proceeded to capture and burn vessels bearing the American flag, and the destruction wrought in less than two years amounted to 65 vessels, and about \$4,000,000 in property. In June, 1864, she put into Cherbourg, France, for repairs. Here she was intercepted by the Federal corvette “Kearsarge,” Captain Winslow, and, after an hour’s battle, Semmes surrendered. An account of her history is given in “Two Years on the Alabama,” by Arthur Sinelair (1895).

**Alabama, The,** a sea-going battleship of the United States navy, launched from Cramp’s shipyard, at Philadelphia, Pa., May 18, 1898. It was the first to be launched of the three new battleships of its type, the others being the “Illinois” and “Wisconsin.” It presents marked differences from the first three, the “Oregon,” “Indiana,” and “Massachusetts,” these differences involving both the arrangement of the battery and the disposition of the armor, as well as a considerable increase in size and displacement. The main battery consists of four 13-inch guns in turrets and fourteen 6-inch rapid firing guns, of which ten are mounted on the gun deck, eight in broad-



## Alabama

side between the turrets, and two firing straight ahead forward of the fore turret on the gun deck. Four are mounted in a small redoubt on easemate deck, two on each side. The broadside 6-inch guns, instead of being mounted in projecting sponsors, are mounted in recess ports in order to secure extensive train forward and abaft the beam. The secondary battery consists of seventeen 6-pounder rapid-fire guns, six 1-pounder rapid-fire guns, and four Gatlings. The general dimensions of the "Alabama" are as follows: Length over all, 374 feet; breadth, 72 feet; freeboard forward, 20 feet; freeboard abaft the after turret, 13 feet 4 inches; draft, 23 feet 6 inches; displacement, 11,570 tons. The guaranteed speed is 16 knots, and the estimated horsepower, 10,000. The maximum thickness of armor on the water line is 16½ inches, tapering to 9½ inches at the bottom of the belt; easemate armor is 5½ inches thick, and the superstructure armor is of the same thickness; armor of the 13-inch gun turrets is 15 inches thick, except the porthole plate, which is 17 inches; armor of the barbettes on which the turrets rest is 15 inches thick; thickness of the protective deck armor on the flat over the citadel amidships, and also forward and aft, is 2¾ inches; and the thickness of the slopes forward and aft of the amidships citadel is 4 inches. The conning tower is cylindrical and 10 inches thick. The total weight of armor and bolts is 2,720 tons, and of the protective deck armor, 593 tons. The contract cost was \$2,650,000, exclusive of armament. On her trial trip in August, 1900, she attained a speed of 17 knots without forcing or mishap. Soon after she was placed in commission.

**Alabama, University of**, a co-educational (non-sectarian) institution in Tuscaloosa, with a thoroughly equipped medical school in Mobile; organized in 1831; has grounds and buildings valued at over \$500,000; scientific apparatus, \$50,000; income, \$275,000; volumes in the libraries, 25,000; professors and instructors, 60; students, 890 (including summer school); number of graduates since organization, over 2,000.

**Alabaster** (from Greek *alabastros*, or the earlier form, *alabastos*), a tapering box, made for holding ointment; a rosebud; a measure of capacity, holding 10 ounces of wine or 9 of oil. The word is also applied to the mineral now called granular gypsum, and to any vessel made of it. Alabaster was named from Alabastron (near modern Antinoë), an Egyptian town in which there was a manufactory of small vessels or pots, made formerly, at least, from a stone occurring in hills near the town, though ultimately other substances were often used, not excluding even gold.

## Alameda

In mineralogy, massive gypsum, either white or delicately shaded. A granular variety is found in England in Cheshire, and a more compact one at Ferrybridge in Yorkshire, in Nottinghamshire, and in Derbyshire; the latter has been made into columns for mansion-houses, and is extensively manufactured at Derby into cups, basins, or other vessels. Some of the alabaster occurring near the town just mentioned is white, while some has veins of a reddish-brown color.

**Alagoas**, a maritime State of the republic of Brazil, bounded on the N. and W. by Pernambuco. The country is mountainous in the N. W., and low, marshy and unhealthy on the coast. The chief productions are the sugar-cane, cotton plant, manioc or cassava, ipeacuanha, maize, rice, etc., and also timber and dye-woods. Pop. (census of 1900), 649,273. The town of Alagoas, once the capital, has 40,000 inhabitants. The present capital is the port of Maceio (pop. 33,000).

**Alajuela** (äl-ä-whä'la), a city of the State of Costa Rica, Central America, 23 miles W. N. W. of Cartago, and a little on the western side of the watershed between the Atlantic and the Pacific. It is connected with Cartago by rail. Pop. 10,000.

**Alaman, Lucas** (ä-lä-män'), a Mexican historian and statesman, born at Guajuato, Oct. 18, 1792. He is best known by his "History of the Mexican Republic" (1844-1849), and "History of Mexico" (1849-1852). He performed important political services for Mexico, among others as Secretary of the Interior, 1823-1825; and established many important public works, including the Mexican Museum. He died in Mexico, June 2, 1853.

**Alamanni, or Alemanni, Luigi** (äl-ä-mä'nē), an Italian poet and diplomatist, born in Florence, on Oct. 25, 1495; distinguished for his wit and tact. In 1522 he took part in a conspiracy against Cardinal Giulio de Medici, and after its discovery, fled to France, where he found protection with François I. In 1527, he reappeared in Florence, endeavored to obtain the protection of the emperor for the republic through Andrea Doria, who was a friend of his, but fell under the suspicion of the ruling party and was compelled to flee the city. The Medici, on their return in 1532, declared him a rebel. He went back to France, where he served as ambassador for François I. to Henry II. He wrote "La Cultivazione" (1533), a book about agriculture, in six volumes. He also wrote love songs, epigrams, satires, comedies, translations, and various other things. He died April 18, 1556.

**Alameda**, co-extensive city and township in Alameda co., Cal.; on San Francisco



## Alamo

Bay and the Southern Pacific railway; 11 miles E. S. E. of San Francisco. It is the seat of the College of Notre Dame (Roman Catholic); a popular summer resort, and the place of residence of many San Francisco business men. It has a State bank, electric light and street railway plants, the largest borax works in the world, extensive potteries, oil refineries, and shipyards. Pop. (1900), 16,464; (1910), 23,383.

**Alamo, The**, a Franciscan mission within the limits of the present San Antonio, Tex.; built about 1722, and after 1793 occupied on occasion as a fort. The building now known as the Alamo was the church of the mission, which included also a convent and hospital building, a small inclosed convent yard, and a plaza of about two acres and a half; the whole being surrounded by a strong wall about eight feet high and nearly three feet thick. The church, which has been partly restored, stands on the east side of the plaza, its carved front facing west. The Alamo is noted for its heroic defense in 1836, during the war for independence in Texas, by a small band of Texans under Colonel William B. Travis, against about 4,000 Mexicans under General Santa Anna, in which the entire number of the defenders was slain. Santa Anna invested this improvised fort on Feb. 23, and on the morning of March 6, after a breach in the wall had been made by his cannon, assaulted in force. The Mexicans were twice driven back with great loss, but finally scaled the parapet and engaged the defenders in a hand-to-hand struggle. The Texans, though weakened by privation and fatigue and overwhelmed by numbers, fought till but five of their number remained alive. These five were killed by Santa Anna's orders. One man escaped from the fort before the assault. Mrs. Dickinson, wife of an officer killed in the fight, her child, and two Mexican women and a negro boy were the only survivors. Col. David Crockett and Col. James Bowie were conspicuous among the defenders. The Mexicans lost 521 killed, about three times the total number of defenders. "Remember the Alamo!" became the war-cry of the Texans in their subsequent battles for independence. The title to the Alamo was in dispute for many years between the city of San Antonio and the Roman Catholic Church. Decision was rendered in 1850 in favor of the Church, by which the Alamo church building was sold to the State in 1883 for \$20,000. Later, the convent portion was purchased for \$75,000, the State appropriating part of this amount, and the balance being donated by the Daughters of the Confederacy.

**Aland Islands**, a group of about 80 islands and islets; between the Gulf of Bothnia and the Baltic Sea, and near the mouth

## Alarcon

of the Gulf of Finland; area, 468 square miles. The principal islands are Aland, which is the largest, and gives name to the group, Lemland, Lumparland, Ekeröe, Foglöe, Kumlinge, Braendoe, Vordoe, and Hanoë. Aland, distant about 30 miles from the Swedish coast, is 25 miles long and about 22 broad. In this island is a harbor capable of containing the whole Russian fleet. The chief towns are Aland and Castelholm. The islands are now included in the province of Finland. Pop. about 16,000.

**Alanus ab Insulis** (a-lā'nus ab in'sū-lis) or **Alain de Lille** (ä-lan' dé lēl), a noted French scholastic philosopher (1114-1203). Of his voluminous theological writings, the best known is the treatise on "The Articles of the Faith." His poem, "Anti-Claudianus, or On the Duties of a Good and Perfect Man," is one of the most celebrated poetic compositions of the Middle Ages.

**Alarcon, Hernando** (ä-lär-kōn'), a Spanish navigator of the 16th century; leader of an expedition to Mexico, which set sail in 1540. He proved that California was a peninsula and not an island, as had been supposed previously. He penetrated in boats a considerable distance up the Colorado river. On his return to New Spain he made a valuable map of the California peninsula.

**Alarcon y Ariza, Pedro Antonio de** (ä-lär-kōn' ē ä-rē'thä), a Spanish novelist, poet, and politician, born in Guadix, March 10, 1833. His critical contributions to papers, political and literary, his description of the Moroccan campaign, but especially his novels and short stories, are among the best of their kind, and present a picture of modern Spanish society as true to life as it is variegated. His clever essay "The Poet's Christmas" went through over 100 editions. An imposing number of his stories appeared under the collective titles "Love and Friendship," "National Tales," "Improbable Stories." Among them, "The Three-Cornered Hat" and "The Scandal" deserve special mention. He died at Valdemoro, near Madrid, July 19, 1891.

**Alarcon y Mendoza, Don Juan Ruiz de** (ä-lär-kōn' ē măn-dō'thä), a noted Spanish dramatist, born at Tasco, Mexico, about 1580 or 1590. Little is known about his early life, but he went to Spain in 1600 and became royal attorney in Seville. From 1608 to 1611, he was in Mexico; then he took up his residence in Madrid, where he was appointed reporter of the royal council of the Indies, about 1628. The last great dramatist of the old Spanish school, he may be considered also as the creator of the so-called character comedy. Elevated sentiment, harmony of verse, and correctness of language distinguish his works, the principal of which are "The Weaver of Segovia"; "Suspicious Truth," the model for Corneille's "Liar"; "Walls Have Ears"; "The Proof of Prom-



ises"; "The Anti-Christ." Complete edition of his works by Hartzenbusch (Madrid, 1866). He died in Madrid, Aug. 4, 1639.

**Alaria**, a genus of sea-weeds belonging to the order *Fucaceæ*, or sea-wracks, and the tribe *Luminaridæ*. One species, *Alaria esculenta*, is used for food by the poorer classes in Ireland, Scotland, Iceland, Denmark, and the Faroë Isles.

**Alaric** (a'lar-ik), a celebrated conqueror, King of the Visigoths. He was a commander of the Goths in the service of Rome, and in 395 revolted and invaded Greece, capturing Athens. He was opposed by Stilicho, and retreated to Epirus; was then made prefect of Illyricum by the Emperor Arcadius, and was elected king by his own people. In 400 he invaded the Western Empire, reaching Milan in 403. He besieged the Emperor Honorius in Asto, who was relieved by Stilicho, and a drawn battle was fought at Pollentia; soon afterward he suffered a serious defeat at Verona. He was again appointed prefect of Illyricum, but shortly afterward demanded an excessive reward for his services. On the death of



ALARIC.

Stilicho, Honorius repudiated his obligations to Alaric, who immediately marched upon Rome and laid siege to it (408), but was induced to leave by the promise of 5,000 pounds of gold and 30,000 pounds of silver. Enraged by further breach of covenant, he advanced on Rome a third time (410), and his troops pillaged the city for six days. Alaric, who was an Arian Christian, like his people, forbidding his soldiers to dishonor women or destroy religious buildings. When Alaric quitted Rome, it was only to prosecute the conquest of Sicily; and he seemed likely to become master of all Italy when, in 410, he died at Cosenza. Legend tells that his remains were hidden from the Romans in the bed of the river Busento, and that the captives employed in the work were killed.

**Alaric II.**, eighth King of the Visigoths, ruled, from 484 onward, Gaul S. of the Loire, and most of Spain. An Arian, he was attacked, completely routed near Poitiers, and slain by the orthodox Clovis, King of the Franks (507).

**Alaska**, an unorganized Territory in the Western Division of the North American Union, comprising the extreme northwestern part of the American continent; bounded by the Arctic and Pacific oceans, Bering Sea, British Columbia, and the Northwest Territories of Canada; gross area, as far as determined, 581,107 square miles; purchased from Russia, in 1867, for \$7,200,000; given a territorial district government in 1884; administrative districts, 7; pop. (1910), 64,356; seat of government, Sitka.

**Topography.**—The Territory includes Prince of Wales Island, the Alexander or King George Archipelago, and the Kadiak, Aleutian, Pribiloff, and St. Lawrence Islands. The coast line exceeds that of the entire Atlantic seaboard of the United States, and has several notable indentations, as Prince William's Sound, Cook Inlet, Bristol Bay, and Northern and Kotzebue Sounds. The extreme length of the mainland, from N. to S., is about 1,100 miles; extreme width, 800 miles. Among rivers, the most important are the Yukon, rising in British Columbia, and about 2,000 miles in total length; the Kuskokwim, which empties into Bering Sea; the Colville, Copper, and Sushitna. Here the Rocky Mountains merge into the Alaskan, culminating in Mount Wrangell, 17,500 feet high. Another range, near the coast, reaches its extreme height in Mount Logan, 19,500 feet (according to Harrington), and Mount Fairweather, 15,500 feet. Mount St. Elias has been given various altitudes, Dall stating it at the highest, 19,500 feet. The Federal Government is still surveying and exploring the entire region. As far as is now known, the region is naturally divided into the Arctic District, the Yukon Basin, the Kuskokwim District, the Aleutian District, the Kadiak District, and the Sitka District.

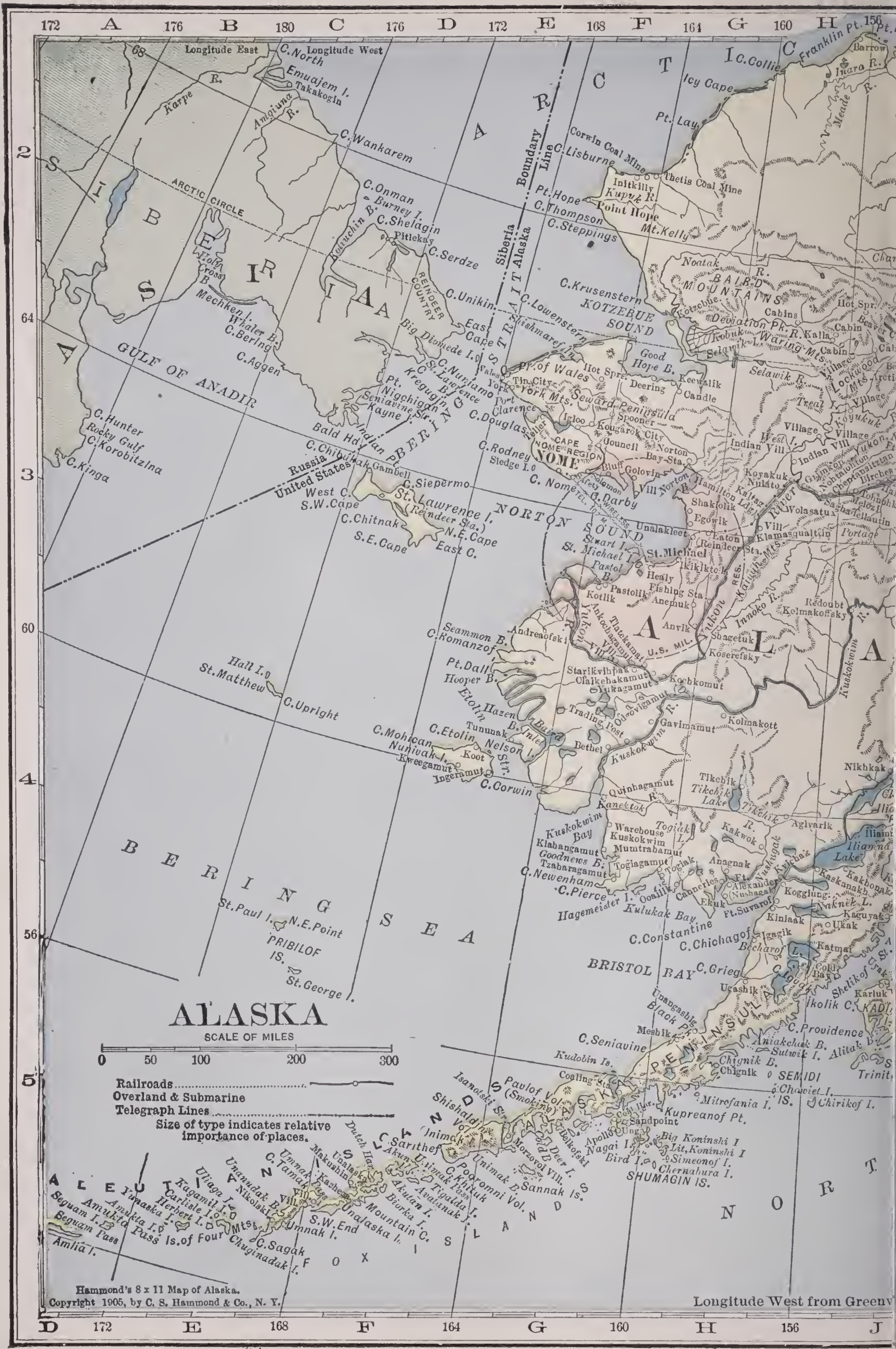
**Geology.**—The Arctic District is treeless, with ranges of hills; the Yukon Basin has large areas of forests; the Kuskokwim District resembles the Yukon Basin, but has more mountains; the Aleutian comprises treeless islands; the Kadiak is still but little known; and the Sitka has valuable timber lands. The glacial and volcanic periods still survive; beds of cretaceous and miocene lignites, dikes of plutonic rock, hot and boiling springs, quartz-bearing ledges, and auriferous gravel beds and sands are abundant.

**Mineralogy.**—Gold was discovered on the Kenai peninsula in 1848, but was not sought further. In 1880, surface gold was found in the S. E., and systematic mining may be said to have begun then. Lignite coal, native copper, cinnabar, graphite, iron ore, white marble, sulphur, medicinal springs, mica, kaolin, manganese, asphalt, and petroleum are found in various sections, and many of them in accessible locations and paying quantities. At present gold mining is the principal mineral industry, and the largest fields are in the Yukon region, on both sides of the boundary line, and in the Cape Nome district, on Bering Sea, and wholly within the American territory, where gold was first discovered in 1898. Operations here during 1899 bid fair to surpass in results those in the famous Klondike region. The output of gold in Alaska in the calendar year 1899 was estimated by the United States Director of the Mint at









Railroads.....  
Overland & Submarine  
Telegraph Lines.....  
Size of type indicates relative  
importance of places.

Hammond's 8 x 11 Map of Alaska.  
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Longitude West from Greenw











\$4,609,819 in value; in 1898, it was \$2,524,800. The same authority estimated the value of all mineral productions in 1909 at \$20,200,000.

*Fisheries.*—The waters of Alaska contain over 100 species of food fish, but the principal fisheries are those confined to salmon, cod and herring. The former is the most valuable, yielding 974,601 cases, 20,518 barrels, and 4,300 half-barrels of packed and salted fish in 1898, valued at \$3,544,128, and in 1899, a production estimated at \$4,120,000. In connection with the Alaska coast there are at least 125,000 square miles of cod fishing banks, the greater part of which still awaits development. Whales and halibut also abound, but as yet they do not support distinct industries.

*Fur Seals.*—When the United States acquired this region, and till gold mining set in, fur sealing was the only industry. Now, through indiscriminate slaughter, to check which the United States and Great Britain have been in negotiation for several years, the sea otter has almost entirely disappeared, and the fur seals are being killed to an extent that will soon terminate the industry if it is not placed under international restrictions. In the season of 1898–1899, the males of proper age were killed almost to the last one—over 14,000 on St. Paul island, and 2,520 on St. George Island.

*Agriculture.*—So far there has been but little done in the line of systematic farming. Congress made an appropriation in 1897 to investigate agricultural possibilities. Oats, wheat, rye, barley, and buckwheat, among cereals; potatoes, turnips, peas, onions, and many minor vegetables; a variety of fruit and excellent hay are grown to advantage.

*Banking.*—In 1899, the territory had one National bank, with \$50,000 in capital, \$11,250 in outstanding circulation, and \$74,745 in reserve. Much of the banking is done in Seattle, Wash., and San Francisco, Cal., whither the bulk of the output of gold is sent.

*Commerce.*—In the fiscal year 1899–1900, the imports of merchandise in the customs district of Alaska aggregated in value \$320,632, and the exports \$270,617. There was also imported gold to the value of \$6,318,346, all from mines on the Canadian side.

*Education.*—In 1898 there was a school population of nearly 10,000, for whom the Federal Government provided 18 schools, in which 1,250 pupils were enrolled. The appropriation for public education was \$30,000, a sum entirely inadequate to the growing communities. Mission schools and stations were maintained by the Protestant Episcopal, Congregational, Roman Catholic, Moravian, Methodist Episcopal, Baptist

and Presbyterian Churches, the Society of Friends, and the Swedish Evangelical Mission Covenant, the denominational schools being largely for the natives. There is an industrial school at Sitka, with an annual average of 200 pupils, where both sexes are taught self-supporting occupations.

*Railroads.*—The territory is only just entering on the era of railroad construction, the present means of communication being principally old trails and a number of short-cut wagon roads constructed by army engineers. Several important lines of railroad have been recently projected or are under construction both in Alaska and the adjoining Canadian territories. In 1898 an ingenious aerial railway was completed over Chilkoot Pass, which shortens the time from tidewater to the headwaters of the Yukon from a month to a day.

*Post-offices and Periodicals.*—In 1899 there were 21 United States mail routes, 46 post-offices, and 16 periodicals of all kinds.

*Government.*—The government is of a tentative character, under the authority of a governor appointed by the President for a term of four years, at an annual salary of \$3,000. There are judicial, customs, and military officers, and, excepting where otherwise provided, the general laws are those established in Oregon. The Territory at present has no representation in Congress.

*History.*—Alaska was discovered by Bering in 1741, and Russian settlements were made to a considerable distance southward. In 1772, many trading companies were established, and later Captain Cook's accounts of the fur animals there caused many more to be organized. In 1799 the Territory was granted to a Russian company by the Emperor Paul VIII., and in 1867 it passed to the United States by treaty with Russia. For several years there had been a contention between the United States and Great Britain concerning the boundary line between Alaska and the British territory in Canada, which became greatly accentuated in 1896 in consequence of the remarkable discoveries of gold in the Yukon valley. Both governments had the disputed region surveyed, separately and by a joint commission, and the delimitation of the boundary was the most important matter referred to the ANGLO-AMERICAN COMMISSION (*q. v.*). The failure of this body to decide the question led to a treaty between the United States and Great Britain in 1902 for the creation of the Alaskan Boundary Tribunal. This body met in London, Eng., under the presidency of Lord Chief Justice Alverstone, on Sept. 3, 1903, and on Oct. 17 following reached a decision which granted all the American contentions excepting some relating to the Portland canal. Here Kannagh-unut and Sitkan islands, commanding the entrance to the channel, were awarded to



## Alaux

the United States, and Wales and Pearse islands to Canada.

**Alaux, Jean** (al-ō'), called "Le Romain," a French painter, born at Bordeaux in 1786. He was a pupil of Vincent and Guérin; in 1815, took the Prix de Rome with the painting of "Briseis Finding the Body of Patroclus in the Tent of Achilles." He executed many portraits and other works. His historical paintings in the Museum of Versailles are famous: "Battle of Villaviciosa," "Valenciennes Taken by Assault by Louis XIV.," "States-General of Paris Under Philippe de Valois," "Assembly of Notables at Rouen Under Henry IV.," "States-General of Paris under Louis XIII.," and the "Reading of the Will of Louis XIV." He spent nine years in painting the 86 pictures which decorate the hall of the States-General of Paris. He was director of the Academy of France from 1847 to 1850, and in 1851 became a member of the Academy. He died in Paris, March 3, 1864. His brother, JEAN PAUL ALAUX, called "le Gentil," born in 1788, was director of the School of Design at Bordeaux.

**Alaux, Jules Emile**, a French professor of philosophy, born in 1828. He wrote "Dramatic Art" (1855); "Religion in the 19th Century" (1857); "Pope and King" (1891); "Conscious Philosophy" (1864); "Progressive Religion" (1869); "Æsthetic Studies" (1874); "History of Philosophy" (1887); "Moral and Political Philosophy" (1894); "Theory of the Human Soul" (1895); and other philosophical works of keen and independent thought. He also published a volume of poems.

**Alba, Duke of.** See ALVA.

**Alba Longa**, a considerable city of Latium, founded by Ascanius, son of Æneas, in B. C. 1152. It was the birthplace of Romulus, under whose dominion it fell, in consequence of the victory of the Romans in the contest between the Horatii and the Curiatii. It was situated on the opposite side of the Lake Albano from where the new town of Albano stands. There was also a city of Alba near the Lacus Fucinus; an Alba Pompeia in Liguria; and an Alba Julia, now Weissenburg, in Transylvania.

**Albani**, a powerful family of Rome, which has supplied the Roman Catholic Church with several cardinals. Two of them are well known as patrons of the fine arts: (1) ALBANI, ALESSANDRO, born in 1692; died in 1779; he was a great virtuoso, and possessed a collection of drawings and engravings which, at his death, was purchased by George III. for 14,000 crowns. (2) ALBANI, GIOVANNI FRANCESCO, nephew of the former, born 1720; a great friend to the Jesuits, but in other respects liberal and enlightened. His palace was plundered by the French in

## Albania

1798, when he made his escape to Naples, stripped of all his possessions. Died in 1803.

**Albani, Francesco**, a famous Italian painter, born at Bologna, 1578; was a scholar of Guido. He was fond of representing the fair sex, and his compositions, in love subjects, are held in high esteem. The most celebrated of the productions are: "The Sleeping Venus," "Diana in the Bath," "Danaë Reclining," "Galathea on the Sea," and "Europa on the Bull." He has been called the Anacreon of painters. It is said that his second wife, who was very beautiful, and his children, served as models for his Venuses and Cupids. Died in 1660. His brother and disciple, GIOVANNI BATTISTA, was a distinguished historical and landscape painter. Died in 1668.

**Albani, Marie Emma (Lajeunesse)**, a dramatic soprano and opera singer, born in 1852, at Chambly, near Montreal, Canada. After studying with Lamperti, at Milan, she made her debut at Messina (1870), in "La Sonnambula," under the name Albani, in compliment to the city of Albany, where her public career began. In 1878 she married Ernest Gye, of the Covent Garden Theatre.

**Albania**, the name given to a region of West European Turkey between the Adriatic Sea, Greece, Macedonia, and Montenegro. Upper or Northern Albania formed part of the Illyria of the Romans; Lower or Southern Albania corresponds to ancient Epirus. It comprises the *vilayets* of Scutari and Janina and parts of Monastir and Kossovo. It forms the southwestern portion of the remaining immediate possessions of European Turkey, and extends along the western shore of the Balkan peninsula, from the river Bojana to the Gulf of Arta. To the N. it is bounded, since 1878-1880, by the newly-won Montenegrin territory, and by Bosnia; on the S. it is separated, since 1881, from Greece by the river Arta. The eastern boundary is a mountain range, which to the N. attains an altitude of 7,990 feet. Westward of this range lie parallel chains, inclosing long, elevated valleys, sinking to level strips along the coast, which mostly consist of unhealthy swamps and lagoons. The highlands advance to the sea, forming steep, rocky coasts. One promontory, the Acroceraunian, projecting in Cape Linguetta far into the sea, reaches a height of 6,642 feet. There are three lakes, Scutari, Ochrida and Janina. The principal rivers are the Boyana, Drin, Shkumbi and Artino. A fine climate and a favorable soil would seem to invite the inhabitants to agriculture, but in the N., little is cultivated but maize, with some rice and barley in the valleys; the mountain terraces are used as pastures for numerous herds of cattle and sheep. In the S. the slopes of the lower valleys are covered with olives, fruit, and mulberry trees,



intermixed with patches of vines and maize, while the densely wooded mountain ridges furnish valuable supplies of timber. The plateau of Janina yields abundance of grain; and in the valleys opening to the S. the finer fruits are produced, along with maize, rice, and wheat. The inhabitants form a peculiar people, the Albanians, called by the Turks Arnauts, and by themselves Skipetar. According to Lord Strangford, "the true Albanian part of their language, after precipitation of the foreign elements, is distinctly Indo-European, and is more closely connected with Greek than with any other Indo-European language existing or recorded" ("Letters on Philological Subjects," 1878). The Albanians are half civilized mountaineers, frank to a friend, vindictive to an enemy. They are constantly under arms, and are more devoted to robbery than to cattle rearing and agriculture. They live in perpetual anarchy, every village being at war with its neighbor. Many of them serve as mercenaries in other countries, and they form the best soldiers of the Turkish army. At one time the Albanians were all Christians; but after the death of their last chief, the hero Skanderbeg, in 1467, and their subjugation by the Turks, a large part became Mohammedans.

**Albano** (al-bä'nō), a town of Italy, 18 miles S. S. E. of Rome, on the declivity of the lava walls which encompass Lake Albano, and opposite the site of Alba Longa. It is the seat of a bishop, and is surrounded by the mansions of wealthy Romans. There are numerous remains of ancient buildings, including an aqueduct. A valuable wine is made here. Pop. (1901), 8,461.

The ALBAN LAKE, or LAGO DI CASTELLO, is formed in the basin of an extinct volcano, and has a circumference of 6 miles, with a depth of 530 feet. Its surface is 961 feet above the sea level. While the Romans were at war with Veii (390 B. C.), this lake rose to an extraordinary height in the heat of summer, and diviners declared that the conquest of Veii depended upon letting off the waters of the lake. Hereupon the Romans opened a tunnel through the lava wall which bounds it. The tunnel, which still remains and still fulfills its ancient office, is a mile in length, with a height of 7 feet, and a width of 4 feet. On the eastern bank of the lake rises Monte Cavo, the ancient Mount Albanus, 3,000 feet high.

**Alban, St.**, the first Christian martyr in Great Britain, lived in the 3d century. After having served seven years as a soldier under the Emperor Diocletian, he returned to Britain, embraced Christianity, and suffered martyrdom in the great persecution of Diocletian. Numerous miracles are attributed to this saint.

**Alban's, St.**, a small and ancient borough of England, Hertfordshire, 20 miles

N. N. W. of London, by the London and Northwestern railway. It is the ancient Roman Verulamium. Pop. of parish, about 4,000. The abbey church is the most imposing object in the place. It was built in 796, in honor of St. Alban, by the King Offa. Of this first abbey there remains but a gateway. The present abbey is an object worthy the attention of the antiquarian and the student of architecture. It is built in the form of a cross, running 547 feet from east to west, and having a breadth of 206 feet, at the intersection of the transept. Its tower has an elevation of 146 feet, crowned with battlements, and is one of the most perfect parts of the building. Every style of architecture, from the time of the Romans to that of Henry VII., may be traced in it. The abbot of St. Alban's was mitred, and as a peer of the realm had a seat in parliament. He took precedence of all other English abbots from the time of Pope Adrian IV. Near the town of St. Alban's, two battles were fought between the houses of York and Lancaster. In the first, May 22, 1455, Richard, Duke of York, obtained a victory over Henry VI. In the second, Feb. 2, 1461, Margaret of Anjou defeated the army of the Yorkists, commanded by Warwick.

**Albany, Albainn, or Albinn**, a name anciently given to the Highlands of Scotland. The title of Duke of Albany was conferred, in 1398, on the brother of King Robert III., and subsequently on Alexander, second son of King James II.; on Henry, Lord Darnley; on Charles I. and James II., when infants; and on Frederick, second son of George III. Prince Charles Edward Stuart assumed the appellation of Count Albany as an incognito title.

**Albany**, city, capital of the State of New York, and county-seat of Albany County; on the west shore of the Hudson river, on the Erie and Champlain canals, and several important railroads; 145 miles N. of New York City. It has a river frontage of 4 miles, and extends W. a distance of 5 miles over an alluvial plain to and upon a tableland 150 feet high, the lower portions being often overflowed by the river in the spring. Albany has always had the advantages of a central position. It lies on the great E. and N. railroad routes, 200 miles W. of Boston and 297 miles E. of Buffalo, while its situation on the Delaware and Hudson and the Hudson River railroads, as well as on the Erie Canal, gives it fine commercial advantages.

*History.* — Albany is one of the very oldest settlements in the United States. Verazano, the French explorer, set up a trading post there in 1540, but it was not maintained. In 1614 the Dutch traders started another trading post, calling it



## Albany

Fort Nassau; but the real settlement of it dates from the arrival of Walloon families, who, in 1624, established Fort Orange. After Indian troubles, in 1629 Killian Van Rensselaer secured a grant of the region and sent over Dutch settlers, who paid him rent as their patroon. In 1664, when the English came into the Dutch possessions, the settlement was named in honor of the Duke of York and Albany (afterward James II.). The city was chartered in 1686. During the French and Indian wars Albany was a place of refuge and of military headquarters. In 1754 it was selected as the meeting-place of the Albany Congress (*q. v.*); in 1777 General Burgoyne aimed his ill-fated Saratoga campaign against it as a strategical point; and in 1797 it became the capital of New York State. Since then it has continued to be a center of political activity; much history of a determining character has been made there. The Erie Canal in 1820 gave a new impetus to the growth of the city's trade, population and general importance.

*Local Features.*—The steep rise of ground westward from the river gives Albany a peculiar look, the inclined plane being divided into four ridges by transverse valleys that cut through it. The main streets are North, South, and Broadway, running parallel to the river, and State, which ascends the hill. There are 144 miles of streets, 85 of which are paved; 30 miles of electric railways in the city, connecting with a number of local lines reaching out to neighboring towns, even as far as Lake George, 71 miles distant. There are 2 fine railroad bridges across the Hudson and one for wagons. The principal buildings are the State Capitol, which cost nearly \$25,000,000; State Normal School; United States Government Building; State Arsenal; City Hall; the old State House, containing the State Museum; High School; Medical College; Harmanus Bleecker Hall; and the old Schuyler House, now used by the Sisters of Charity as an orphan asylum. The city contains over 70 churches, the finest of which are the Roman Catholic Cathedral of the Immaculate Conception, and the Episcopal All Saints Cathedral. The Episcopal St. Peter's Church is especially fine, in the French Gothic style. The public school buildings are valued at above \$1,000,000, and there are a number of high-grade institutions of learning—academies and colleges—as well as the Dudley Observatory. The hospital and the penitentiary are both expensive structures.

*Manufacturing and Finance.*—The manufactures of Albany are of standard grades and great variety, involving nearly \$22,000,000 invested, with (1900) a product of \$24,992,021. The tax valuation for 1903 was \$68,672,887, the public debt being \$1,318,435. The 7 banks have resources of

## Albany Regency

\$2,885,000, and the 7 savings banks hold deposits of fifty-five and a half millions. The city is steady, substantial, and prosperous. Pop. (1900), 94,151; (1910), 100,253.

**Albany**, a city and county-seat of Linn County, Oregon, on the Willamette river, about 25 miles S. by W. from Salem, and 85 from Portland; on the Southern Pacific and the Corvallis and Eastern railroads. It has fine water power from the river, which is spanned by a steel bridge. Its industries comprise foundries, machine shops, brick yards, wagon factories, planing and saw mills, flour mills, etc., and it has an outside trade in grain, flour, and sandstone. It was founded about 1850, and incorporated in 1864. Pop. (1900) 3,149.

**Albany Congress**, an assembly of representatives of the most important British North American colonies, which was called together in 1754 by the British Government to consult in regard to the threatening French war. Two plans were proposed: First, a league with the Indians, which was carried out, and second, a proposal offered by Franklin for a political union. In this a common president was proposed and a great council, representing the different colonies. This plan was rejected by the British Crown, because it gave too much power to the colonies, and by the colonies because it gave too much power to the Crown. The significance of this congress lies in the fact that it stimulated the union of the colonies.

**Albany, Louisa, Countess of**, daughter of Prince Stolberg of Gern, in Germany, born in 1753; married, in 1772, the adventurous Charles Edward Stuart. The Countess being much younger, the match was ill-assorted, and she retired to a convent. Subsequently she went to France, but on the death of her husband, in 1788, she settled in Florence. Here she secretly allied herself by marriage to Count Alfieri, the poet, taking the title of Countess of Albany, as the relict of the last of the Stuarts. Alfieri died in her house, and in 1810 she erected to his memory, in the Church of Santa Croce, a monument executed by Canova. She was possessed of a refined mind, loved literature and the arts, and while in Florence her house was the resort of the most cultivated and distinguished persons. Died in 1824.

**Albany Regency, The**, a name given in American political history to a powerful combination of eminent Democratic leaders of New York State, who stood together for purposes of solid influence in State and National party affairs. It was instituted in 1822 by Martin Van Buren, who remained its dominating spirit for many years. It continued to exercise large power until 1854, with such men as William L. Marcy, Silas Wright, John A. Dix, and Horatio Seymour



identified with it. Afterward Samuel J. Tilden, Dean Richmond, and Daniel Manning preserved in a manner its traditions.

**Albatross** (*Diomedea*), a genus of natorial birds, having the following generic characters: a very long bill, which is sutured, robust, thick, straight, and laterally compressed, terminating in a large hook, which is apparently articulated therewith. The upper mandible is laterally grooved, and the short, tubular nostrils are situated in these grooves; the lower mandible being truncated. The toes are very long, and are webbed with an entire membrane; and the lateral toes are externally edged by a narrow membrane. There is no hinder toe; the nails are short and blunt. The tail is rounded, and composed of 14 feathers. The wings have their second quills longest. The albatross most generally known is the *Diomedea exulans* of naturalists. It is one of the largest of marine birds, as its wings, when extended, measure from 10 to 12 feet from tip to tip. These long wings are very narrow; but the albatross being extremely strong, is able to fly with ease over a vast space. Except during high winds, when it ascends to the upper regions of the air, the albatross sails gently over the surface of the billows, rising and sinking in graceful undulation, and seizing with avidity every luckless creature that approaches the surface. It is met with at great distances from the land, settling down on the waves at night to sleep.

The albatross is exceedingly voracious. Whenever food is abundant it gorges to such a degree as to become unable either to fly or swim; frequently it is seen in this state, with a fish partly swallowed and partly hanging from its mouth. The gulls then often attack and worry it till it disgorges its prey, which they are ready to seize. Fish spawn, oceanic mollusca, and other small marine animals constitute its ordinary food. The voice of the albatross is a harsh, disagreeable cry, which has been compared to the braying of an ass. Toward the middle of June vast numbers of these birds flock toward the coast of Kamchatka, the Sea of Okhotsk, the shores of the Kurile Islands and Bering Straits. They arrive there extremely lean, preceding by a short time the fishes which come annually to spawn in the fresh water of the rivers. Soon after the birds become very fat from the abundance of food. They begin to retire from these coasts about the end of July, and by Aug. 15 the whole have disappeared. During their sojourn the Kamchadales catch large numbers of them by baiting hooks with fish, or by knocking them on the head when overgorged. They are not taken for their flesh, which is coarse, rank, and disgusting; but their large, hollow, wing bones furnish the natives with various useful implements, while

certain parts of their intestines are inflated and employed as floats for fishing nets. About the middle of September they seek some lonely islet or unfrequented coast for the purpose of breeding; there they build large nests of earth, grass, etc., and lay a single egg, which is larger than those of a goose, being about 4½ inches long, generally white, except toward the larger extremity, where there are some dark spots. These eggs are edible, and it is stated by those who have used them that the white is not rendered hard by boiling. While the female sits upon the nest the male is industriously employed in supplying her with food.

The common albatross is from three to four feet long, of a grayish-brown or whitish color, with lines of black upon the back and wings. The inferior part of the body and rump are white; the end of the tail and a great part of the wings are black. The shafts of the quills are yellow. The feet, toes, and web membrane are of a reddish-brown color; the beak is blackish. The female is similar to the male, but the young differ much from the adult. The albatross moults twice a year without changing its colors. Several other species have been established by naturalists, among which we may mention *D. chlororhynchos*, the black and yellow beaked albatross, of the size of a domestic goose; *D. spadicea*, the dark brown or chocolate-colored albatross, larger than the common goose; and *D. fuliginosa*, sooty or Quaker albatross, smaller than the common albatross.

**Albay**, a province in the S. E. part of Luzon, Philippine Islands, and the richest hemp-growing district on the island. It has yielded as much as 40,000 tons of hemp in a season. The province contains a picturesque volcano, Mayon, which has had several destructive eruptions, the last in 1888. In January, 1900, Brig.-Gen. William A. Kobbé, United States Volunteers, was appointed military governor of the province and Catanduanes Island, with temporary authority over Samar and Leyte Islands, for the purpose of controlling the hemp-growing country and occupying and opening to trade the various hemp ports. He had several sharp fights to gain possession of his new command, but at the end of the month his expedition, with the aid of the navy, had accomplished its mission. The principal towns in the province are Albay (the capital), Tivi, Malinao, Tobacco, Malilipot, Bagacay, Libog, Legaspi, Manito, Libon, Polangui, Ligao, Oas, Guinobatan, Cagsaua, and Camalig. Vicol is almost the exclusive language of the province. Here are several telegraph stations, and all of the important towns are connected by carriage roads. The industries comprise hemp-growing (annual product valued at \$4,750,-



217), shipbuilding, the manufacture of cloth, and gold, silver, coal, and iron mining. Pop. (1903), 240,326.

**Albemarle, Duke of.** See **MONK**.

**Albemarle Sound**, an inlet near the N. E. extremity of the State of North Carolina, running inland for 60 miles, with a breadth of from 4 to 15 miles. It has no great depth of water, and a narrow island at its mouth prevents the sound from being affected by the tides. Into its upper extremity the Roanoke and Chowan rivers debouch. It is connected by channels with Chesapeake Bay and Currituck and Pamlico Sounds.

**Albemarle, The**, in the American Civil War, a Confederate iron-clad ram which did much damage to Union steamers in the spring of 1864, but was destroyed by the daring explosion of a torpedo by Lieut. W. B. Cushing, U. S. N., on Oct. 27, of that year.

**Albergati Capacelli, Marquis Francesco** (al-ber-gä'te kap-ä-chel'le), an Italian senator who was not only a powerful dramatist, but such an excellent performer as to merit the title of the "Garriek of the Italian nobility." His works have been pronounced unrivaled for wit, humor, facetious sallies, and knowledge of the world. Born at Bologna, in 1730; died in 1802.

**Alberoni, Guilo**, cardinal and minister of the King of Spain; born in Firenzuola, Parma, in 1664, and educated for the Church. He soon gained the favor of powerful patrons, especially the Duke of Vendôme, whom he accompanied to Paris and then to Spain, the duke being appointed generalissimo of the armies of Philip V. Having made himself a favorite of the Spanish king he rose to be prime minister, became a cardinal, was all-powerful in Spain after the year 1715, and endeavored to restore it to its ancient splendor. He reformed abuses, created a naval force, organized the Spanish army on the model of the French, and rendered the kingdom of Spain more powerful than it had been since the time of Philip II. His favorite project was the restoration to Spain of the empire ruled by Charles V. and Philip II.; and he began with Sardinia and Sicily. Even when the Duke of Orleans, regent of France, renounced the Spanish alliance to form a connection with England, the proud prelate did not alter his system; on the contrary, he threw off his mask, attacked the emperor, and took Sardinia and Sicily. After the Spanish fleet was destroyed by the English in the Mediterranean he entertained the idea of stirring up a general war in Europe, of forming an alliance for this purpose with Peter the Great and Charles XII., of involving Austria in a war with Turkey, exciting an insurrection in Hun-

gary, and causing the Duke of Orleans to be arrested by a court faction.

The duke, in connection with England, declared war against Spain, and explained in a manifesto the intrigues of the Italian cardinal. A French army invaded Spain, and although Alberoni endeavored to cripple the power of France by fomenting disturbances within that kingdom, the Spanish monarch became despondent, and concluded a peace the chief condition of which was the dismissal of the cardinal. He received, December, 1720, orders to quit Madrid within 24 hours, and the kingdom within five days. He was now exposed to the vengeance of the powers of Europe, by all of whom he was hated, and saw no country where he could abide. He did not even dare to go to Rome, because he had deceived the Pope, Clement XI., in order to obtain the rank of cardinal. While crossing the Pyrenees his carriage was attacked, one of his servants killed, and he himself obliged to continue the journey on foot and in disguise. He wandered about a long time under false names. He was arrested in the territory of Genoa at the request of the Pope and the King of Spain; the Genoese, however, soon dismissed him. The death of Clement put an end to this persecution, and his successor, Innocent XIII., restored him in 1723 to all the rights and honors of a cardinal. In 1740 he withdrew to Piacenza, where he passed the remainder of his life. He died in Rome in 1752. He left behind him the character of a bold and versatile intriguer rather than that of a great politician, though he certainly gave a powerful temporary impulse to the Spanish monarchy, and established many regulations which were favorable to arts, agriculture, and commerce.

**Albert I., Duke of Austria**, and afterward Emperor of Germany; born in 1248; son of Rudolph of Hapsburg, who had a short time before his death attempted to place the crown on the head of his son. But the electors, tired of his power, and emboldened by his age and infirmities, refused his request, and indefinitely postponed the election of a King of the Romans (the title of the designated successor of the emperor). After the death of Rudolph, Albert, who inherited only the military qualities of his father, saw his hereditary possessions, Austria and Styria, rise up in rebellion against him. He quelled by force this revolt, which his avarice and severity had excited; but success increased his presumption. He wished to succeed Rudolph in all his dignities, and without waiting for the decision of the diet seized the insignia of the empire. This act of violence induced the electors to choose Adolphus of Nassau emperor. The disturbances which had broken out against him in Switzerland,



and a disease which deprived him of an eye, made him more humble. He delivered up the insignia, and took the oath of allegiance to the new emperor. Adolphus, after a reign of six years, having lost the regard of all the princes of the empire, Albert was elected to succeed him. A battle ensued near Gellheim, in which Adolphus fell by the hand of his adversary. The last barrier had fallen between Albert and the supreme power, but he was conscious of having now an opportunity of displaying his magnanimity. He voluntarily resigned the crown conferred on him by the last election, and as he had anticipated was reelected. His coronation took place at Aix-la-Chapelle in August, 1298, and he held his first diet at Nuremberg with the utmost splendor.

But a new storm was gathering over him. The Pope, Boniface, VIII., denied the right of the electors to dispose of the imperial dignity, declaring himself the real emperor and legitimate King of the Romans. He accordingly summoned Albert before him to ask pardon and submit to such penance as he should dictate; he forbade the princes to acknowledge him, and released them from their oath of allegiance. The Archbishop of Mainz from a friend became the enemy of Albert, and joined the party of the Pope. On the other hand, Albert formed an alliance with Philip le Bel of France, secured the neutrality of Saxony and Brandenburg, and by a sudden irruption into the electorate of Mainz forced the archbishop not only to renounce his alliance with the Pope but to form one with him for the five ensuing years. Dismayed by this rapid success Boniface entered into negotiations with Albert, in which the latter again showed the duplicity of his character. He broke his alliance with Philip, acknowledged that the Western Empire was a grant from the Popes to the emperors, that the electors derived their right of choosing from the see of Rome, and promised to defend with arms the rights of the Pope, whenever he should demand it, against any one. As a reward Boniface excommunicated Philip, proclaimed him to have forfeited his crown, and gave the kingdom of France to Albert. Philip, however, chastised the Pope.

Albert was engaged in unsuccessful wars with Holland, Zealand, Friesland, Hungary, Bohemia, and Thuringia. While preparing to revenge a defeat which he had suffered in Thuringia he received the news of the revolt of the Swiss, and saw himself obliged to direct his forces thither. The revolt of Unterwalden, Schwyz, and Uri had broken out Jan. 1, 1308. Albert had not only foreseen this consequence of his oppression but desired it, in order to have a pretence for subjugating Switzerland entirely to himself. A new act of injustice, however, put an end to his ambition and life. Suabia was the inheritance of John, the son of his younger

brother Rodolph. John had repeatedly asserted his right to it, but in vain. When Albert set out for Switzerland John renewed his demand, which was contemptuously rejected by Albert. John, in revenge, conspired with his governor, Walter of Eschenbach, and three friends against the life of Albert. The conspirators took advantage of the moment when the emperor, on his way to Rheinfelden, was separated from his train by the river Reuss, and assassinated him. Albert breathed his last, May 1, 1308, in the arms of a poor woman who was sitting on the road. He was a prince regardless of right and equity, tyrannical, avaricious, and ambitious, but possessed considerable abilities.

**Albert I.**, Margrave of Brandenburg, surnamed the BEAR, from his heraldic emblem, was the son of Otto the Rich, Count of Ballenstädt. As Marquis of Lusatia he served the Emperor Lothaire with credit in his war with Bohemia. The diet afterward withdrew Lusatia from him, but the emperor for further services conferred on him in 1134 the margravate of Brandenburg. In 1136-1137 he made incursions into the territory of the Wends, who disturbed his government, and checked their disorders. In 1138 the Emperor Conrad conferred on him the duchy of Saxony, of which he had deprived Henry the Proud. This led to a war with Henry, in which Albert was deprived of Brandenburg, but was restored by an armistice negotiated by the ecclesiastical electors. On the death of Henry (1139) he reassumed the title of Duke of Saxony. A combination was then formed against him, which, in spite of the favor of the emperor, reduced him to extremities. Peace was concluded in 1142. Albert resigned Saxony, and Brandenburg was raised to an immediate fief of the empire. He acquired at the same time by inheritance from Przibislas, a Vandal king who had taken his name in baptism, the country between the Elbe and the Oder. He made his new possessions a fief of the empire, and in order the better to guard them removed his residence to Brandenburg. In 1148 he led an expedition into Pomerania, and in the following year induced the duke of that country to embrace Christianity. In 1150 he was raised to the electoral dignity. In 1157 he made a third expedition against the Wends, conquered their country, and colonized it with agriculturists from Germany, Holland, and Zealand. In 1164 he went on a crusade to the Holy Land. Another war broke out between him and Henry, Duke of Saxony, which was terminated to the advantage of the latter in 1168 by the mediation of the Emperor Frederick I. In 1169 Albert remitted his estates to his son. He died in 1170. The origin of Berlin, Kölln, Aken on the Elbe, and other towns, is attributed to the colonies founded by him.



**Albert, Margrave of Brandenburg**, son of Casimir, Margrave of Culenbach, born in 1522. He entered into the confederacy formed by Maurice, Elector of Saxony, and other princes, against Charles V., and committed many excesses in that war, burning towns and levying heavy contributions wherever he marched. Subsequently a league headed by Maurice himself was formed against him, and, in 1553, a great battle was fought at Siverhus, in which Maurice was slain and Albert wounded. He was afterward put under the ban of the empire, and deprived of his possessions. Died in 1558.

**Albert II.**, King of Hungary and Bohemia and Duke of Austria, succeeded Sigismund as Emperor of Germany in 1438. He held a great diet at Nuremberg, in which the Vehmie or secret courts were suppressed. He died the following year, as he was preparing to take the field against the Turks, who were ravaging Hungary.

**Albert**, or **Albrecht**, the Pious, Archduke of Austria, born in 1559, was the third son of the Emperor Maximilian II. He was brought up at the Spanish court, and dedicated himself to the Church. In 1577 he was made cardinal, in 1584 Archbishop of Toledo, and during the years 1594-1596 held the office of Viceroy of Portugal. He was next appointed Stadtholder of the Netherlands, where he continued, until his death, the representative of the Spanish monarchs, discharging the duties of his function with a moderation unwonted among the proud proconsuls of Spain. He abandoned his ecclesiastical profession, and, in 1598, married the Infanta Isabella. Albert was defeated by Maurice of Nassau in 1599, made a 12 years' truce with him in 1609, and died in July, 1621, at Brussels.

**Albert I.**, Duke of Prussia, son of Frederick, Margrave of Ansbach and Beyrout, and grandson of Albert Achilles, Elector of Brandenburg; born May 17, 1490. Being designed for the Church he was educated by the Archbishop of Cologne, and became a prebendary in the cathedral of that town; but he did not neglect knightly exercises, and along with his father followed the Emperor Maximilian I. on his expedition against Venice, and was present at the siege of Pavia. In 1511 he was chosen by the Teutonic knights grand-master of their order. Being the son of Sophia, sister of Sigismund, King of Poland, and descended from one of the most powerful German families, the knights hoped by his means to be freed from the feudal superiority of Poland, and placed under the protection of the empire. Being recognized by Poland he proceeded to Königsberg and assumed the government in 1512. He refused the oath of allegiance to Poland, which the previous grand-master had evaded, and pre-

pared for resistance. In 1520, after protracted negotiations, Sigismund attempted to enforce submission by an invasion of the territories of the order, but the contest was without decisive result, and in the following year a truce of four years was agreed to at Thorn.

The latter years of his reign were troubled with many intrigues, foreign and domestic; in 1532 he was put under the ban of the empire, but he succeeded in transmitting his succession to his son. He died of the plague March, 20, 1568. His wife, who was attacked with the same malady, survived him only a day.

**Albert, Prince (Albert Francis Augustus Charles Emmanuel)**, Prince of Saxe-Coburg-Gotha, and Prince Consort of England; the second son of Ernest I., Duke of Saxe-Coburg, and of his first wife Louise, only daughter of the Duke of Saxe-Gotha; born Aug. 26, 1819; received his early education at home under his father's eye; and in 1837 was sent with his elder brother Ernest to the University of Bonn, where he devoted himself to the studies of political and natural science, history, philosophy, etc., as well as to those of music and painting. In the latter pursuits, indeed, he attained to no mean proficiency, and several of his musical compositions became favorably known to the public. Handsome and accomplished, he had made a considerable impression on his cousin Queen Victoria during a visit which he paid to England in 1836; he was present at and stayed for some time after the coronation of the queen in 1839; and on Nov. 23 of the same year the queen made known to the privy council her intention of marrying the prince. The marriage was celebrated on Feb. 10, 1840, and proved in every respect eminently happy. An allowance of £30,000 a year was settled upon the prince, who was naturalized by act of Parliament, received the title of Royal Highness by patent, was made a field-marshal, a Knight of the Garter, of the Bath, etc. Other honors were subsequently bestowed upon him, the chief of which was the title of Prince Consort (1857), which gave him the rank of a prince of the United Kingdom.

He always carefully abstained from party politics, a course which his position rendered necessary, but which no doubt often required much tact and prudence; but he never ceased to take a deep and active interest in the welfare and social advancement of the people in general. His services to the cause of science and art were very important; and the great exhibition of 1851 owed much of its success to his activity, knowledge, and judgment. He presided and delivered the inaugural address at the meeting of the British Association for the Advancement of Science held at Aberdeen in



1859. To the sorrow of the whole nation, he died Dec. 14, 1861, after a short illness. He was buried in St. George's Chapel, Windsor, whence his remains were afterward removed to the mausoleum built by the Queen at Frogmore. A biography of the Prince by Sir Theodore Martin in five volumes is the official "Life" (London, 1875-1880).

**Albert Edward.** See EDWARD VII.

**Alberta**, a province of the Dominion of Canada, bounded on the N. by the district of Mackenzie, on the S. by the United States, on the E. by Saskatchewan, and on the W. by British Columbia. Beginning at lon.  $110^{\circ}$  W., it extends westward to the crest of the Rocky mountains, where it meets the boundary of British Columbia. Starting on the S. at the international boundary line, it extends to lat.  $60^{\circ}$  N. Area, 253,540 square miles, of which 2,360 square miles are under water.

*Physical Characteristics.*—In the S. the land is open prairie, treeless, except along the foothills of the Rocky mountains and in the valleys of the larger rivers. Toward the N. the land is generally level and wooded, with open prairie areas, few in number and of small size. The middle and S. portions of the province slope gradually upward toward the base of the Rocky mountains, attaining an elevation of 3,000 to 4,000 feet. The N. portion is lower, sloping downward toward the N., and is drained by the Athabasca, Peace, and Great Slave rivers, whose waters are discharged through Great Slave Lake and the Mackenzie river into the Arctic Ocean.

Of the great open prairie area of western Canada, Alberta possesses about one-third. The lakes are neither so large nor so numerous as those of Saskatchewan. The western half of Lake Athabasca, in the N. E., lies within the province; other lakes are Lesser Slave, Hay, Bistcha, Claire, Lac la Biche, Beaver, besides several smaller ones. The principal rivers are the Athabasca (*q. v.*), which flows northward into the lake of that name; the Peace, which flows northeasterly and joins the Great Slave river just N. of the western extremity of Lake Athabasca; the North and South branches of the Saskatchewan; the Hay; the Red, Loon, and Smoky, tributaries of the Peace; the Pembina, a tributary of the Athabasca; the Battle, a tributary of the North Saskatchewan; the Red Deer, a tributary of the South Saskatchewan; and the Bow, Belly, and St. Mary's rivers, which unite to form the South Saskatchewan. On the W. side of the province runs the majestic range of the Rocky mountains, with their white peaks in view. The mountains and their melting snows are the sources of the rivers of Alberta.

*Soil and Climate.*—The soil is, generally, a black, alluvial loam, of great fertility; but in places shades off to light sandy loam. While the subsoil is usually clay, it is oc-

asionally sandy or gravelly. Both N. and S. Alberta are adapted for all kinds of cereals and root crops; but a considerable belt immediately N. of the international boundary line needs irrigation. To the N. of this belt water is furnished by the Bow, Belly, and St. Mary's rivers, while the arid belt is irrigated by large canals, carrying water from near the mountains 100 miles over the thirsty ground. The irrigation works of Cardston, Raymond, and other towns have made the arid plains highly productive. At Raymond a large beet-sugar factory has proved very successful, and around that town for miles the land is in summer one great beet field. The largest irrigation canals have been constructed by the Canadian Pacific railway from Calgary (*q. v.*) in various directions. Farther N., there flow from the wooded slopes of the mountains streams, such as the Red Deer, Rosebud, Battle, and North Saskatchewan, which furnish an abundant supply of water. Its mountains, forests, prairies, lakes, and rivers combine to make the landscape of Alberta very beautiful.

The climate is exceedingly salubrious, with abundance of bright sunshine. The cold and snows of winter are tempered by the Chinook wind, which pours through the mountain passes from British Columbia, and in a few days, sometimes in a few hours, sweeps away every vestige of snow and ice. The open winter favors the life of tens of thousands of horses, cattle, and sheep that roam the plains. At Edmonton, the capital, and the chief city of N. Alberta, the average winter temperature is about  $11^{\circ}$  F. At Calgary, 180 miles S., the average winter temperature is  $1^{\circ}$  F. higher, while the average summer temperature is  $3^{\circ}$  F. higher.

*Minerals and Mining.*—According to Dr. G. M. Dawson, an eminent Canadian geologist, several of the rivers E. of the Rockies yield gold in remunerative quantities. Building stone also occurs. Immense deposits of lignite, or brown coal, resembling that of Germany and Bohemia, are found. They are often near the surface and easily worked. Near and among the foothills of the Rocky mountains the coal deposits are mostly bituminous. Coal mining has only fairly begun, but promises very important results in the future. The Galt mine in Lethbridge has long sent out its great yearly yield to be carried 1,000 miles E.; the coal of Edmonton is bituminous and is found almost everywhere underlying a few feet of soil. The anthracite of the Bow river pass, above Banff, is a most useful coal for the whole of western Canada; lighter in weight than Pennsylvania anthracite, it is easier to burn and more pleasant to use. In all parts of Alberta coal prevails at slight depths below the surface. Probably connected with the coal deposits is the remarkable production of natural gas in seemingly illimitable quan-



tities at Medicine Hat. The gas is being used for lighting and fuel in this town, and is drawing thither manufacturing enterprises of various kinds. It is practically impossible to appreciate the amount of coal that may be extracted from the deposits in Alberta. Prof. D. B. Dowling, of the Canadian Geological Survey, has made what he calls a conservative estimate of their productive capacity, as follows:

|                                   |      |                |
|-----------------------------------|------|----------------|
| Good lignite,.....                | Tons | 44,000,000,000 |
| True coal (below bituminous)..... | "    | 20,000,000,000 |
| Steam and anthracite.....         | "    | 60,000,000,000 |

Among other minerals found are iron, copper, silver, galena, and petroleum. There are sulphur springs at Banff.

*Forests.*—The main forested area is N. of the North Saskatchewan river and on the Rocky mountain slopes and foothills. The chief kinds of trees are the pine, spruce, tamarack, poplar, and birch.

*Agriculture and Live Stock.*—The fertile soil and abundant sunshine during the growing season combine to produce cereals and root crops of superior quality. Except in certain parts, however, Alberta is not equal to Saskatchewan or Manitoba in wheat production. Until recently the vast stretches of pasture made ranching the most important industry; but the increasing conversion of pasture to grain-growing land, and the profitableness of mixed farming, have begun to displace the rancher in favor of the settler.

The following table gives the number of acres devoted to wheat, oats, and barley during 1900, 1905, and 1906:

|              | 1900    | 1905    | 1906    |
|--------------|---------|---------|---------|
| Wheat .....  | 43,104  | 147,921 | 223,930 |
| Oats.....    | 118,025 | 311,804 | 489,627 |
| Barley ..... | 11,099  | 80,900  | 108,175 |
|              | 172,228 | 540,625 | 821,73  |

According to these figures, the increase in total acreage from 1900 to 1905 was 213 per cent., and from 1900 to 1906, 377 per cent. The increases in the wheat acreage of 1905 and 1906, respectively, over that of 1900 were 243 and 419 per cent.; of the oats acreage, 164 and 314 per cent.; of the barley acreage, 628 and 874 per cent.

According to the Dominion census, the production of wheat, oats, and barley in 1900 and 1905 was as follows:

|                     | 1900      | 1905       |
|---------------------|-----------|------------|
| Wheat, bushels..... | 797,839   | 3,035,843  |
| Oats, " .....       | 3,791,259 | 11,728,314 |
| Barley, " ... ..    | 287,343   | 2,231,878  |

Thus the production of wheat increased 280 per cent.; of oats, 209 per cent.; of barley, 776 per cent. The grain production for 1906 was estimated at a total of 33,782,503 bushels, of which 5,871,397 bushels were wheat, an increase of 93 per cent. over the production of 1905 and of 636 per cent. over that of 1900; 3,878,683 bushels were barley,

an increase of 73 per cent. over the crop of 1905 and of 1,249 per cent. over that of 1900; 24,032,423 bushels were oats, an increase of 104 per cent. over the crop of 1905 and of 533 per cent. over that of 1900. This rapid growth has been due chiefly to the large immigration of agricultural settlers, many of whom came from Britain and the United States; and especially to the facility with which those of Canadian and American birth, being already familiar with the best methods of cultivation, and possessing a sufficient capital, were able to take up land that could be cultivated with immediate profit. Besides wheat, barley, and oats, there were raised, in 1905, 84,982 bushels of rye, 11,623 bushels of flax, 1,271,728 bushels of potatoes, 167,020 bushels of other field roots, 19,598 tons of sugar beets, 26,748 tons of forage crops, 50,611 tons of sown hay, and 838,164 tons of native or prairie hay. Small fruits of many kinds are abundant, but apples are not generally cultivated.

Horse and cattle raising are very important industries, but ranching is giving place to grain growing and mixed farming in the southern districts. According to the Dominion census, Alberta in 1906 possessed 228,534 horses, as compared with 93,001 in 1901; 101,245 milch cows, against 46,295 in 1901; 849,387 of other horned cattle, against 329,391 in 1901; 154,266 sheep and lambs, against 80,055 in 1901; and 114,623 swine, against 46,163 in 1901. Dairying is a large and profitable industry, and there are many cheese factories and creameries in the province.

*Manufactures and Commerce.*—Like Saskatchewan, Alberta is an agricultural province, but the growth of cities and towns has created a manufacturing industry which has increased very rapidly during the opening years of the twentieth century. According to the Dominion census of 1906, Calgary, Edmonton, Lethbridge, Medicine Hat, and Strathcona had in 1905 a combined manufactured output valued at \$4,114,099, as compared with \$1,050,436 in 1900, a gain of 291 per cent. The leading articles of manufacture are lumber, flour, oatmeal, cement for building, sashes and doors, furniture, mining supplies, foundry and machine-shop products, glass, harness and saddlery, leather, meat-packing products, etc.

Alberta has a considerable export trade in grain, cattle, horses, beef, cheese, butter, etc., and is well supplied with means of transportation by rail, though these are to be largely increased in the near future. The Canadian Pacific railway traverses the province in several directions: westerly, through Medicine Hat and Lethbridge; northwesterly, from Medicine Hat to Calgary and Kicking Horse Pass; and northerly, from Lethbridge to Edmonton, with additional branches in contemplation. The Canadian Northern runs from Battleford, Saskatche-



wan, to Edmonton, and is being extended in other directions. The Grand Trunk Pacific, intersecting the boundary line between Alberta and Saskatchewan at about lat. 50° N., and proceeding to Edmonton, is being extended northwesterly through the province. Branches have also been projected from Battleford to Calgary, and from Edmonton to Yellow Head Pass. It is impossible to describe fully the extent and directions of railway building in Alberta and Saskatchewan, as they are largely determined by the tide of immigration, which is increasing yearly. The North Saskatchewan is navigable for small steamers to Edmonton from Battleford and other towns in Saskatchewan.

*Government and Finance.*—The affairs of the province are administered by a lieutenant-governor, appointed by the governor-general-in-council, and a legislative assembly of 25 members. The lieutenant-governor is advised by an executive council of four members, responsible to the legislative assembly. The province is represented in the Dominion Senate by four members and in the Dominion House of Commons by five members. Pending legislation, the Supreme Court of the Northwest Territories retains jurisdiction over the provinces of Alberta and Saskatchewan. Alberta has no debt. The annual budget of receipts and expenditures is brought before the assembly and subjected to the methods which regulate a similar procedure in the other provinces. The Dominion government retains control of the public lands, and in compensation grants an annual subsidy to the province.

*Education and Religion.*—The public school system is similar to that of Saskatchewan (*q. v.*). It is the result of legislation by the Dominion Parliament. There are normal, high, and other middle schools. The leading religious denominations are well represented. There has been no religious census since that of 1901, before the provinces of Alberta and Saskatchewan had been formed.

*History and Population.*—Alberta was created by the Dominion Parliament out of the former district of Alberta, the W. half of the former district of Athabasca, and a strip of the former districts of Assiniboia and Saskatchewan. It was proclaimed a province of the Dominion of Canada in 1905. In 1901 the population was 73,022; on March 31, 1910, it was 321,862, the increase being due largely to British, American, and North European immigration. The leading cities and towns and their populations in 1906 were: Calgary (11,697); Edmonton (11,167); Medicine Hat (3,020); Lethbridge (2,313); Strathcona (2,921); and Wetaskiwin (1,652). Since 1906 the populations of Calgary, Edmonton, and Strathcona have increased considerably.

**Albert Edward Nyanza** (MUTA-NZIGE),

a lake of central Africa, in the upper part of the Nile basin just S. of the equator, 3,307 feet above sea level; discovered by Stanley in 1876, and again visited by him in 1889. It has a diameter of 45 miles, and drains the S. slopes of the Ruwenzori mountain through the Wami and Mpanga rivers.

**Albert, Friedrich August**, King of Saxony, born in Dresden, April 23, 1828. He was educated under the direction of the Saxon historian Langenn. On the death of his father, in 1873, he became king. He had already distinguished himself at the battle of Sedan, and also at Beaumont, where he defeated the French under MacMahon. He married (1853) the Princess Carola of Wasa. He died June 19, 1902.

**Alberti, Leone Battista** (al-bārt'ē), an eminent Italian architect, philosopher, art critic, and poet; born in Venice, Feb. 18, 1404. From 1432 to 1472 he was papal abbreviator at Rome. Both in Florence and Mantua there are buildings which bear witness to his skill as an architect and as an apostle of the classical style. He wrote on many subjects, his greatest work being "Della Famiglia" (1439-41), which deals with education and domestic economy, and portrays Italian life during the period of renaissance. He was an accomplished Latin scholar, and his imitations of classical models were so skilful that his comedy "Philodoxius" was long held to be the work of an ancient author. He died in Rome, April, 1472.

**Albert Lea**, city, county-seat of Freeborn co., Minn.; 110 miles S. of Minneapolis. The Albert Lea College (female, Presbyterian, founded 1885) is located here; and there are a fine court house, a public library, and 5 banks. This is the market center for the dairy and farm products of the adjacent country, with flour mills and grain elevators. There are also brick yards, manufactories of wagons and plows, machine shops, etc. Pop. (1890) 3,305; (1900) 4,500; (1910) 6,192.

**Albert Nyanza** (MWUTA-NZIGE), a large lake of British East Africa, in lat. 2° N. and lon. 31° E., 80 miles N. W. of the Victoria Nyanza, whose outlet, the Victoria Nile, it receives. It is 100 miles long by 25 broad, and has an area of about 2,000 square miles. From the N. E. end flows the White Nile, and into the S. W. the Semliki, outlet of the Albert Edward Nyanza. The surface elevation of the lake is about 2,100 feet above sea-level. The Albert Nyanza was discovered in 1864 by Sir S. W. Baker, and in 1877 surveyed by Col. A. M. Mason, an American officer in the Khedival service.

**Albertus Magnus**, or **Albert the Great**, Count of Bollstadt, Bishop of Ratisbon, a distinguished scholar of the thirteenth century; born in Lauingen, Suabia, in 1193, or, according to some authorities, in 1205. He



## Albi

studied at Padua, and in 1222 became a monk of the Dominican Order, teaching in the schools of Hildesheim, Ratisbon, and Cologne, where the afterward celebrated Thomas Aquinas became his pupil. In 1245 he went to Paris, obtained the degree of magister, and publicly expounded the doctrines of Aristotle, notwithstanding the prohibition of the Church. He became rector of the school of Cologne in 1249; in 1254 he was made provincial of his order in Germany; and in 1260 he received from Pope Alexander IV. the appointment of Bishop of Ratisbon. In 1263 he resigned his charge and retired to his convent at Cologne, in order to devote himself to literary and scientific pursuits, and there he composed many works, especially commentaries on the writings of Aristotle. Among the sciences studied or illustrated by him were chemistry, botany, mechanics, optics, geometry, and astronomy. He fell into dotage some time previous to his death, in 1280. Albertus was probably the most learned man of his age, and of course did not escape the imputation of using magical arts and trafficking with the Evil One. He was distinguished for originality, and deserves to be gratefully remembered for his praiseworthy efforts toward the diffusion of knowledge. His followers were called Albertists.

**Albi**, or **Alby**, the capital of the Department of Tarn, France; the ancient Albiga; a stronghold of the Albigenses, to whom it gave their name. The Cathedral of St. Cecilia is chiefly of the 14th century, with Italian frescoes dating from about 1505. Pop. (1901), 22,571.

**Albigenses**, a religious sect opposed to the Church of Rome, coming first into prominence in the 12th century, and taking its name from Albiga, the old form of Albi, a city of Southern France, now capital of the department of Tarn. What their doctrines were has not been determined, as no formal statement of them was ever drawn up. It appears that the Albigenses held beliefs similar to those of the Cathari and Manicheans, the doctrines of the Cathari being traced to the Manichean sect known as Paulicians, that settled in Bulgaria, whence their tenets spread W. to France. They taught the doctrine of the Manicheans, that there are two opposing creative principles, one good, the other evil; the invisible world proceeding from the former, the body and all material things from the latter. "Their teachers assumed a great simplicity of manners, dress, and mode of life; they inveighed against the vices and worldliness of the clergy, and there was sufficient truth in their censures to dispose their hearers to believe what they advanced, and reject what they decried. They also rejected the Old Testament, said that infant baptism was useless, and denied

## Albinism

marriage to the 'perfect,' as they called their more austere members." (Addis and Arnold's "Catholic Dictionary.") They had increased very much toward the close of the twelfth century in the S. of France, about Toulouse and Albi, and in Raymond, Count of Toulouse, they found a patron and protector. As the condemnation of their doctrines by the Church produced no effect, ecclesiastical officials were specially sent by the Pope to endeavor to extirpate the heresy. The assassination of the papal legate and inquisitor, Peter of Castelnau, in 1208, led to the proclamation of a crusade against them by Pope Innocent III.

An army was accordingly collected, large numbers of those composing it being mere mercenaries and adventurers. The chief leader of the papal troops was Simon de Montfort, father of the well-known Earl of Leicester. Raymond's territories were ravaged, and in 1209 the legates, Arnold, abbot of Citeaux, and Milo, took Béziers, the capital of his nephew Roger, by storm, and put 20,000 of the inhabitants, without any distinction of creed, to the sword. Simon de Montfort was equally severe toward other places in the territory of Raymond and his allies, of whom Roger died in a prison and Peter I., King of Aragon, in battle. The lands taken were presented by the Church, as a reward for his services, to Simon de Montfort, who, however, was killed at the siege of Toulouse in 1218. Even after the death of Raymond VI., in 1222, under excommunication, his son, Raymond VII., was obliged, notwithstanding his readiness to do penance, to defend his inheritance against the legates and Louis VIII. of France, who fell in 1226 in a campaign against the heretics. After hundreds of thousands had fallen on both sides, a peace was made in 1229, by the terms of which Raymond was obliged to purchase his absolution with a large sum of money, to cede Narbonne, with several estates, to Louis IX., and make his son-in-law, a brother of Louis, heir of his other lands. The heretics were now delivered up to the proselytizing zeal of the Dominicans, and to the courts of the Inquisition; and the Albigenses gradually disappeared.

**Albinism**, a deficiency of pigment, occurring in man or the animals, and affecting not only skin and hair, but also, in the true albino, the iris and choroid membrane of the eye. In the human albino the skin is pale and transparent, the hair light flaxen or white, and the iris pink. The eye is sensitive to light, the albino being short-sighted by day (partially blind in sunlight), and seeing best at dusk. Albinism exists as an uncommon condition among several races, but is most frequently found in negroes. It is encountered in birds, mice, rabbits, and other animals; most con-



## Albino.

spicuously in the white elephant, which in Siam is considered sacred.

**Albino.** See ALBINISM.

**Albion**, the oldest name by which the island of Great Britain was known to the Greeks and Romans. Great Britain and Ireland were known by the general appellation of the *Britannic Islands*, while the former was designated by the particular name of *Albion* or *Alwion*, and the latter by that of *Ierne*, *Iouernia*, or *Erin*. Cæsar does not use the word *Albion*; his name for England is *Britannia*. Pliny says (iv:16): "The name of the island was *Albion*, the whole set of islands being called *Britannic*." The word *Albinn* is still the only name by which the Gaels of Scotland designate that country; and the word signifies, in the Gaelic language, white or fair island. The word *alb* itself is not now in use in the Gaelic, but is probably the same root that we find in the Latin adjective *alb-us*, and in the word "*Alps*"; *inn* signifies island.

**Albion College**, a co-educational institution in Albion, Mich., organized under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over \$250,000; endowment, \$280,000; scientific apparatus, \$30,000; income, \$55,000; volumes in the library, 19,000; professors and instructors, 26; students, 540; number of graduates since organization, over 950.

**Alboin**, a king of Lombardy, who, after having slain Cunimund, King of the Gepidæ, married his daughter Rosamond. He was slain in 574, by an assassin instigated by his wife. He had incurred her hatred by sending her, during one of his fits of intoxication, a cup, wrought from the skull of her father, filled with wine, and forcing her, according to his own words, to drink with her father. This incident has been introduced by Alfieri, in a very pathetic manner, in his tragedy called "*Rosmunda*."

**Alboni, Marietta** (al-bō'nē), an Italian contralto, born in Romagna, 1823. She made her debut as Orsini in "*Lucrezia Borgia*." After singing in Europe for some years, she made a successful tour of the United States. On the death of her husband, Count Pepoli, in 1866, she left the stage, and in 1877 she married M. Ziegir, a French officer. She died in France in 1894.

**Albret, Jeanne d'** (al-brā'), daughter of Margaret, Queen of Navarre, born in 1528. She married Antoine de Bourbon in 1548; gave birth in 1553 to a son, who was afterward Henry IV. of France; and on the death of her father, in 1555, became Queen of Navarre. She lost her husband in 1562, and eagerly began to establish the reformation in her kingdom. Being invited to the French court to assist at the nuptials of her son with Margaret of Valois, she suddenly ex-

## Albumen

pired, not without suspicion of having been poisoned. Died in 1572.

**Albright, Jacob**, an American minister of the Methodist Church, born in 1759. His work lay among the Germans of Pennsylvania. Becoming impressed with the decline of religious life and of the doctrines and morals of the surrounding churches, he began a work of reform in 1790. He traveled about the country at his own expense, preaching his mission, until he founded in 1800 the *EVANGELICAL ASSOCIATION* (q. v.). He died in 1808.

**Albuera** (al-bo-ā'rä), a village of Spain, in the province of Badajoz, on the Albuera river; 13 miles S. E. of Badajoz. Here (May 16, 1811) a British and Portuguese army of 32,500, under General Beresford, defeated in a sanguinary battle a French army of 23,000 under Marshal Soult, the total loss being 16,000, about equally divided. Soult tried to relieve Badajoz, which was besieged by the British, but was obliged to withdraw to Seville, while the allied British and Portuguese, of whom Wellington then took command, continued the siege.

**Albumen** or **Albumin**. (1) In chemistry, the name of a class of albuminoids that are soluble in water, as serum and egg albumen. Egg albumen differs from serum by giving a precipitate when agitated with ether; it is scarcely soluble in strong nitric acid; its specific relation is 35.50 for yellow light. The white of eggs is composed of this substance; it dries up into a light yellow gum-like substance, which will not putrefy. It is converted into coagulated albumen by heating the fluid albumen to 72° C. It contains sulphur, and blackens a silver spoon. It is precipitated by strong acids. It is an antidote in cases of poisoning by corrosive sublimate or copper salts. Coagulated albumen is obtained by heating neutral solutions of albumen, fibrin, etc., to boiling, or by the action of alcohol, also by heating precipitated albuminates or casein. It is insoluble in water, alcohol, and scarcely in dilute potash, but dissolves in acetic acid; by the action of caustic potash it is converted into albumenate. Pepsin and HCl (hydrochloric acid), at blood-heat, convert it into syntonin, and then into peptone.

Derived albumens are insoluble in water, and in solutions of NaCl (sodium chloride), but soluble in dilute acids and alkalis. There are acid albumens and alkali albumens.

Acid albumen is formed by adding a small quantity of dilute HCl (hydrochloric acid) to serum or egg albumen, and gradually raising the temperature to 70°. It does not coagulate and the rotation to the left is increased to 72°. By neutralizing the liquid,



a white flocculent precipitate is obtained, insoluble in water, but soluble in alkali and in dilute solutions of alkaline carbonates.

Alkali albumen, or albumenate, is obtained by adding very dilute caustic alkali, heating the liquid, and precipitating with acids. It closely resembles the casein of milk. Potassium albuminate is also called protein.

(2) In botany, a substance interposed between the embryo and the testa of many plants. It is sometimes soft and fleshy, and at other times hard. It varies greatly in amount in those plants in which it is present, being particularly large in some endogens, such as the cocoanut, in which it constitutes the eatable part of the fruit.

(3) In photography, a process by which albumen is used instead of collodion to coat glass or paper. A method of doing this in the case of glass was published by M. Niépce de Saint Victor in the "Technologist" for 1848. It was subsequently improved by M. le Gray. The foreign transparent stereoscopic views were at one time obtained by the use of albumen in the way now described.

**Albuminoids**, in chemistry, a name given to certain chemical substances which occur in the animal and vegetable tissues. They are amorphous, and their chemical constitution has not yet been discovered. They contain about 54 parts of carbon, 7 of hydrogen, 16 of nitrogen, 21 of oxygen, and 1 to 1½ of sulphur. They are dissolved by acetic acid and strong mineral acids; nitric acid converts them into xanthoproteic acid; caustic alkalies decompose them, forming leucine, tyrosine, oxalic acid, and ammonia. They are divided into the following classes: (1) Albumens, soluble in water; as serum and egg albumen. (2) Globulins, insoluble in water, soluble in very dilute acids and alkalies, soluble in a solution—one per cent.—of NaCl (sodium chloride), as myosin, globulin, fibrinogen, vitellin. (3) Derived albumens, insoluble in water, and in solutions of NaCl (sodium chloride), soluble in dilute acids and alkalies; as acid albumen, alkali albumens, or albuminates, as casein. (4) Fibrin, insoluble in water, sparingly soluble in dilute acids and alkalies, and in neutral saline solutions; as fibrin and gluten. (5) Coagulated proteids, soluble in gastric juice; as coagulated albumen. (6) Amyloids, or lardacein, insoluble in gastric juice.

**Albuminuria**, a disease characterized by the presence of albumen in the urine. It may be acute or chronic. Acute albuminuria is a form of inflammation of the kidneys. Chronic albuminuria, the commoner and more formidable malady, arises from grave constitutional disorders. It is often attended by or produces dropsy. Whether acute or chronic, but especially when the latter, it is generally called Bright's disease,

after Dr. Bright, who first described it with accuracy.

**Albuquerque** (al'be-kerk), a town and county-seat of Bernalillo co., N. M.; on the Rio Grande and the Atchison, Topeka and Santa Fé and the Santa Fé Pacific railroads; 75 miles S. W. of Santa Fé. It has an elevation of 5,000 feet above sea-level; is an ancient and interesting settlement, divided into the Old and New towns; and is the seat of the University of New Mexico and of a Government school for Indians. The town has extensive railroad shops, a foundry and machine works, a National bank, and large mining, trading, and jobbing interests. Pop. (1910) 10,020.

**Albuquerque, Affonso d'** (al'bö-kärk'e), "the Great," Viceroy of the Indies, was born in 1453, near Lisbon. In that age, the Portuguese people were distinguished for heroism and a spirit of adventure. They had discovered and subjugated a great part of the western coast of Africa, and were beginning to extend their dominion over the seas and the people of India. Albuquerque, being appointed Viceroy of these new possessions, landed on the Malabar coast in 1503, with a fleet and some troops; conquered Goa, which he made the seat of the Portuguese Government, and the center of its Asiatic commerce; and afterward Ceylon, the Sunda Isles, the Peninsula of Malacca, and (in 1515) the Island of Ormuz at the entrance of the Persian Gulf. When the King of Persia sent for the tribute which the princes of this island had formerly rendered to him, Albuquerque presented bullets and swords to the ambassador, saying: "This is the coin in which Portugal pays her tribute." He made the Portuguese name profoundly respected among the princes and people of the East; and many of them, especially the Kings of Siam and Pegu, sought his alliance and protection. He maintained strict military discipline, was active, far seeing, wise, humane, and equitable, respected and feared by his neighbors while beloved by his subjects. His virtues made such an impression on the Indian peoples that, long after his death, they resorted to his grave to implore his protection against the misgovernment of his successors. Yet he did not escape the envy of courtiers and the suspicions of his king, who appointed Soarez, a personal enemy of Albuquerque, to supersede him as Viceroy. This news reached him just as he was leaving Ormuz, and gave a severe shock to his shattered health. A few days after, he died at sea near Goa, Dec. 16, 1515.

**Alcæus** (al-kī'us or al-sē'us), a Greek lyric poet; native of Mitylene; flourished in the 6th century B. C. Of his poems we have only fragments; some were hymns to the gods, others battle songs, still others were



in praise of liberty; very many were love songs of pronounced erotic character. He is said to have been the literary model of Horace. He engaged in the civil war which convulsed his country at the time of the expulsion of the tyrants, and used both the lyre and the sword in the cause of liberty. In the beginning he took part with Pittacus, but subsequently against him. On account of his political activity he was compelled to leave his native country, and spent the latter part of his life in exile. He wrote in the Æolic dialect, and was the inventor of the meter which bears his name, one of the most beautiful and melodious of all the lyric meters.

**Alcala de Henares** (al-ka-lä' de ā-när'-ās), a town in Spain, Cervantes' birthplace, on the Henares, 21 miles E. of Madrid by rail. It once boasted of a university, founded by the famous Cardinal Ximenes in 1510, which enjoyed a European fame and was attended by thousands of students. It was removed to Madrid in 1836, and the town is now not a shadow of its former self. Here was printed in 1517, in six folio volumes, at an expense of 80,000 ducats, the great Complutensian Bible, a monument of the piety and learning of the great cardinal. The chief buildings are the Colegio de San Ildefonso, the seat of the ancient university, its chapel containing the founder's tomb; the archbishop's palace, the cathedral, and the Church of Santa Maria, in which Cervantes was baptized, Oct. 9, 1547. The house in which he was born is marked by an inscription. Pop. about 15,000. The Complutum of the Romans, the town owes its modern name to the Moors, under whom it was Al-Kalat, "the castle."

**Alcantara**, a former suburb of Lisbon, noted for the signal victory gained there by the Duke of Alva over the Portuguese in 1580.

**Alcantara**, a fortified town of Spain, capital of a district of the same name, Province of Estremadura, the Nova Cæsarea of the Romans. The famous bridge of Trajan, built A. D. 105, exists to-day practically as the Romans left it.

*Order of Alcantara.*—At the expulsion of the Moors in 1213, which was aided by the Knights of San Julian del Pereyro, the defense of the town was intrusted to them, and they thenceforward assumed the title of Knights of Alcantara. In 1492, Ferdinand the Catholic united the office of grand master with the crown. The Order has been since abolished. At their nominations, the knights might prove four generations of nobility. The crest of the Order was a pear tree.

**Alcazar** (äl-kä'thär), the name of many castles and palaces in Spain. Ciudad-Rodrigo, Cordova, Segovia, Toledo and Seville

have alcazars. The one at Seville is an imposing relic of the Arab dominion. The Alcazar of Segovia suffered from a fire in 1862, which ruined its most effective features. It has since been partially restored.



ALCAZAR IN SEGOVIA.

**Alcazar, Baltasar de**, a Spanish poet, born at Seville in 1530. His light poems, not very numerous, received flattering notice from Cervantes and others. He had, in his time, many imitators, but few equals. His best known poem is "The Jovial Supper." He died at Ronda, Jan. 15, 1606.

**Alcedo**, the typical genus of the family *alcedinidae*, or kingfishers. Two species occur in the United States, the *alcedo ispida*, and the *alcedo aleyon*.

**Alceste**, or **Alcestis**, was the daughter of Peleus, and wife of Admetus, King of Thessaly. Her husband, according to an oracle, would die, unless someone made a vow to meet death in his stead. This was secretly done by Alceste, who became sick, and Admetus recovered. After her decease, Hercules visited Admetus, and promised to bring her from the infernal regions. He made Pluto restore Alceste to her husband. Euripides has made this the subject of a tragedy.

**Alchemy**, a study of nature with three special objects: (1) That of obtaining an alkahest or universal solvent. (2) That of acquiring the ability to transmute all metals into gold or silver, especially the former. (3) That of obtaining an elixir vitæ, or universal medicine, which might cure all diseases and indefinitely prolong human life.

The word is derived from the Arabic *al-kimia*, compounded of the Arabic article and a Greek word *chemia*, used in Diocle-



tian's decree against Egyptian works treating of the *chemia* (transmutation) of gold and silver. The Greek word is now most usually explained to mean "the Egyptian art," and derived from the Egyptian name for Egypt, *Khmi*; but it was ultimately confounded with the true Greek *chumeia*, pouring, infusion. The latter form, which was possibly, however, the real original of *chemia*, justifies the renaissance spellings, alchemy and chymistry.

Tradition points to Egypt as the birthplace of the science. Hermes Trismegistus is represented as the father of it; but it should be remembered that the speculations of some of the early Greek philosophers, as of Empedocles, who first named the four elements, pointed in the direction of a rudimentary chemical theory. Zosimus the Theban discovered in sulphuric acid a solvent of the metals, and liberated oxygen from the red oxide of mercury. The students of the "sacred art" at Alexandria believed in the transmutation of the four elements. The Roman Emperor Caligula is said to have instituted experiments for producing gold out of orpiment (sulphuret of arsenic); and in the time of Diocletian the passion for this pursuit, conjoined with magical arts, had become so prevalent in the empire that that emperor is said to have ordered all Egyptian works treating of the chemistry of gold and silver to be burned. For at that time multitudes of books on this art were appearing, written by Alexandrian monks and by hermits, but bearing famous names of antiquity, such as Demoeritus, Pythagoras, and Hermes.

At a later period, the Arabs, who had enthusiastically adopted Aristotle from the Greeks, appropriated the astrology and alchemy of the Persians and the Jews of Mesopotamia and Arabia; and to them European alchemy is directly traceable. The school of polypharmacy, as it has been called, flourished in Arabia during the caliphates of the Abbassides. The earliest work of this school now known is the "*Summa Perfectionis*," or "Summit of Perfection," composed by Gebir in the 8th century; it is consequently the oldest book on chemistry proper. It contains so much of what sounds like jargon in our ears that Dr. Johnson (erroneously) ascribed the origin of the word "gibberish" to the name of the compiler. It is a kind of text book, or collection of all that was then known and believed. It appears that these Arabian polypharmacists had long been engaged in calcining and boiling, dissolving and precipitating, subliming and coagulating chemical substances. They worked with gold and mercury, arsenic and sulphur, salts and acids; and had, in short, become familiar with a large range of what are now called chemicals. Gebir discovered corrosive sublimate,

the process of eupellation of gold and silver, and distillation. He taught that there are three elemental chemicals—mercury, sulphur, and arsenic. These substances, especially the first two, seem to have fascinated the thoughts of the alchemists by their potent and penetrating qualities. They saw mercury dissolve gold, the most incorruptible of matters, as water dissolves sugar; and a stick of sulphur presented to hot iron penetrates it like a spirit, and makes it run down in a shower of solid drops, a new and remarkable substance, possessed of properties belonging neither to iron nor to sulphur. The Arabians held that the metals are compound bodies, made up of mercury and sulphur in different proportions. With these very excusable errors in theory, they were genuine practical chemists. They toiled away at the art of making "many medicines" (polypharmacy) out of the various mixtures and reactions of such chemicals as they knew. They had their pestles and mortars, their crucibles and furnaces, their alembics and aludels, their vessels for infusion, for decoction, for cohabitation, sublimation, fixation, lixiviation, filtration, coagulation, etc. Their scientific creed was transmutation, and their methods were mostly blind gropings; and yet, in this way, they found out many new bodies, and invented many useful processes. To the Arab alchemists we owe the terms alcohol, alkali, borax, elixir.

From the Arabs, alchemy found its way through Spain into Europe generally, and speedily became entangled with the fantastic subtleties of the scholastic philosophy. In the Middle Ages, the monks occupied themselves with alchemy. Pope John XXII. took great delight in it, but denounced the searchers for gold "who promise more than they can perform," and the art was afterward forbidden by his successor. The earliest authentic works on European alchemy now extant are those of Roger Bacon (1214–1294) and Albertus Magnus (1193–1280). Roger Bacon, who was acquainted with gunpowder, condemns magic, necromancy, charms, and all such things, but believes in the convertibility of the inferior metals into gold. Still, he does not profess to have ever effected the conversion, an idea which took firm possession of the imagination and, latterly, of the avarice of the Middle Ages. Their conception was that gold was the perfect metal, and that all other metals were so many removes or deflections from gold, in consequence of arrestment, corruption, or other accidents. Now, though gold, being simply perfect, could not, if mixed with the imperfect, perfect the latter, but would rather share its imperfections; yet, were a substance found many times more perfect than gold, it might well perfect the imperfect. Such a substance would be composed



of purest mercury and sulphur, commingled into a solid mass, and matured by wisdom and artificial fire into possibly a thousand thousand times the perfection of the simple body. This was the philosopher's stone. Roger Bacon followed Gebir in regarding potable gold — that is, gold dissolved in nitro-hydrochloric acid or aqua regia — as the elixir of life. Urging it on the attention of Pope Nicholas IV., he informs his holiness of an old man who found some yellow liquor (the solution of gold is yellow) in a golden vial, when ploughing one day in Sicily. Supposing it to be dew, he drank it off. He was thereupon transformed into a hale, robust, and highly accomplished youth. Albertus Magnus had a great mastery of the practical chemistry of his times; he was acquainted with alum, caustic alkali, and the purification of the royal metals by means of lead. In addition to the sulphur-and-mercury theory of the metals, drawn from Gebir, he regarded the element water as still nearer the soul of nature than either of these bodies. He is the first to speak of the affinity of bodies, a term he uses in reference to the action of sulphur on metals. Thomas Aquinas also wrote on alchemy, and was the first to employ the word amalgam. Raymonnd Lully is another great name in the annals of alchemy. He was the first to introduce the use of chemical symbols, his system consisting of a scheme of arbitrary hieroglyphics. He made much of the spirit of wine (the art of distilling spirits would seem to have been then recent), imposing on it the name of *aqua vitæ ardens*. In his enthusiasm, he pronounced it the very elixir of life. He wrote more than 500 works on alchemy.

Basil Valentine introduced antimony into medical use. He, along with some previous alchemists, regarded salt, sulphur, and mercury as the three bodies contained in the metals. He inferred that the philosopher's stone must be the same sort of combination — a compound, namely, of salt, sulphur, and mercury; so pure, that its projection on the baser metals should be able to work them up into greater and greater purity, bringing them at last to the state of silver and gold. His practical knowledge was great; he knew how to precipitate iron from solution by potash, and was acquainted with many similar processes, so that he is ranked as the founder of analytical chemistry.

But more famous than all was Paracelsus, in whom alchemy proper may be said to have culminated. He held, with Basil Valentine, that the elements of compound bodies were salt, sulphur and mercury — representing respectively earth, air and water, fire being already regarded as an imponderable — but these substances were in his system purely representative. All kinds of matter were reducible under one or

other of these typical forms; everything was either a salt, a sulphur or a mercury, or, like the metals, it was a mixed or compound. There was one element, however, common to the four; a fifth essence or quintessence of creation; an unknown and only true element, of which the four generic principles were nothing but derivative forms or embodiments: in other words, he inculcated the dogma that there is only one real elementary matter, nobody knows what. This one prime element of things he appears to have considered to be the universal solvent of which the alchemists were in quest, and to express which he introduced the term *alkahest*. He seems to have had the notion that, if this quintessence or fifth element could be got at, it would prove to be at once the philosopher's stone, the universal medicine, and the irresistible solvent. An often-quoted saying of his is "*Vita ignis, corpus lignum*." ("Life is the fire, the body the fuel.")

After Paracelsus, the alchemists of Europe became divided into two classes. The one class was composed of men of diligence and sense, who devoted themselves to the discovery of new compounds and reactions — practical workers and observers of facts, and the legitimate ancestors of the positive chemists of the era of Lavoisier. The other class took up the visionary, fantastical side of the older alchemy, and carried it to a degree of extravagance before unknown. Instead of useful work, they compiled mystical trash into books, and fathered them on Hermes, Aristotle, Albertus Magnus, Paracelsus, and other really great men. Their language is a farrago of mystical metaphors, full of red bridegrooms, and lily brides, green dragons, ruby lions, royal baths, waters of life. The seven metals correspond with the seven planets, the seven cosmical angels, and the seven openings of the head — the eyes, the ears, the nostrils and the mouth. Silver was Diana, gold was Apollo, iron was Mars, tin was Jupiter, lead was Saturn, and so forth. They talk forever of the power of attraction, which drew all men and women after the possessor: of the *alkahest* or universal solvent, and the grand elixir, which was to confer immortal youth upon the student who should prove himself fit to kiss and quaff the golden draft. There was the great mystery, the mother of the elements, the grandmother of the stars. There was the philosopher's stone, and there was the philosophical stone. The philosophical stone was younger than the elements, yet at her virgin touch the grossest calx (ore) among them all would blush before her into perfect gold. The philosopher's stone, on the other hand, was the first-born of nature, and older than the king of metals. Those who had attained full insight into the



arcana of the science were styled wise, those who were only striving after the light were philosophers, while the ordinary practicers of the art were called adepts. These visionaries formed themselves into Rosicrucian societies and other secret associations. In connection with this mock-alchemy, mixed up with astrology and magic, abounded the quackery and imposture depicted by Scott in the character of Dousterswivel in "The Antiquary." It is interesting to observe that the doctrine of the transmutability of other metals into gold and silver, a doctrine which it was at one time thought that modern chemistry had utterly exploded, receives not a little countenance from a variety of facts now coming to light, especially in connection with allotropy.

**Alcibiades**, son of Clinias and Deinomache, was born in Athens about 450 B. C. He lost his father in the battle of Coronea, (447), so was brought up in the house of his kinsman Pericles. In youth he gave evidence of his future greatness, excelling in both mental and bodily exercises. His goodly person, his distinguished parentage, and the high position of Pericles, procured him a multitude of friends and admirers. Socrates was one of the former, and gained considerable influence over him, but was unable to restrain his love of luxury and dissipation, which found ample means of gratification in the wealth that accrued to him by his union with Hipparete. His public displays, especially at the Olympic



ALCIBIADES.

games, were costly beyond belief. He first bore arms in the expedition against Potidæa (432), where his life was saved by Socrates—a debt which eight years later he repaid at Delium, by saving, in his turn, the life of the philosopher. He seems to have taken no part in political matters till after the death of the demagogue Cleon, when Nicias brought about a 50 years' treaty of peace between Athens and Lacedæmon. Alcibiades, jealous of the esteem in which Nicias was held, persuaded the Athenians to ally themselves with the people of Argos, Elis and Mantinea (420), and did all in his power to stir up afresh their ancient enmity to Sparta. It was at his suggestion that, in 415, they engaged in the Sicilian expedition, to the command of which he was elected, along with Nicias and Lamachus. But

while preparations were making, one night all the statutes of Hermes in Athens were mutilated. Alcibiades' enemies threw on him the blame of the sacrilege, but postponed the impeachment until he had set sail, when they stirred up the people against him to such a degree that he was recalled in order to stand his trial. On the voyage home, he landed in Italy, and thence crossed to Lacedæmon, where, by conforming to the strict Spartan manners, he soon became a favorite. He induced the Lacedæmonians to send assistance to Syracuse, to form an alliance with Persia, and to support the people of Chios in their effort to throw off the Athenian yoke. He went thither himself, and raised all Ionia in revolt. But Agis, and other leading Spartans, jealous of Alcibiades' success, ordered their generals in Asia to have him assassinated. Discovering the plot, he fled to Tissaphernes, a Persian satrap, who had orders to act in concert with the Spartans. He now resumed his old manners, adopted the luxurious habits of Asia, and made himself indispensable to Tissaphernes, representing to him that it was contrary to Persia's interests entirely to disable the Athenians. He then sent word to the Athenian commanders at Samos that he would procure for them the friendship of the satrap if they would establish an oligarchy at Athens. The offer was accepted, and the supreme power vested in a council of four hundred. When it appeared, however, that this council had no intention of recalling Alcibiades, the army of Samos chose him for a general, desiring him to lead them to Athens. But Alcibiades did not wish to return to his native country till he had rendered it some service; and during the next four years he defeated the Lacedæmonians at Cynossema, Abydos and Cyzicus; recovered Chalcedon and Byzantium, and restored to the Athenians the dominion of the sea. He then returned home (407), on a formal invitation, and was received with general enthusiasm. His triumph, however, was brief. He was sent back to Asia with a hundred ships; but his own ill-success against Andros, and the defeat of his lieutenant at Notium, enabled his enemies to get him superseded (406). He went into exile in the Thracian Chersonesus, and two years later crossed over to Phrygia, with the intention of repairing to the court of Artaxerxes. Historians differ as to why, and by whom the deed was done; but one night, in 404, his house was fired by a band of armed men; and, rushing out sword in hand, he fell pierced with a shower of arrows. Nature had gifted him with winning eloquence (though he stuttered in his speech, and could not articulate the letter *r*), and his in a rare degree was the power



to fascinate and govern men. In all his actions he allowed himself to be guided by circumstances, because he had no fixed principles of conduct. But he possessed the boldness that arises from conscious superiority; he shrank from no difficulty, because he was never doubtful of the means for attaining an end.

**Alcidæ**, or **Alcadæ**, a family of birds (natatores), including auks, penguins, puffins, and guillemots. They are oceanic, and have the bill compressed and pointed. Their wings are adapted for an aquatic life. The legs are short and placed so far back that, in resting, the birds appear to stand upright. Their food is principally fish.

**Alciphron** (al'si-frōn), a Greek rhetorician who flourished in the 2d century of the Christian era, and attained celebrity through his series of more than a hundred imaginary letters purporting to be written by the very dregs of the Athenian population, including courtesans and petty rogues. Their importance in literature is due almost wholly to the insight they afford into the social conditions and manners and morals of the day. The letters from the courtesans (*hetairai*) are based upon incidents in Menander's lost plays, and the new Attic comedy was likewise drawn upon for material.

**Alcmæon** (alk-mē'on), a son of Amphiarus and Eriphyle, was one of the heroes who took part in the successful expedition of the Epigoni against Thebes. He was charged by his father to put his mother to death, in revenge for her having urged her husband to take part in an expedition in which his foresight showed him he should perish. She had been gained over to urge this fatal course by a gift from Polynices of the fatal necklace of Harmonia. The matricide brought upon Alcmæon madness and the horror of being haunted by the Furies, but at Psophis he was purified by Phegeus, whose daughter he married, giving her the fatal present. But the land became barren in consequence of his presence, and he fled to the mouth of the river Achelous, the god of which gave him his daughter Collirrhoe in marriage. His new wife longed for the fatal necklace, and sent her husband to Psophis to procure it, under the pretence of dedicating it at Delphi; but Phegeus, learning for whom it was really intended, caused his sons to murder the ill-fated Alcmæon.

**Alcman**, one of the earliest and greatest of Greek lyric poets, belonging to the 7th century B. C. He is supposed to have been a native of Lydia, and to have been taken as a slave to Sparta. Only small fragments of his odes remain. He used the broad, homely Doric dialect. His poems were love ditties, hymns, pæans, processional chants, etc.

**Alcmene**, or **Alkmene** (alk-mē'nē), in Greek mythology, the daughter of Anaxo and Electryon, King of Mycenæ. She became the mother of Hercules through Zeus, who took the form of her husband, Amphitryon. Finally Zeus bade Hermes guide her to the Islands of the Blest, where she was happily united with Rhadamanthus.

**Alcohol**, a colorless, inflammable liquid, of agreeable odor, and burning taste, termed also spirit of wine, and ethylic or vinic alcohol.

In organic chemistry, alcohol is the name given to a class of compounds differing from hydrocarbons in the substitution of one or more hydrogen atoms by the monatomic radical hydroxyl (OH)'. Alcohols are divided into monatomic, diatomic, triatomic, etc., according as they contain 1, 2, or 3 atoms of H (hydrogen), each replaced by (OH)'. Alcohols may also be regarded as water in which one atom of H is replaced by a hydrocarbon radical. Alcohol can unite with certain salts, as alcohol of crystallization. The O in  $\begin{matrix} \text{H} \\ | \\ \text{O} \\ | \\ \text{H} \end{matrix}$  (water) can be replaced by S (sulphur),

as  $\begin{matrix} \text{H} \\ | \\ \text{S} \\ | \\ \text{H} \end{matrix}$  (hydrogen sulphide); so in alcohol,  $\begin{matrix} \text{C}_2\text{H}_5 \\ | \\ \text{H} \end{matrix}$  O, forming mercaptan,  $\begin{matrix} \text{C}_2\text{H}_5 \\ | \\ \text{H} \end{matrix}$  S.

Alcohol may also be compared with acids, as  $\begin{matrix} \text{Cl} \\ | \\ \text{H} \end{matrix}$  O (hypochlorous acid),  $\begin{matrix} \text{C}_2\text{H}_5 \\ | \\ \text{H} \end{matrix}$  O (alcohol); the H can be replaced by K or Na, as  $\begin{matrix} \text{Cl} \\ | \\ \text{Na} \end{matrix}$  O (sodium hypochlorite),

and  $\begin{matrix} \text{C}_2\text{H}_5 \\ | \\ \text{Na} \end{matrix}$  O (sodium ethylate), therefore, it can be considered a weak acid. Also it can be compared with bases,

as  $\begin{matrix} \text{K} \\ | \\ \text{H} \end{matrix}$  O (potassium hydrate) with acids forms salts and water. As  $\text{KHO} + \text{HCl} = \text{KCl}$  (potassium chloride) and  $\text{H}_2\text{O}$  (water),

so alcohol and acids form acid ethers and water:  $\begin{matrix} \text{C}_2\text{H}_5 \\ | \\ \text{H} \end{matrix}$  O +  $\begin{matrix} \text{H} \\ | \\ \text{Cl} \end{matrix}$  (hydrochloric acid)

$= \text{H}_2\text{O}$  and  $\text{C}_2\text{H}_5\text{Cl}$  (ethyl chloride). An alcohol is said to be primary, secondary, or tertiary, according as the carbon atom which is in combination with hydroxyl (OH) is likewise directly combined with one, two, or three carbon atoms. The hydrocarbon radicals can also have their carbon atoms linked together in different ways, forming isomeric alcohols. Primary alcohols, by the action of oxidizing agents, yield aldehydes, then acids; secondary alcohols, by oxidation, yield ketones; tertiary alcohols, by oxidation, yield a mixture of acids. Alcohols derived from benzol, or its substitution compounds, are called aromatic alcohols; they contain one or more benzol rings.



In chemistry, pure ethyl alcohol, also called absolute alcohol, is obtained by distilling the strongest rectified spirit of wine with half its weight of quicklime. Pure alcohol is a colorless, limpid liquid, having a pungent, agreeable odor and a burning taste. Its specific gravity at  $0^{\circ}$  is 0.8095, and at  $15.5^{\circ}$  is 0.7938, its vapor referred to air 1.613. It is very inflammable, burning with a pale blue, smokeless flame. It boils at  $78.4^{\circ}$  when anhydrous. It becomes viscid at  $-100^{\circ}$ . It mixes with water in all proportions, with evolution of heat and contraction of volume; and it readily absorbs moisture from the air, and from substances immersed in it. Chlorine converts alcohol into chloral,  $C_2HCl_3O$ , but in the presence of alkalies into chloroform,  $CHCl_3$ . By oxidation alcohol is converted into aldehyde,  $C_2H_4O$ , then into acetic acid,  $C_2H_4O_2$ . The alkaline metals replace one atom of H, forming  $C_2H_5NaO$  (sodium ethylate). Strong  $H_2SO_4$  (sulphuric acid) forms with alcohol  $(C_2H_5)H.SO_4$ , sulphovinic acid. HCl (hydrochloric acid) with alcohol yields ethyl chloride,  $C_2H_5Cl$ , and water. Alcohol can be formed by synthesis from the elements, C, H, O: thus acetylene,  $C_2H_2$ , can be formed by passing an electric current in an atmosphere of H. between carbon points; this is converted by nascent H into olefiant gas,  $C_2H_4$ , which is absorbed by  $H_2SO_4$  (sulphuric acid); by diluting with water, and distilling, alcohol is obtained. Alcohol is used as a solvent for alkaloids, resins, essential oils, several salts, etc. Alcohol is obtained by the fermentation of sugars, when a solution of them is mixed with yeast, *Myeoderma cervisiæ*, and kept at a temperature between  $25^{\circ}$  and  $30^{\circ}$ , till it ceases to give off  $CO_2$  (carbonic acid gas). It is then distilled. Proof spirit contains 49.5 per cent. of alcohol, and has a specific gravity of 0.9198 at  $20^{\circ} C$ . Methylated spirit contains 10 per cent. of wood spirit in alcohol of specific gravity 0.830; it is duty free, and can be used instead of spirits of wine for making chloroform, olefiant gas, varnishes, extracting alkaloids, and for preserving anatomical preparations, etc. Wines contain alcohol; port and sherry, 19 to 25 per cent.; claret and hock and strong ale, about 10 per cent.; brandy, whiskey, gin, etc., about 40 to 50 per cent. These liquids owe their intoxicating effects to the alcohol they contain.

**Alcoholism**, a term applied to the diverse pathological process and attendant symptoms caused by the excessive indigestion of alcoholic beverages. These differ if a large quantity is consumed at one time or at short intervals, or if smaller quantities are taken habitually; and hence they are subdivided into those due to (a) acute and (b) chronic alcoholism. To the acute forms of alcoholism belong the acute ca-

tarrh of the alimentary mucous membrane, rapid coma, some cases of delirium tremens, and certain special forms of acute insanity; while to the chronic class are referred the prolonged congestions, the fatty and connective tissue degenerations of the various organs and tissues, most cases of delirium tremens, nervous affections of slow onset and course, and the *æchexiæ* which in varying combinations attend a continuously immoderate consumption of alcohol.

**Treatment.**—In acute gastric catarrh, copious drafts of tepid water, followed by a saline purge, will be of benefit. Delirium tremens must be treated differently in the young and in the old. In the first attacks in young subjects, complete abstinence from alcoholics, milk diet, and moderate purgation, with bromide at night if the subject is sleepless. In older cases a mild purge should begin the treatment; light but very nourishing food should be given at short intervals. Milk, beef-tea, raw eggs beaten up with milk, strong soups, etc., are to be given freely. Sedatives should be given only with great caution, but, if necessary, a full dose of laudanum, 30 to 40 drops at bed-time, is of great value. In chronic alcoholism easily digested and nourishing foods should take the place of the stimulants. Bitter tonics, such as nuxvomica, quinine in small doses, calumba gentian, with carminatives, as chloroform, armoracia, and capsicum, come in service. If the stomach is irritable, alkalies, carbonated waters, or hydrocyanic acid will be found useful. In long standing cases, cod liver oil, arsenic, iron, and very small doses of opium are found of great benefit.

**Alcoholometer**, an instrument devised by Gay Lussac for measuring the proportion of pure alcohol which spirituous liquors contain. It is placed in the liquid to be tested, and the depth to which it sinks shows the proportion of alcohol in the mixture.

**Alcohol Thermometer**, a thermometer in which colored alcohol is used instead of mercury; employed for registering very low temperatures, as alcohol does not solidify at the greatest known cold.

**Alcott, Amos Bronson**, an American philosophical writer and educator, one of the founders of the transcendental school of philosophy in New England, born in Wolcott, Conn., Nov. 29, 1799. From 1834–1837 his private school in Boston, conducted on the plan of adapting the instruction to the individuality of each pupil, attracted attention. He was on terms of friendship with Emerson, Hawthorne, Channing, Thoreau, Margaret Fuller, and many other noted persons. After 1840 he lived in Concord, Mass., and was the projector and dean of the Concord School of Philosophy. Lectures on speculative and



practical subjects occupied his later years. His chief works are "Orphic Sayings," contributed to the "Dial" (1840); "Tablets" (1868); "Concord Days" (1872); "Table-Talk" (1877); "Sonnets and Canzonets" (1882); "Ralph Waldo Emerson, His Character and Genius" (1882); "New Connecticut" (1886). He died in Boston, March 4, 1888.

**Alcott, Louisa May**, an American author, daughter of the preceding, born in Germantown, Pa., Nov. 29, 1832; wrote at an early age; her "Flower Fables" (1855) and "Moods" (1865, revised edition, 1881) made little impression; but "Hospital Sketches" (1869), "Little Women" (1868), "Little Men" (1871), "Old-Fashioned Girl," "Aunt Jo's Scrap-Bag," "Rose in Bloom," and many others of like character and popularity, made her famous. She died in Boston, Mass., March 6, 1888. Few writers are more popular with children than Miss Alcott; she is a pleasant teacher, and her stories are valuable as giving insight into the more wholesome side of child-life and child-ways in the United States.

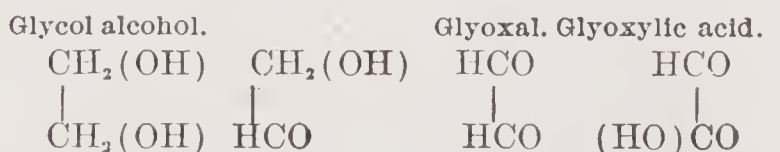
**Alcuin** (alk'win), an English ecclesiastic, born at York in 735. He was a pupil of Bede and of Egbert, whose librarian he became, and who appointed him director of the school of York. His reputation reached Charlemagne, who called him to France in 782 to aid in his designs for education in the empire. Charlemagne became himself a pupil of Alcuin, and the lectures given at the court were later given in a regular school, probably at Aix. Alcuin's teaching was in the seven liberal arts of that time, which included music and astronomy; and to these were added Biblical exegesis. Under his influence schools were established at Lyons, Orleans, and Tours, in order to instruct the benighted priests, even in the language (Latin) in which the Scriptures were written. He was so much trusted as to be made a member of the Council of Frankfort (794), where Felix, Bishop of Urgel, was condemned for heresy. Charlemagne loaded Alcuin with riches, and allowed him to have more than 1,000 slaves. Alcuin received the rich Abbey of St. Martin of Tours, where he reformed the dissolute morality of the monks and founded a school. He made with his own hand a copy of the Scriptures, which he presented to Charlemagne, and which became of great assistance to later editors. His importance lies not so much in his erudition as in the fact that he transplanted the wisdom of antiquity into the kingdom of Charlemagne, and thus into the greater part of Europe. Till his death here in 804, he still corresponded constantly with Charlemagne. His works comprise poems, works on grammar, rhetoric, and dialectics, theo-

logical and ethical treatises, lives of several saints, and over 200 letters.

**Alcyonium**, in zoology, a genus of polyps; the typical one of the family *alcyonidæ*. The alcyonium digitatum is found on the British coast, and is known as "dead men's fingers," "dead men's toes," and "cow's paps." These names are applied to the alcyonium from its resemblance to finger-shaped masses, each of which masses consists of a colony of several hundred polyps united to form a composite organism. They are found attached to stones, mussel shells, and other objects. The alcyonium carneum abounds on the shores of America N. of the latitude of Cape Cod.

**Aldborough**, or **Aldeburgh**, a small seaport and watering-place of Suffolk, 29 miles N. E. of Ipswich by rail. It was disfranchised in 1832; but in 1885 it received a new municipal charter. It has a quaint, half-timbered Moot hall; and in the church is a bust of the poet Crabbe, who described the place in his poem, "The Borough." It has a 2-mile promenade and lobster and herring fisheries. Pop. 2,159.

**Aldehydes**, in chemistry, compounds formed by the oxidation of alcohols, and are reconverted into alcohols by the action of nascent hydrogen; by further oxidation they are converted into acids. They differ from alcohols in having two atoms less of hydrogen, which are removed from the carbon atom containing the radical HO' (hydroxyl) connected to it in the alcohol; thus the aldehyde monatomic radical is (O=C—H)'. The carbon atom having two bonds united to an atom of oxygen, and another to an atom of hydrogen, the fourth is united to a monatomic hydrocarbon radical, or hydrogen. From monatomic alcohols only one aldehyde can be formed; from a diatomic alcohol there may be formed a diatomic aldehyde containing the radical (OCH)' twice, or an alcohol aldehyde, or acid aldehyde: thus, glycol alcohol could yield



Many aldehydes of monatomic alcohols have been prepared by oxidation of the alcohols, or by distilling a mixture of the potassium salt of the corresponding acid with potassium formate, which yields potassium carbonate and the aldehyde. Aldehydes form crystalline compounds with acid sulphites; they also unite with aniline. Ketones are aldehydes in which the atom of hydrogen united to the radical (CO)' is replaced by a hydrocarbon radical.

**Alden, Henry Mills**, an American editor and prose writer, born at Mount



## Alden

Tabor, Vt., Nov. 11, 1836. He was graduated at Williams College and Andover Theological Seminary; settled in New York in 1861, became managing editor of "Harper's Weekly" in 1864, and editor of "Harper's Monthly Magazine" in 1868, which post he now holds. He has published "The Ancient Lady of Sorrow," a poem (1872); "God in His World" (1890); and "A Study of Death" (1895).

**Alden, John**, a magistrate of the Plymouth colony, born in 1599. His name is familiarized by the poem of Longfellow, "The Courtship of Miles Standish." He was originally a cooper of Southampton, was employed in making repairs on the ship "Mayflower," and came over in her with the Pilgrim Fathers. By some accounts he was the first to step ashore at Plymouth. In Longfellow's poem he is in love with and eventually marries Priscilla, with whom he had previously pleaded the cause of Miles Standish. He was for over 50 years a colonial magistrate. He died in 1687.

**Alden, William Livingston**, an American humorous writer and journalist, born at Williamstown, Mass., Oct. 9, 1837. He introduced the sport of canoeing into the United States. He was for a time United States Consul-General at Rome. Among his principal writings are "Domestic Explosives" (1877); "Shooting Stars" (1878); "The Canoe and the Flying Proa" (1878); "Moral Pirates" (1880); "The Comic Liar" (1882); "Cruise of the Ghost" (1882); "Life of Christopher Columbus" (1882); "A New Robinson Crusoe" (1888), etc.; London correspondent "New York Times," 1900. He died Jan. 14, 1908.

**Aldenhoven**, a town of Prussia, Rhine province; 12 miles N. E. of Aix-la-Chapelle. Here the French, in 1793, under Dumouriez, were defeated by 50,000 Austrians, under Prince Josias of Coburg, and were prevented

from making their contemplated invasion of Holland. In 1794 the French under Jourdon, numbering 35,000, conquered the Austrians under Clerfayt.



BLACK ALDER.

**Alder**, the common name for a genus of plants (*alnus*), of the order *cupiliferæ* (oak family). In the Eastern United States it is a very common shrub, branching freely from the roots, and forming dense clumps along the banks of streams and in other wet places. On the W. coast it often attains a height of from 40 to 60 feet in favorable locations. It is found in temperate and cold

## Alderney

regions. The species familiar in England has a wood soft and light, but very durable in the water, and, therefore, well adapted to mill work, sluices, piles of bridges, etc. Its bark and shoots are used for dye, and its branches for the charcoal employed in making gunpowder. The names black, red and white alder are often popularly applied to plants of other orders.

**Alderman**, a title pertaining to an office in the municipal corporations of Great Britain and the United States. In early Saxon times the term was indefinitely applied, and was generally given to a person possessed of an office of rank or dignity. The title, Alderman of all England, was applied to the first subject of the realm, corresponding to the latter chief justiciary. Other aldermen, or ealdermen, were governors of counties; hence the English word earl. Even kings were so called. In modern times the organization and functions of boards of aldermen vary considerably in the English speaking countries, and also in different cities of the same country. In the court of the corporation of London the aldermen have legislative and judicial authority, and are elected for life. In other corporations of England, Wales, and Ireland, they are elected for six years, one half going out every three years. The corresponding officer in Scotland is entitled bailie. In the United States the powers and duties of aldermen differ in the various States and cities. As a rule they are elected by popular vote and constitute the source of municipal legislation.

**Alderman, Edwin Anderson**, an American educator, born in Wilmington, N. C., May 15, 1861; was graduated at the University of North Carolina in 1882; was superintendent of the Goldboro city schools in 1884-1887; Assistant State Superintendent of Public Instruction in 1889-1892; Professor of English in the State Normal College in 1892; and Professor of Pedagogy in the University of North Carolina in 1892-1896. In the last year he was chosen President of the University of North Carolina, in 1900-1905 was President of Tulane University in New Orleans, then of the University of Virginia; works include "Life of William Cooper," "School History of North Carolina," etc.

**Alderney** (French, *Aurigny*; Latin, *Riduna*), a British island in the English channel, 55 miles S. by E. of Portland Bill, 15 N. E. of Guernsey, 31 N. of Jersey, and 10 W. of Cape la Hague. The Race of Alderney, or strait that separates it from the coast of Normandy, is very dangerous in stormy weather. The length of the island is  $4\frac{1}{4}$  miles; its extreme breadth,  $1\frac{1}{2}$  miles; and its area is 1,962 acres, or three square miles. The highest point is 281 feet above sea level. To the S. the coast is bold and lofty; to the N. it descends, forming numer-



ous small bays, one of which has been formed into a fine, though uncompleted, harbor, with a granite breakwater, at a cost, including strong fortifications, of more than \$6,000,000. The Caskets are a small cluster of dangerous rocks,  $6\frac{3}{4}$  miles to the W., on which are three lighthouses. The soil in the center of the island is highly productive; and the Alderney cattle, a small but handsome breed, have always been celebrated. The climate is mild and healthy, and good water abounds. Education to some extent is universal. The population was originally French, but half the inhabitants now speak English, and all understand it. Protestantism has prevailed here since the Reformation. Alderney is a dependency of Guernsey, and subject to the British crown. The civil power is vested in a judge appointed by the crown, and six jurats chosen by the people. These, with 12 popular representatives or *douzeniers* (who do not vote), constitute the local legislature. The town of St. Anne is situated in a picturesque valley near the center of the island. It has an Albert memorial in the shape of a Gothic arch, and a cruciform church (1850) in the Early English style, with a tower 104 feet high. Pop. about 2,000.

**Aldershot Camp**, a permanent camp of exercise on the confines of Hampshire, Surrey, and Berkshire, 35 miles S. W. of London, and  $18\frac{1}{2}$  miles S. of Windsor. It was established in 1855 after the Crimean War, to provide for practical instruction in tactics, outpost duties, and other exercises requiring a wide tract of country and large bodies of troops, etc. From its situation on the Bagshot Sands it is extremely healthy; the old wooden huts have been superseded by brick huts and barracks. The Basingstoke canal, running directly across the Heath, has occasioned a division into North Camp and South Camp. There are usually from 10,000 to 15,000 troops of all arms at the camp; and a considerable town has sprung up near it, with a pop. (1891) of 25,595.

**Aldine Editions**, the books printed by Aldus Manutius and his family, in Venice (1490–1597). They comprise the first editions of Greek and Roman classics; others contain corrected texts of modern classic writers, as of Petrarch, Dante, or Boccaccio, carefully collated with the MSS. All of them are distinguished for the remarkable correctness of the typography; the Greek works, however, being in this respect somewhat inferior to the Latin and Italian. The editions published by Aldo Manuzio (1450–1515), the father, form an epoch in the annals of printing, as they contributed in no ordinary measure to the perfecting of types. No one had ever before used such beautiful Greek types, of which he got nine different kinds made, and of Latin as many as 14.

It is to him, or rather to the engraver, Francesco of Bologna, that we owe the types called by the Italians *Corsivi*, and known to us as italics, which he used for the first time in the octavo edition of ancient and modern classics, commencing with Vergil (1501). Manuzio's impressions on parchment are exceedingly beautiful; he was the first printer who introduced the custom of taking some impressions on finer or stronger paper than the rest of the edition—the first example of this being afforded in the "Epistolæ Græcæ" (1499). From 1515 to 1533 the business was carried on by his father and brothers-in-law, Andrea Torresano of Asola, and his two sons—the three Asolani. Paolo Manuzio (1512–1574), Aldo's son, possessed an enthusiasm for Latin classics equal to that of his father for Greek; and he was succeeded by his son, the younger Aldo (1547–1597). The printing establishment founded by Aldo continued in active operation for 100 years, and during this time printed 908 different works. The distinguishing mark is an anchor, entwined by a dolphin, with the motto either of "*Festina lente*" or of "*Sudavit et alsit*." The demand which arose for editions from this office, and especially for the earlier ones, induced the printers of Lyons and Florence, about 1502, to begin the system of issuing counterfeit Aldines. The Aldo-mania has considerably diminished in later times. Among the Aldine works which have now become very rare may be mentioned the "Horæ Beatæ Mariæ Virginis," of 1497, the "Vergil" of 1501, and the "Rhetores Græci," not to mention all the editions, dated and undated, from 1490 to 1497, which are now extremely rare. See Renouard's "Annales de l'Imprimerie des Aldes" (1834), and Didot's "Alde Manuce" (1873).

**Aldrich, Thomas Bailey**, an American poet, essayist, and writer of fiction, born in Portsmouth, N. H., Nov. 11, 1836. He spent his early youth in Louisiana, but at the age of 17 entered a mercantile house in New York. Removing to Boston in 1866, he became editor of "Every Saturday," and, in 1881, editor of the "Atlantic Monthly." He has become almost equally eminent as a prose writer and poet. Among his prose works the best known are "The Story of a Bad Boy" (1870); "Marjorie Daw and Other People" (1873); "Prudence Palfrey" (1874); "The Queen of Sheba," a romance of travel (1877); "The Stillwater Tragedy" (1880). Of his poems, most are included in "Complete Poems" (1882) and "Household Edition" (1895). He died March 19, 1907.

**Aldridge, Ira**, an American negro actor, called the African Roseius, born in 1810. He was educated in England for the minis-



## Ale

try, which he abandoned for the stage, and made his debut in London as Othello. He was rated as one of the best tragedians of his day. He played in the provinces till 1852; then on the continent won a high reputation, which London refused to endorse (1857); and finally died at Lodz, in Poland, in 1867.

**Ale**, the current name in England for malt liquor in general before the introduction of "the wicked weed called hops" from the Netherlands, about the year 1524. The two names, ale and beer, are both Teutonic, and seem originally to have been synonymous. According to the "Alvismal," a didactic Scandinavian poem of the 10th century, it is called ale among men, and among the gods, beer. The word ale is still the name for malt liquor in the Scandinavian tongues (Swedish, Danish, and Icelandic, *öl*). The hopped liquor came to be called beer, and now this is the generic name in the trade for all malt liquors. The popular application of the two words varies in different localities. In the eastern counties of England, and over the greater portion of the country, ale means strong, and beer, small, malt liquor; while in the W. country, beer is the strong liquor, and ale the small. As now used, ale is distinguished from beer chiefly by its strength and the quantity of sugar remaining undecomposed. Strong ale is made from the best pale malt; and the fermentation is allowed to proceed slowly, and the ferment to be exhausted and separated. This, together with the large quantity of sugar still left undecomposed, enables the liquor to keep long without requiring a large amount of hops. The Scotch ales are distinguished for the smallness of the quantity of hops they contain, and for their vinous flavor. They are fermented at an unusually low temperature. The ales of Edinburgh, Wrexham, and Alloa have a high reputation. Burton ale is the strongest made, containing as much as 8 per cent. of alcohol; while the best brown stout has about 6 per cent., and table-beer only 1 or 2 per cent. India pale ale differs chiefly in having a larger quantity of hops.

**Aleardi, Aleardo, Count** (ä-lä-är'dē), an Italian poet and patriot, born near Verona, Nov. 4, 1812; studied first philosophy and natural science, and then jurisprudence. His political principles, as revealed in his poem "Arnaldo" (1842), brought him under suspicion, and public office under the (Austrian) government was denied him. Others of his works are "Primal Histories" (1857), a poem on the intellectual, ethical and social evolution of man; "An Hour in My Youth," a piece inspired at once with tenderest love of nature and intense devotion to Italian independence; "Letters to Mary," "Raphael and the Fornarina," "The

## Alemanni

Maritime Cities of Italy," and "A Political Ode," directed against Pope Pius IX. (1862). He died in Verona, July 17, 1878.

**Alectryomancy**, imagined divination by means of a cock. A circle being described upon the ground, and divided into 24 equal parts, each with a letter of the alphabet traced in it, a grain of wheat was laid on the top of a letter and a cock was turned loose into the area, careful note being taken as to what grains of wheat he ate. The letters under the eaten grains were then made into a word or words, and were taken as a prophecy or divination. The practice is said to have existed during the declining period of the Roman empire. The Emperor Valens, when he learned that the cock answered the question as to his successor by picking out the Greek letters *ΘΕΟΔ* caused many whose names began with Theod to be put to death. Nevertheless, his successor was Theodosius the Great.

**Aleman, Matteo** (ä-lä-män'), a Spanish novelist, born in Seville about 1550. For some time an official in the royal treasury, he resigned or was dismissed in consequence of an annoying lawsuit, and about 1608 went to Mexico. His fame rests on the satirical romance, "The Life and Deeds of the Píearoon Guzman de Alfarache," which, like its forerunner and model, the "Lazarillo de Tormes," by Mendoza, is one of the most famous representatives of the "picaresque" novel. Its first part, under the title of "Watch-Tower of Human Life," appeared in 1599 in three editions, and up to 1605 attained to 26 more editions, of over 50,000 copies. This immense success induced a literary freebooter to publish a spurious second part in 1603, which was followed by the genuine in 1605. The work was translated into every European language, and, in 1623, even into Latin. The best edition of the original is in volume three of Aribau's "Library of Spanish Authors" (Madrid, 1846). He died in Mexico after 1609.

**Alemanni, or Alamanni**, a confederacy of several German tribes which, at the commencement of the 3d century after Christ, lived near the Roman territory, and came then and subsequently into conflict with the imperial troops. Caracalla first fought with them in 213, but did not conquer them; Severus was likewise unsuccessful. About 250 they began to cross the Rhine westward, and in 255 they overran Gaul along with the Franks. In 259 a body of them was defeated in Italy at Milan, and in the following year they were driven out of Gaul by Postumus. In the 4th century they crossed the Rhine and ravaged Gaul, but were severely defeated by the Emperor Julian and driven back. Subsequently they occupied a considerable territory on both sides of the Rhine; but at last Clovis broke their



power in 496 and deprived them of a large portion of their possessions. Part of their territory was latterly formed into a duchy called Alemannia or Suabia, this name being derived from Suevi or Suabians, the name which they gave themselves. It is from the Alemanni that the French have derived their names for Germans and Germany in general, namely, Allemands and Allemagne, though strictly speaking only the modern Suabians and Northern Swiss are the proper descendants of that ancient race.

**Alembert, Jean le Rond d'**, one of the most distinguished mathematicians and literary characters of the 18th century; born in Paris, Nov. 16, 1717; was the natural son of Madame de Tencin and a M. Destouches, a commissary of artillery. The infant was exposed on the steps of the Church of St. Jean le Rond soon after its birth, and appeared so weak that the police officer who found it, instead of carrying it to the foundling hospital, committed it to the care of the wife of a poor glazier. By her he was brought up, and with her he lived for more than 30 years, leaving the humble abode only when compelled by the state of his health and the strict injunctions of several physicians. His parents never publicly acknowledged him, but his father settled upon him an income of 1,200 livres, a sum which was then amply sufficient to procure the necessaries of life. He showed much facility in learning, and at the age of four years was sent to a boarding school. He was but 10 years old when the principal, a man of merit, declared that he could teach him no more. He entered the College Mazarin at the age of 12. His talents surprised his instructors, who thought they had found in him a second Pascal to support the cause of the Jansenists, with whom they were closely connected. He wrote, in the first years of his philosophical studies, a commentary on the Epistle of Paul to the Romans. But when he began to study mathematics this science captivated him so much that he renounced all theological questions. He left college, studied law, became an advocate, but did not cease to occupy himself with mathematics. A pamphlet on the motion of solid bodies in a fluid, and another on the integral calculus, which he laid before the Academy of Sciences in 1739 and 1740, showed him in so favorable a light that the Academy received him in 1741 into the number of its members. He soon after published his famous work on dynamics, "*Traité de Dynamique*" (1743), which may be said to have formed an epoch in the science; and that on fluids, "*Traité des Fluides*." In 1746 his "*Memoire sur la Cause générale des Vents*" obtained the prize offered by the Academy of Berlin, of which he was chosen a member. Among his communications to this academy two are

highly distinguished — one on pure analysis, and another which treats of the vibrations of strings. He also took a part in the investigations which completed the discoveries of Newton respecting the motion of the heavenly bodies. While Euler and Clairaut were engaged in these he delivered in 1747, to the Academy of Sciences, a solution of the problem proposed to determine what disturbances are occasioned by the mutual attraction of the planets in their elliptical revolutions round the sun, and what their motion would be if they were acted on only by the attractive power of the sun. He continued these labors for several years, and published at intervals various important astronomical treatises, including one on the precession of the equinoxes; also his experiments on the resistance of fluid bodies, and a number of dissertations on other subjects — works of the value of which there is but one opinion among scholars, but which produced a coldness on the part of Euler and others. In the first fervor of his fondness for mathematics he had for a time become indifferent to literature, but his early love of it was revived after his most important discoveries, when mathematical investigations ceased to afford him so rich a harvest of new truths, or he felt the necessity of relaxation. He entered on this new career with his "*Discours Préliminaire to the Encyclopédie*," which will always be a pattern of style in treating of scientific subjects, uniting as it does elegance and precision. D'Alembert comprised in his "*Discours*" the essence of all his knowledge of mathematics, philosophy, and literature, acquired in a study of 20 years, and this was all that was known at that time in France on these subjects. He undertook to prepare the mathematical part of the "*Encyclopédie*," and wrote a great number of excellent articles. His name being prefixed to this work he shared its fate, and exposed himself to numberless quarrels. D'Alembert soon after entered the French Academy, and continued to cultivate literature together with mathematics. His literary works are distinguished by purity of language, clearness of style, and force of thought. Although he experienced much persecution, on account of his connection with the "*Encyclopédie*," and was neglected by the government of his country, he would not accept the invitations of Frederick II. to settle in Berlin, nor the offers of the Russian empress, Catherine II., who desired him to take charge of the education of her son, with a pension of 100,000 livres. Though his income was always moderate his beneficence was great. His long attachment to Mdlle. de l'Espinasse shows that he was not destitute of deep and lasting affection. He died Oct. 29, 1783. Frederick II., who had in 1763 become personally acquainted with D'Alembert, maintained a correspondence with him, which was pub-



## Alembic

lished after the death of both, and is very interesting.

**Alembic**, a simple apparatus sometimes used by chemists for distillation. The cucurbit, or body, contains the substance to be distilled, and is usually somewhat like a bottle, bulging below and narrowing toward the top; the head, of a globular form, with a flat under-ring, fits on to the neck of the cucurbit, condenses the vapor from the heated liquid, and receives the distilled liquid on the ring inclosing the neck of the lower vessel, and thus causes it to find egress by a discharging pipe into the third section, called the receiver.

**Alemtejo**, a province of Portugal. Its surface is undulating, being broken only by low hills. In the S. and W., where the climate is hot and dry, grazing is carried on, many sheep and goats being raised. In the E. the hills are covered with fine forests, and in the fertile valleys grapes, olives, lemons, figs, and other fruits are cultivated. The principal rivers, which rise in Spain, are the Guadiana in the S. and the Tagus in the N. The capital is Evora. Area of province 9,417 square miles. Pop. (1890) 393,000.

**Alencar, Jose Martiniao de** (ä-län-kär'), a Brazilian novelist, born at Fortaleza, May 1, 1829. A lawyer by profession, he was also active as a conservative politician, and in 1868-1869 was Minister of Justice. His novels, in the style of Cooper, treat subjects from Brazilian history, and city and country life, chiefly based on Indian traditions, and contain masterly descriptions of tropical nature. He died in Rio de Janeiro, Dec. 12, 1877.

**Alençon** (al-an-sôn'), an ancient county of France; united to the crown in 1212 by Philip Augustus. Later it became a duchy, dependent on the house of Valois. JEAN IV., born in 1409, in 1417 lost the duchy to the King of England. He distinguished himself in the wars against England and, when they were driven out, received his duchy back. Twice he was condemned to death on account of supposed intrigues in favor of England against Charles VIII. and Louis XI., but was pardoned, and died in 1476. RENE, son of Jean IV., aroused suspicion, and Louis XI., in 1481, had him confined three months in an iron cage. After the death of Louis XI. he received his freedom, title, and estates back from Charles VIII., and died Nov. 1, 1492. The son of René, Duke CHARLES IV., born in 1489, married MARGUERITE DE VALOIS, sister of Francis I. At the battle of Pavia, he was commander of the left wing. At a decisive moment he and his troops took to flight and caused the misfortune of the day, the capture of King Francis I. He died April 11, 1525, and with him perished the house of Alençon. His wife, MARGUERITE, re-

## Aleppo

mained in possession of the duchy until her death in 1549. From 1549 to 1566, CATHERINE DE MEDICI was Duchesse d'Alençon, and Charles IX. presented it to his younger brother, FRANCIS OF ANJOU. After his death it was reunited to the crown. Henry IV. transferred the duchy in 1595 to the Duke of Würtemberg, who willed it in 1688 to his son, from whom, in 1612, Marie de Medici purchased it back for the crown. Since that time the title has been several times used by the princes of the royal house. It is now borne by the second son of the Duke Philippe de Nemours.

**Alençon**, a city of France, and capital of the Department of Orne, on the Sarthe, 65 miles by rail W. S. W. of Paris. Its Cathedral of Notre Dame, built between 1553 and 1617, is in the Gothic style. The entrance has a handsome tower and porch flanked by graceful turrets. The most noticeable features of this cathedral are the fine vaults, stained glass windows, renaissance organ loft, canopied altar and pulpit. The Hôtel de Ville was built in 1783 on the site of the ancient castle of the Dukes of Alençon, two of the towers of which are still preserved and used as prisons. The new palace of justice is a beautiful building. The town has a lyceum, a small but elegant museum and a library of 15,000 volumes. It has manufactories of muslin, linen, leather, and a lace called point d'Alençon. It has also a lively trade in horses, and every January a horse market is held there. During the Franco-Prussian War the city was captured by the Grand Duke of Mecklenburg. Pop. (1901), 17,270.

**Aleppo**, a city of Turkey in Asia, in Northern Syria, and capital of the *vilayet* of Aleppo; on the Koeik river, 71 miles E. of the Mediterranean. The foundation of Aleppo dates back to about 2,000 years B. C. Its first name was Khaleb, which the Greeks called Chlybon. After the fall of Palmyra, it became of great importance. Seleucos Nikator beautified the city and called it Beroyia, which name it bore till its conquest by the Arabs; then the name was Haleb, which the Italians called Aleppo. It was conquered by the Saracens in 636; was the seat of a Seljuk sultanate in the 11th and 12th centuries; was plundered by Timur in 1402; in the 15th century became the great emporium of trade between Europe and Asia; was taken by the Turks in 1517; and was nearly destroyed by an earthquake in 1822, when it lost two-thirds of its 250,000 inhabitants. The present inhabitants are Turks, Greeks, Armenians, and Jews. It consists of two parts, the middle city or Medine, and several suburbs, three of which are inhabited by Christians. The streets are well paved, although they have an Oriental appearance. There are



many quaint arches and most of the houses are of one story, built out of square blocks. In the middle of the city there is a hill about 65 meters high or 200 feet, perhaps of artificial origin, which contains an ancient castle with high towers. The water is provided for the city by an ancient aqueduct. In the Middle Ages it had a very important trade with the Italians. In spite of the earthquakes and insurrections which devastated the city, there is now a great trade there in the hands of the Greeks and Mohammedans. Their chief exports are apples, dye stuffs, cotton, tobacco, wheat, nuts, oil, etc. Pop. about 127,000.

**Alesia**, a town in the E. of ancient Gaul, the siege and capture of which formed one of Cæsar's greatest exploits. Vercingetorix, after several defeats, had shut himself up with 80,000 Gauls in Alesia, which was situated on a lofty hill. Cæsar, with his army of 60,000 men, completely surrounded the place; and in spite of the desperate efforts of the besieged, the town was obliged to surrender. Alesia was destroyed by the Normans in 864. Near the site stands the modern village of Alise-Sainte-Reine, in Côte d'Or, W. of Dijon. On the hill Napoleon III. erected, in 1864, a colossal statue of Vercingetorix.

**Alessandria**, city and capital of the Province of Alessandria, Italy; on the river Tanaro. It was built in 1168 for protection against Emperor Frederick I. Its original name, Cæsarea, was changed to Alessandria in honor of Pope Alexander III. It was taken by Sforza, Duke of Milan, in 1522, by Prince Eugene in 1707, and ceded to Savoy in 1713 by the Peace of Utrecht. By the armistice of Alessandria, after the battle of Marengo (1800), all of North Italy as far as the Mineio was ceded to France. It was taken by the Austrians in 1821, and became the headquarters of the Piedmontese in the insurrection of 1848-1849. At present its fortress is one of the strongest in Europe. The city contains, exclusive of the garrison, about 35,000 inhabitants. The richly decorated cathedral was rebuilt in 1823. Two great fairs are held here annually. The city is the meeting point of several railway lines. The Province has an area of 1,980 square miles, and pop. (1906) 835,213. It is a fertile plain on the E. and the W. is hilly, with rich wooding. The city (pop. 71,298) has a considerable trade in linen, silk, and woolen stuffs, and artificial flowers.

**Alessandria, Armistice of**, an armistice concluded between Napoleon and the Austrians, after the defeat of the latter at Marengo. By it all of Italy N. of the Mincio was ceded to France.

**Aletes** (a-lē'tēz), in Greek legendary history, a son of Hippotes and descendant of Hercules; captured Corinth and expelled the

Sisyphids. His name, meaning the wanderer, may have been gained from the exile of his father for the murder of Carnus. The stories connected with his taking of Corinth are among the most interesting of Greek legends.

**Aleutian** (a-lū'shi-an) **Islands**, or **Catherine Archipelago**, a group of about 150 islands, extending W. from Alaska peninsula for a distance of 1,650 miles; belongs to Alaska Territory. The islands are mountainous, with several volcanic peaks. The principal islands are Umnak and Unalaska. The inhabitants are nearly all Aleuts, a people allied to the Eskimos. These islands were discovered by Bering in 1728. Pop. about 3,000.

**Alewife**, a North American fish (*clupea pseudoharengus*) belonging to the same family as the herring and the shad, and closely allied to them. It is caught in seines with the shad, in large quantities, at many places along the Atlantic coast from North Carolina to Nova Scotia, notably in Chesapeake Bay and the harbor of St. John, N. B. In the spring it ascends rivers as far as the head of the tidewater, to spawn, and returns in midsummer. When fully grown it is about 12 inches long. The name is given also to other related species of *clupea*, and to fish of other families, as the round pompano of the Bermudas and the allice-shad of England.

**Alexander**, a name of various ancient writers, philosophers, etc. (1) ALEXANDER of Ægæ; a peripatetic philosopher of the 1st century A. D.; tutor of Nero. (2) ALEXANDER the Ætolian; a Greek poet who lived at Alexandria about 285-247 B. C., reckoned as one of the seven poets constituting the tragic pleiad. (3) ALEXANDER of Aphrodisias, surnamed Exegetes; lived about 200 A. D.; a learned commentator on the works of Aristotle. (4) ALEXANDER CORNELIUS, surnamed Polyhistor, of the 1st century B. C. He was made prisoner during the war of Sulla in Greece and sold as a slave to Cornelius Lentulus, who took him to Rome, made him the teacher of his children and restored him to freedom. The surname Polyhistor was given him on account of his prodigious learning. The most important of his voluminous works was one in 42 books, containing historical and geographical accounts of nearly all the countries in the ancient world. (5) A Greek rhetorician and poet, surnamed Lychnus; lived about 30 B. C., wrote astronomical and geographical poems. (6) ALEXANDER NUMENIUS; a Greek rhetorician and teacher of elocution, of the 2d century A. D., two of whose works are historically known. (7) ALEXANDER the Paphlagonian; a celebrated impostor who lived about the beginning of the 2d century A. D., obtained a great in-



fluence with the people as an oracle; pretended to be Æsculapius reappeared. Lucian chiefly has made him known to us. (8) A Greek rhetorician of the 2d century A. D., surnamed Peloplaton, who vanquished Herodes Atticus in a rhetorical contest. (9) ALEXANDER PHILALETHES; a physician, of the 1st century B. C., who succeeded Zeuxis as president of the famous Herophilean school of medicine. (10) SAINT ALEXANDER (died 326 A. D.); the Patriarch of Alexandria from 312 A. D.; an opponent of Arius; member of the Council of Nice (325 A. D.); commemorated in the calendar Feb. 26. (11) ALEXANDER of Tralles; an eminent physician of Lydia, of the 6th century A. D.; author of two extant Greek works.

**Alexander**, the name of eight Popes. (1) ALEXANDER I., a bishop of Rome about 109 A. D., not then having the title of Pope, but now reckoned in the list. He is supposed to have died a martyr's death.

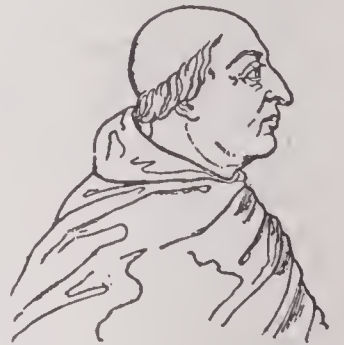
2. ALEXANDER II., Anselmo Baggio, a native of Milan; he lived for some time at the court of Henry III., and in 1056 or 1057 became Bishop of Lucca. In 1059 he became papal legate at Milan, and, on Oct. 1, 1061, through the zeal of Hildebrand, he was raised to the papal throne, consequently the imperial party elected Bishop Cadalus of Palmer, a rival Pope, as Honorius II. Alexander fought with him in 1062 in the vicinity of Rome and then withdrew to Lucca and, on the decision of the contest by Bishop Burchard of Halberstadt, he was sent by the German court to Italy and recognized as Pope. At the Council of Mantua in 1064, with the assistance of Anso of Cologne, he got possession of Rome against his rival. His reign, under the influence of Hildebrand, carried out the reform of the churches and their emancipation from secular control. When Henry IV. wished a divorce from his wife Bertha, Alexander, through his legate, Cardinal Pietros Damiana, decided against him and summoned the king to Rome to answer for his crimes, but shortly after he died, April 21, 1073.

3. ALEXANDER III. (died in 1181), Rolando Ranuci; Pope 1159-1181. His career is historically important because of his vigorous prosecution, in opposition to Frederick Barbarossa, of the policies begun by Hildebrand. Three anti-Popes, Victor IV., Pascal III. and Calixtus III., had been confirmed in succession by the emperor. Alexander succeeded, and after the decisive victory at Legnano compelled Frederick's submission. The papal struggle was carried on in England by Thomas à Becket, ending in a victory for Alexander. William the Lion, of Scotland, was excommunicated for opposing Alexander. Important changes were made by Alexander III., increasing ecclesiastical powers and privileges.

4. ALEXANDER IV., Pope 1254-1261; of weak character. His administration is signalized by attempts to unite the Greek and Roman Churches, and the establishment of the Inquisition in France (1255). He was the nephew of Gregory IX. In his battle with Manfred of Sicily, he suffered bitter humiliations and, deserted by his bishops, was obliged to escape from Rome. He died in Viterbo, in 1261.

5. ALEXANDER V., Pietro Philargi, of Candia. He was for some time professor in Paris, and in 1402 was made Archbishop of Milan, and in 1404 cardinal. In 1409, after the deposition of the rival Popes, Gregory XII. and Benedict XIII., he was elected Pope by the Council of Pisa, but was recognized by only a part of Christendom. He forbade the teaching of Wyclif in Bohemia, and vainly summoned Huss to be tried for his heresies. He died at the age of 70, and it was supposed by his contemporaries that he was poisoned by his successor, Balthasar Cossa (Pope John XXIII).

6. ALEXANDER VI., Rodrigo Lenzuoli Borgia, a Spaniard, of Valencia, son of Isabelle Borgia, whose family name he took, born Jan. 1, 1431. At first he studied law, and then was appointed by his uncle, Pope Calixtus III., a cardinal before he was 25 years old. In 1458 he was made Archbishop of Valencia, and as such he led a dissipated life. The beautiful Vanozza de Cataneis bore him four sons and a daughter. After the death of Innocent VIII. he was crowned Aug. 26, 1492, with great pomp and solemnity. To his son John, Duke of Gandia, he presented the duchy of Benevento, in 1497, which was separated from the estates of the Church. His daughter, Lucretia Borgia, was married to Giovanni Sforza, Lord of Pesaro, afterward to Alfonso di Biseglia, then thirdly to Alfonso d'Este, Prince of Ferrara. His son, Cæsar, who afterward got complete control of him, was made Archbishop of Valencia, and, in 1493, was appointed cardinal. Afterward, in order to create for him a secular principality, he made an alliance with Louis XII. of France. Cæsar Borgia, therefore, left the Church and became Duke of Valentinois. In 1501 he became Duke of the Romagna. On May 4, 1493, Alexander issued a bull dividing the New World between Spain and Portugal; on May 23, 1498, the execution of Savonarola took place by his order; and in 1501 he instituted the censorship of books. Alexander died Aug. 18, 1503, from poison said to have been intended for Cardinal Corneto.



POPE ALEXANDER VI.



## Alexander I.

7. **ALEXANDER VII.**, Fabio Chigi, of Siena, was, during the treaties of peace at Münster and Osnabrück, papal nuncio in Germany. He was chosen Pope April 7, 1665, through the influence of France. In 1661, in spite of the protests of the Jansenists, he confirmed the condemnation of the five Jansenist dogmas which had been indorsed by his predecessor, Innocent X. Later, he fell into controversy with Louis XIV. During his rule Rome was beautified in many directions, especially through the colonnade before St. Peters. He was himself a poet and friend of the arts and sciences. A collection of his poems appeared in 1656. Through the purchase of the library of Queen Christine of Sweden he enriched the Vatican with precious manuscripts.

8. **ALEXANDER VIII.** (1610-1691), Pietro Ottoboni, of Venice; Pope 1689-1691; assisted Italy in wars against the Turks; was a notable nepotist.

**Alexander I.**, Emperor of Russia, son of Paul I. and Maria, daughter of Prince Eugene, of Würtemberg; born Dec. 23, 1777. On the assassination of his father, March 24, 1801, Alexander ascended the throne, and soon after a ukase was published for diminishing the taxes, liberating debtors, etc. One of the first acts of his reign was to conclude peace with Great Britain, against which his predecessor had declared war. In 1803 he offered his services as mediator between England and France, and two years later a convention was entered into between Russia, England, Austria, and Sweden for the purpose of resisting the encroachments of France on the territories of independent States. He was present at the battle of Austerlitz (Dec. 2, 1805), when the combined armies of Russia and Austria were defeated by Napoleon. Alexander was compelled to retreat to his dominions at the head of the remains of his army. In the succeeding campaign the Russians were again beaten at Eylau (Feb. 8, 1807), and Friedland (June 14), the result of which was an interview, a few days after the battle, on a raft anchored in the Niemen, between Alexander and Napoleon, which led to the treaty signed at Tilsit, July 7. The Russian emperor now for a time identified himself with the Napoleonic schemes. The seizure of the Danish fleet by the British brought about a declaration of war by Russia against Great Britain and Sweden, and Alexander invaded Finland and conquered that long-oveted duchy, which was secured to him by the peace of Friedrichshamn (1809). In 1809-1812 war was carried on against Turkey. The French alliance, however, he found to be too oppressive, and his having separated himself from Napoleon led to the French invasion of 1812. In 1813 he published the famous manifesto which served as the basis of the coalition of the other European powers against France. After

## Alexander III.

the battle of Waterloo, Alexander, accompanied by the Emperor of Austria and the King of Prussia, made his second entrance into Paris, where they concluded (Sept. 26, 1815), the treaty known as the Holy Alliance. The remaining part of his reign was chiefly taken up in measures of internal reform, including the gradual abolition of serfdom, and the promotion of education, agriculture, commerce, and manufactures. He died in the Crimea, Dec. 1, 1825.

**Alexander II.**, Emperor of Russia; born April 29, 1818; succeeded his father Nicholas in 1855, before the end of the Crimean War. After peace was concluded the new emperor set about effecting reforms in the empire, among the first being the putting of the finances in order. The greatest of all the reforms carried out by him was the emancipation of the serfs by a decree of March 2, 1861. The czar also did much to improve education in the empire, and introduced a reorganization of the judicial system. During his reign the Russian dominions in Central Asia were considerably extended, while to the European portion of the monarchy was added a piece of territory, S. of the Caucasus, formerly belonging to Turkey in Asia. A part of Bessarabia, belonging since the Crimean War to Turkey in Europe, but previously to Russia, was also restored to the latter power. The latter additions resulted from the Russo-Turkish War of 1877-1878, in which the Turks were completely defeated, the Russian troops advancing almost to the gates of Constantinople. Toward the end of the czar's life several attempts at his assassination were made by Nihilists, and at last he was killed by an explosive missile flung at him in a street in St. Petersburg, March 13, 1881. He was succeeded by his son, Alexander III.

**Alexander III.**, of Russia, son of Alexander II. was born March 10, 1845, and married the daughter of the King of Denmark in 1866. After his father's death, through fear of assassination, he shut himself up in his palace at Gatchina. His coronation was postponed till 1883, and was celebrated with extraordinary magnificence, and with national festivities lasting several days. Through the fall of Merv, the subjugation of the Turkomans in Central Asia was completed. In 1885 hostilities with England with regard to the defining of the frontier between the Russian territories and Afghanistan, for a time seemed imminent. In European affairs he broke away from the triple alliance between Russia, Germany, and Austria, and looked rather to France. He was aggrieved by the new Bulgarian spirit. His home policy was reactionary, though strong efforts were made to prevent malversation by officials, and stern economics were practiced. The liberties of the Baltic Provinces and of Finland were curtailed, the Jews were oppressed, and old



## Alexander

Russian orthodoxy was favored. Several Nihilist attempts were made on his life, and he kept himself practically a prisoner in his palace. He died at Livadia, Nov. 1, 1894.

**Alexander I.**, King of Scotland, the fourth son of Malcolm Canmore, was born about 1078, and in 1107 succeeded his brother, Edgar, only, however, to that part of the kingdom N. of the Firths of Forth and Clyde. He married Sibylla, a natural daughter of Henry I. of England, and his reign was comparatively untroubled, though about 1115 he had to quell an insurrection of the Northern clans. He founded the abbeys of Seone and Incheolm, and initiated a diocesan episcopate; while his determined resistance to the claims of York and Canterbury to supremacy over the see of St. Andrews, did much to secure the independence, not only of the Scottish Church, but of Scotland itself. He died at Stirling in 1124.

**Alexander II.**, born at Haddington in 1198, succeeded his father, William the Lion, in 1214. He early displayed that wisdom and strength of character in virtue of which he holds so high a place in history among Scottish kings. His entering into a league with the English barons against King John drew down upon him and his kingdom the papal excommunication; but two years later the ban was removed, and the liberties of the Scottish Church were even confirmed. On Henry III.'s accession to the English throne, Alexander brought the feuds of the two nations to a temporary close by a treaty of peace (1217), in accordance with which he married Henry's eldest sister, the Princess Joan (1221). The alliance thus established was broken after her death without issue (1238), and the second marriage of Alexander with the daughter of a noble of France. In 1244 Henry marched against Scotland, to compel Alexander's homage; but a peace was concluded without an appeal to arms. In 1249, while engaged in an expedition to wrest the Hebrides from Norway, Alexander died of fever on Kerrera, near Oban.

**Alexander III.**, King of Scotland, born in 1241, in 1249 succeeded his father, Alexander II., and in 1251 married the Princess Margaret (1240-1275), eldest daughter of Henry III. of England. Very shortly after he had come of age, his energies were summoned to defend his kingdom against the formidable invasion of Haco, King of Norway (1263), whose utter rout at Largs secured to Alexander the allegiance both of the Hebrides and of the Isle of Man. The alliance between Scotland and Norway was strengthened in 1282 by King Eric's marriage to Alexander's only daughter, Margaret (1261-1283); the untimely death of their

## Alexander

infant daughter, Margaret, commonly designated the Maid of Norway, on her way to take possession of her throne, was the occasion of many calamities to Scotland. During the concluding years of Alexander's reign the kingdom enjoyed a peace and prosperity which it did not taste again for many generations. His only surviving son died without issue in 1284; and next year Alexander contracted a second marriage with Joleta, daughter of the Count de Dreux. The hopes of the nation were soon after clouded by his untimely death. Riding on a dark night between Burntisland and Kinghorn, he fell with his horse, and was killed on the spot, March 12, 1286. A monument (1887) marks the scene of his death.

**Alexander I.**, King of Servia, born Aug. 14, 1876; son of King Milan I. In 1889 Milan abdicated and proclaimed Alexander king, under a regency till he should attain his majority (18 years). On April 13, 1893, when in his 17th year, Alexander suddenly took the royal authority into his own hands, and summarily dismissed the regent. On Aug. 5, 1900, he married Mme. Draga Maschin. In a revolt of the military, June 10, 1903, the king, queen, and eight others, were assassinated.

**Alexander, Archibald**, an American clergyman, of Scottish descent, was born in Virginia, April 17, 1772, and died at Princeton, N. J., Oct. 22, 1851. He studied theology, and performed itinerant missionary work in various parts of Virginia; became president of Hampton-Sidney College in 1796, and pastor of a Presbyterian church in Philadelphia in 1807. On the establishment of Princeton Theological Seminary in 1812, he was appointed its first professor, a position which he held till his death. Among other works, he published "Outlines of the Evidences of Christianity," "Treatise on the Canon of the Scriptures" (1826); "History of the Patriarchs" (1833); and "History of the Israelitish Nation" (1852); his "Moral Science" was posthumous. His eldest son, JAMES WADDELL ALEXANDER (1804-1850), was a Presbyterian minister in Virginia, New Jersey, and at New York; and afterward professor in Princeton Theological Seminary. He contributed to the "Princeton Review," wrote more than 30 children's books, a life of his father, and miscellaneous works. JOSEPH ADDISON ALEXANDER, third son (1809-1860), graduated at Princeton in 1826, lectured there on Biblical Criticism and Ecclesiastical History, and for the last eight years of his life filled the chair of Biblical and Ecclesiastical History. He was engaged at the time of his death, along with Dr. Hodge, on a commentary of the New Testament. He is best known by his



## Alexander Archipelago

commentaries and "Prophecies of Isaiah" (1846-1847; revised edition, 1864), and the "Psalms Translated and Explained" (3 volumes, 1850), both of which have had a large circulation, and have been reprinted in England.

**Alexander Archipelago**, or **Alexander Islands**, a group of islands on the W. coast of North America, extending from 54° 40' N. to 58° 25' N.; belong to Alaska Territory. The principal islands are Baranoff and Prince of Wales.

**Alexander, Mrs. Cecil Frances (Humphrey)**, an Irish poet, born in County Wicklow in 1818. She was very active in religious and charitable works. She is best known as a writer of hymns and religious poems. Among the most noted are the hymns, "Roseate Hue of Early Dawn" and "All Things Bright and Beautiful." Her most famous poem is "The Burial of Moses." She died in Londonderry, Oct. 12, 1895.

**Alexander, Sir James Edward**, a British soldier and explorer, born in Scotland in 1803; served in the principal wars of his day, particularly distinguishing himself in the Crimean; conducted an exploring expedition into Central Africa, and published several narratives of travel. He died April 2, 1885.

**Alexander Jarostowitz Nevski, St.**, Grand Duke of Vladimir and Prince of Novgorod, born in 1219; gained a brilliant victory over the Swedes, Danes, and Livonian knights (1240, 1241, 1242); a Russian national hero and patron saint of St. Petersburg, where Peter the Great founded in his honor the magnificent monastery and the religious order that bear his name. He died in 1263. In the calendar of the Russian Church his day is Nov. 23.

**Alexander, John W.**, an American portrait painter, born in Pittsburg, Pa., Oct. 7, 1856; studied at Munich, Paris, and in Italy; became a sociétaire of the Beaux Arts in Paris; was appointed one of the American jurors on paintings for the Paris Exposition in 1900.

**Alexander, Mrs.**, pseudonym of ANNIE HECTOR, an Irish novelist, born in Dublin in 1825. She began to write at an early age, and is a prolific and popular novelist. Her books include "The Wooing O't" (1873); "Ralph Wilton's Weird" (1875); "Her Dearest Foe" (1876); "The Freres" (1882); "A Golden Autumn" (1897); and "A Winning Hazard" (1897). She died July 10, 1902.

**Alexander of Hales**, a noted English philosopher and theologian, born at Hales, Gloucestershire. One of the greatest of the schoolmen, he was among the first to study Aristotle from the point of view of the Arabic commentators. His chief work was "The Sum of Theology" (1475). He was

## Alexander Severus

called "The Irrefutable Doctor," "The Doctor of Doctors," "The Fountain of Life." He died in Paris, 1245.

**Alexander of Rumania**, was born March 20, 1820. Through his marriage with a daughter of the Boyar Rosetti, he became allied to the Sturdzas and with the whole upper nobility of the country. In 1848 he joined the Patriotic party. During the discussion over the constitution he became the representative of the Union party. In 1859 he was chosen Hospodar of Rumania and was proclaimed ruling prince of the united principalities as Alexander Johann I. His endeavors for absolute centralization caused dissension, although by his abolition of serfage and division of the lands he conferred great benefits upon the peasantry. The financial difficulties and discontent increased and his prorogation of the Parliament had no effect. All parties agreed that the only hope lay in the fall of Alexander. On the evening of Feb. 22, 1866, many of the principal leaders forced their way into the prince's bed-chamber and compelled him to abdicate. He died in 1873.

**Alexander Severus** (in full, MARCUS AURELIUS ALEXANDER SEVERUS), a Roman emperor; born in Ace (the modern Acre), Phœnicia, in A. D. 205; was the son of Gessius Marcianus and of Julia Mamaea, niece to the Emperor Severus. He was admirably educated by his mother, and was adopted and made Cæsar by his cousin Heliogabalus, then but a few years older than himself, at the prudent instigation of their common grandmother, Mæsa. That contemptible emperor, however, soon grew jealous of his cousin, and would have destroyed him but for the interference of the prætorian guards, who soon after put Heliogabalus himself to death, and raised Alexander to the imperial dignity in his 17th year, March 11, 222. Alexander adopted the noble model of Trajan and the Antonines; and the mode in which he administered the affairs of the empire, and otherwise occupied himself in poetry, philosophy, and literature, is eloquently described by Gibbon. On the whole, he governed ably both in peace and war; but whatever he might owe to the good education given him by his mother, he allowed her a degree of influence in the government which threw a cloud over the latter part of his reign. He himself finally became convinced that in this matter he had allowed his filial reverence to mislead him, and is said to have reproached his mother with his dying breath as the cause of the disaster which had befallen them both. Alexander behaved with great magnanimity in one of the frequent insurrections of the prætorian guards; but, either from fear or necessity, he allowed many of their seditious mutinies to pass unpunished, though in one of them they murdered their prefect,



the learned lawyer Ulpian, and in another compelled Dion Cassius the historian, then consul, to retire into Bithynia. At length, after having defeated, in 232, the Persians under Artaxerxes, who wished to drive the Romans from Asia, and undertaking an expedition into Gaul to repress an incursion of the Germans, he was murdered with his mother in an insurrection of his Gallic troops, headed by the brutal and gigantic Thracian, Maximin, who took advantage of their discontent at the emperor's attempts to restore discipline. This event happened in 235, after a reign of 13 years. Alexander was favorable to Christianity, following the predilections of his mother, Julia Mammæa, and he is said to have placed the statue of Jesus Christ in his private temple, in company with those of Orpheus and Apollonius of Tyana.

**Alexander the Great**, the 3d King of Macedon bearing the name which he made so famous; born in Pella, 356, B. C. His mother was Olympias, an Epirote princess, who traced her descent from Achilles. There is little reason to doubt that his father was Philip of Macedon, though the latter was not confident about his paternity, and though there is no evidence of any feelings between the two such as are expected to subsist between father and son. On the contrary, Philip seems to have resented the imperial qualities of his son, which he was clever enough to see and appreciate; and Alexander showed a precocious envy of his father's neglected opportunities of conquest, a feeling which the sagacious biographer Plutarch has noted and dwelt on. No open rupture took place till Philip repudiated Olympias to wed a Macedonian lady (Cleopatra according to Plutarch and others, but Eurydice according to Arrian). During the nuptial feasting Philip made at Alexander with his sword, while the son jeered at his father's drunken fury and unsteady gait. In the assassination of Philip in 336 the repudiated and banished Olympias certainly had a hand, and we cannot be sure that Alexander was not an accomplice.

The memorable year in which Alexander first appeared on the stage of universal history was 339 B. C. At the age of 16 the regency of Greece was intrusted to him by Philip when he set out on an expedition against Byzantium; and in that capacity it fell to his lot to lead his first army against an Illyrian rising, to found his first Alexandria in the upper valley of the Strymon, and to receive a deputation of envoys from the King of Persia—a fit beginning for the miracle of precocity, who was afterward to destroy Thebes at 21, to conquer Babylon at 25, and to die master of the world at 33. In the year after his appointment to the regency Alexander showed eminent military capacity at the battle of Chæronea (338),

and, on the murder of Philip, ascended the throne in 336, before he had reached his 20th year.

The brilliant natural gifts of Alexander had been developed under the tutelage of Aristotle. His personal beauty, with its ardent expressiveness and flashing eyes, was very remarkable, and he was preëminent in horsemanship and all athletic accomplishments. A habit (or perhaps some peculiar muscular conformation of the neck) which gave his head a tilt towards the left shoulder imparted to him an air of hauteur, which gave a note of eminent distinction to manners of charming grace and affability. He was of an extremely trusting disposition. His position in ascending the throne was a difficult one. He had enemies on every side. The Illyrians and Thracians were always watching an opportunity to attack Macedon, and indeed most of the Grecian States were ready, if possible, to throw off the Macedonian yoke. Persia regarded the growth of Macedon with suspicion; and, finally, his own Macedonian subjects were far from being united in approval of the career of conquest on which Philip and Alexander had both resolved to embark.

His reign began with an act of cruelty, such as was destined subsequently to become almost a matter of course on every change of rulers; his uncle and his half-brother were put to death, and the little daughter of Cleopatra, Philip's widow, was butchered in the arms of her mother. In the autumn of 336 Alexander marched into Greece, and was confirmed in the chief command against Persia by the Amphictyones at Thermopylæ. In 335 he advanced to the Hæmus range (the Balkans), and showed great ability in his campaign against the Thracians, crossing the Danube—apparently out of mere bravado—in the face of the enemy without losing a single man. He had no real friends among the Greek States. The Thebans, hearing a false report of his death, became overt enemies, proclaimed their independence, and slew some Macedonian officers. Alexander appeared in Bœotia with amazing dispatch, and took Thebes by storm on the third day of the siege. This was the occasion on which, in the words of Milton,

The great Emathian conqueror bade spare  
The house of Pindar.

Leaving Antipater to govern in Europe, he crossed over into Asia in the spring of 334 with 30,000 foot and 5,000 horse. The Persian empire, the conquest of which he undertook, was at least 50 times as large as his own and numbered about 20 times as many inhabitants. It extended from the Hellespont to the Punjab, from Lake Aral to the cataracts of the Nile. But it was a vast congeries of subject provinces having no internal bond, and no principle of cohesion but the will of the king. For 80 years it



had been tending to dissolution in its W. provinces, which were the most exposed to danger. As stages in this process may be mentioned the revolt of Egypt under Amyrtæus in 410, and that of the Cypriote Evagoras, which was not put down till 383; the numerous revolts of satraps, of Greek cities, and of semi-Greek tyrants during the first half of the 5th century; and the attack on Persia made by Tachos, King of Egypt, in 361. It has been well remarked by Adolf Holm that the position of the Persian empire when attacked by Alexander had some resemblance to that of the Roman empire when overrun by the Germans. Both empires held together merely by the law of inertia; in both their strength lay not in their native elements, but in mercenaries taken from the very peoples, the Germans, and the Greeks, who threatened respectively the safety of the two empires. Alexander proposed to himself nothing short of complete dispossession of Darius in favor of himself as Captain-General of Hellas, and the establishment of his own Panhellenic empire in the room of the Persian. He was not led from point to point by this or that strategical reason. His business was not to leave Asia till every satrapy in the Persian empire acknowledged his sway. Even the burning of the Persian capital Persepolis was probably no act of drunken folly, as which it has often been described, but rather a signal and emphatic assertion of mastery and ownership, as of one who should say, "the Persian empire is mine, to throw it into the fire if I please." Alexander had no intention of remaining king of Macedon. His design was to be the Greek emperor of Europe and Asia; and this position in effect he assumed on the death of Darius. With this view throughout his whole career in Asia he sought as much as possible to fuse and commingle his Asiatic and European subjects, very much as England did in India. This was the project to which he was giving all his efforts at the time of his death.

The first hostile army he encountered was on the Granicus river (an affluent of the Sea of Marmora). He crossed the Granicus, just as he afterward crossed the Pinarus at Issus, in full view of the enemy, hurled himself with all his force on their center, and completely broke it up. It was not his way to refrain from the pass in *quart* till he has first hit in *tierce*. His victories sometimes remind us of the oft-quoted *O'est magnifique mais ce n'est pas la guerre*. He won by an impetuous dash a victory which a subtler strategy might have failed to achieve, just as his sword-cut at Gordium made away with the knot which his fingers could not undo. The victory at Granicus was attended with unprecedented results. Sardes, Miletus, Ephesus, Halicarnassus submitted one after another, and he estab-

lished in them democracies of the Greek type. In November, 333, Darius, eager to meet the invader, hastened to the sea-coast near Issus (at the head of the Gulf of Iskanderoon). The tactics pursued at the Granicus had here again a successful issue. Darius fled, leaving his family and his treasures in the hands of the conqueror. The mother, wife, two daughters, and son of Darius were treated with a clemency which foreshadowed the ages of chivalry. An Asiatic conqueror would have put the males to death, probably with torture, and would have sent the females to his harem. Captive Greek generals he also spared and liberated. He took possession of Damascus, a city which even then could boast of a hoary antiquity, and secured all the towns along the Mediterranean Sea. His plan now was to occupy Egypt, and this was made easy by the capture of Tyre on Aug. 20, 332, after a siege of seven months. During the siege a message came from Darius offering Alexander 10,000 talents, the hand of his daughter in marriage, and Asia as far as the Euphrates, if he would make peace. "I would accept it if I were Alexander," said his general, Parmenio; "so would I," replied Alexander, "if I were Parmenio." Gaza fell in November, 332, and Alexander, taking possession of Egypt, sacrificed to Apis and the Egyptian gods in Memphis, and held musical and athletic competitions after the Greek fashion in Tyre. Thus he conciliated the affections of his subjects. Politically he organized Egypt as a province in a way which, as Arrian remarks, foreshadowed the Roman system, giving the civil administration first to two, and then to a single governor, while the troops were placed under several separate commanders. It was now that Alexander founded the celebrated Alexandria—destined in two generations to be the first city in the Levant—and marched through the Libyan desert to consult the oracle of Jupiter Ammon, whose son he claimed to be.

Meantime Darius was collecting an army in Assyria; but before the decisive battle of Arbela he made overtures of peace to Alexander, whose answer was, "I, Alexander, hold all thy treasure and all thy land to be mine"—a verbal cutting of the Gordian knot. The Persian force encountered by the Greeks at Gaugamela, near the ancient Nineveh, and about 50 miles from Arbela (which strangely has given its name to the battle ever since), is said to have numbered 1,000,000 infantry, 40,000 cavalry, 200 scythed chariots, and 15 elephants. Alexander had only 40,000 foot and 7,000 horse, but he won a decisive victory on Oct. 1, 331. The Macedonians aimed at the faces of their adversaries, as the Cæsarians afterward did at Pharsalus. Babylon and Susa opened their gates to the conqueror, who then entered Persepolis, the capital of the province



of Persis, seized its immense treasures, and burned its palace and citadel to the ground.

In the spring of 330 Alexander proceeded to Media in pursuit of Darius. That weak monarch was being carried about by Bessus, satrap of Bactria, who, on hearing of the approach of Alexander, inflicted a mortal wound on Darius and fled, leaving him to die. Darius died before Alexander came up with him (July, 330). The conqueror sent his body to Persepolis to be interred with royal honors. After taking possession of Hyrcania and Bactriana he was meditating still more gigantic plans, when he learned in the autumn of 330 that Philotas, the son of Parmenio, though cognizant of a conspiracy against his life, had not reported it. He put both Philotas and Parmenio to death. The execution of the former has been condemned, but is on the whole defensible; the murder of the latter is an inexcusable act of brutal tyranny. About the end of 330 or the beginning of 329 he crossed the great range of the Caucasus (not the modern Caucasus, but the Hindu Kush) by a pass at an altitude of 13,200 feet—a march comparable with that of Hannibal over the Alps. He reached the city of Bactra (Balkh), and made his way N. as far as the Jaxartes or Tanais, where he founded a city, probably the modern Khojend.

He remained in these regions till the summer of 327, spending the winter in Nautaca, on the right bank of the Oxus. Here occurred the murder of Clitus and Alexander's marriage with Roxana, daughter of Oxyartes, a satrap of Sogdiana. She had a son named after his father in 323. After the death of Alexander she compassed the destruction of his other wife, the daughter of Darius, and was killed with her son in 311 by Cassander. The murder of Clitus has been regarded as a great plot on the career of Alexander. But the circumstances in which he was placed greatly extenuate the act. The East believed in the divinity of Alexander, and such a belief was almost an essential condition of the permanence of his empire. When one of his own officers openly denied and ridiculed the emperor's pretensions at a State banquet he seriously imperiled the Hellenic *raj*. The empire of Alexander was never subject to a second single emperor. The destinies of the West awaited the struggle between Rome and Carthage. But his vast empire nowhere save in India reverted to the pre-Alexandrine type.

Alexander now formed the idea of conquering India. He passed the Indus in 327, and formed an alliance with Taxiles, under whose guidance he reached the Hydaspes (modern Jhelum). This river he crossed after a severe struggle with Porus, in whom he met an opponent very superior to the Persian satraps who had hitherto confronted him or rather retreated before him. He

then moved farther E. and crossed the Acesines (Chenab) and the Hyraotes (Ravi), and reached the Hyphasis (Beas), which now joins the last river of the Punjab, the Sutlej, but which then flowed in a different channel. He never reached the Sutlej itself. The murmurs of his army compelled him to return. The fine instrument, which he had fashioned so dexterously, broke in his hand. He recrossed the Acesines to the Hydaspes, where he completed the cities of Nicæa and Bucephala (named after his famous horse Bucephalus), which he had already begun. He had only seen the fringe of India—the Punjab. The wondrous country of Brahma and Buddha never felt the sway of Secundar. It was the only land which, on his departure, reverted to its condition before his arrival. He was obliged to content himself with writing his name large across the histories of Hellenic, Semitic, Egyptian, and Iranian civilization. Alexander's name does not appear in Sanskrit literature.

When he had reached the Hydaspes he built a fleet, in which he sent part of his army down the river, while the rest proceeded along the banks. The city of the Malli, where Alexander was wounded, is probably Multan; Puttala is perhaps Haidarabad. The march of 500 miles through the hideous desert of Gedrosia (Baluchistan), and the voyage of Nearchus, have given much material to romancers and rhetoricians. At Carmania he was joined by Craterus, who had marched through the Bolan Pass to Kandahar, and by Nearchus, whose voyage, then thought so marvelous a feat, is no more than the short steam run from Karachi to Bunder Abbas. From Carmania he went to Pasargadæ, and thence to Susa, where he devoted himself with great energy to the task of uniting as far as possible the Macedonian and Persian nations. He himself married two Persian princesses, and he gave rewards to those of his staff who followed his example in contracting Persian alliances. He sent home to Macedonia, with a present of a talent each, about 10,000 Macedonians who by age or wounds were incapacitated for service. These veterans were led by Craterus, who was sent to succeed Antipater as governor of Europe. Antipater seems to have fallen into disfavor, though in 330 he had done service in defeating Agis, the Spartan king who threatened Megalopolis. It was of this exploit that Alexander contemptuously observed, "So there has been a battle of the mice in Arcadia, while we have been conquering Asia."

In 323 Alexander arrived at Babylon, where he found numberless envoys from nations near and far, come to pay their homage to the young conqueror. He was engaged in very extensive plans for the future, including the conquest of Arabia and the reorganization of the army, when he fell



ill of a fever, shortly after the death of his beloved Hephæstion, which had deeply affected him. He died in 323, after a reign of 12 years and eight months. The day before a rumor had gone abroad that the great general was dead, and that his friends were concealing the truth. The dying king caused his army to defile past his bed, and feebly waved them a last farewell. Alexander was a great administrator, a second Pericles in his devotion to work, an Alcibiades in his distinguished presence, a Phocion in his simplicity of character.

**Alexandria**, a city of Egypt, founded by Alexander the Great in 331 B. C. It was situated originally on the low tract of land which separates the Lake Marcotis from the Mediterranean, about 14 miles W. of the Canopic mouth of the Nile. Before the city, in the Mediterranean, lay an island, up on the N. E. point of which stood the famous lighthouse, the Pharos, built in the time of Ptolemy I., in the 3d century B. C. and said to have been 400 feet high. The island was connected with the mainland by a mole, called the Heptastadium, thus forming the two harbors. The plan of Alexandria was designed by the architect Deinocrates, and its original extent is said to have been about 4 miles in length, with a circumference of 15 miles. It was intersected by two straight main streets, crossing each other at right angles in a large square, and adorned with handsome houses, temples and public buildings. The most magnificent quarter of the city was that called the Brucheion, which ran from the center to the eastern harbor. This quarter of the city contained the palaces of the Ptolemies, the Museum, for centuries the focus of the intellectual life of the world, and the famous library; the mausoleum of Alexander the Great and of the Ptolemies, the temple of Poseidon, and the great theater. To the S. was the beautiful gymnasium. The Serapeum, or temple of Serapis, stood in the western division of the city, which formed the Egyptian quarter, and was called Rhacôtis; a small town of that name had occupied the site before the foundation of Alexandria. To the W. of the city lay the great Necropolis, and to the E. the race-course and suburbs of Nicopolis. Much of the space under the houses was occupied by vaulted subterranean cisterns, which were capable of containing a sufficient quantity of water to supply the whole population of the city for a year. From the time of its foundation, Alexandria was the Greek capital of Egypt. Its population, in the time of its prosperity, is said by Diodorus to have amounted to about 300,000 free citizens, and probably a larger number of slaves. This population consisted mostly of Greeks, Jews and Egyptians, together with settlers from all nations of the known world. After

the death of Alexander the Great, Alexandria became the residence of the Ptolemies. They made it, next to Rome and Antioch, the most magnificent city of antiquity, as well as the chief seat of Greek learning and literature, which spread hence over the greater part of the ancient world. The situation of the city, at the point of junction between the East and West, rendered it the center of the commerce of the world, and raised it to the highest degree of prosperity.

Alexandria had reached its greatest splendor when, on the death of Cleopatra, the last of the Ptolemies, in 30 B. C., it came into the possession of the Romans. Its glory was long unaffected, and it was the emporium of the world's commerce, especially for corn. In the reign of Caracalla, however, it suffered severely; and the rise of Constantinople promoted the decay of Alexandria. Christianity was introduced, according to tradition, by St. Mark. In the 2d century its adherents were very numerous; among its teachers were Clemens Alexandrinus and Origen. The strife between Christianity and heathenism—powerfully described in Kingsley's "Hypatia"—gave rise to bloody contests in Alexandria. The Serapeum, the last seat of heathen theology and learning, was stormed by the Christians in 389 A. D., and converted into a Christian church. Alexandria was a chief seat of Christian theology till it was taken by the Arabs, under Amru, in 641, at which time it was much injured. The choice of Cairo as capital of the Egyptian caliphs hastened the now rapid decay of the city; the discovery of America, and of the passage to India by the Cape of Good Hope, very much diminished its trade; and when, in 1517, the Turks took the place, the remains of its former splendor wholly vanished, walls and buildings being reduced to ruins. In 1778, Alexandria contained no more than 6,000 inhabitants. Under Mehemet Ali, however, the tide turned, and the city recovered rapidly. It is now again one of the most important commercial places on the Mediterranean. The Suez canal diverted part of its trade as the center of steam communication with India; but this was more than compensated by the general impetus given by the canal to Egyptian prosperity. In 1882, during the rising of Arabi Pasha, serious damage was done to the city. The Europeans were maltreated; and as Arabi would not desist from strengthening the fortifications, an English fleet, in the interests of the Khedive, bombarded the forts of Alexandria for over 10 hours, July 11. On the two following days the town was sacked and plundered by the soldiers and populace, and great part of it destroyed by fire. A British force occupied it on the 14th.



## Alexandria

The present city (called Skanderieh by the Arabs) is not situated exactly on the site of the old one, but is chiefly built on the mole, which has been increased by alluvial deposits till it has become a broad neck of land between the two harbors. The city is a strange mixture of East and West, old and new, not gracefully harmonized. The native town, unpaved and, in wet weather, hardly passable, contains poor houses and wretched huts. The ever increasing Frankish quarters have quite a European appearance, and swarm with cafés, shops, theaters, and the like, lighted with gas. The castle stands near the old Pharos, and the handsome new lighthouse has a revolving light, visible at a distance of 20 miles. Recent improvements, undertaken at a cost of \$10,000,000, are expected to make the western or the old harbor by far one of the best and most spacious on the Mediterranean. There is railway communication with Cairo and Suez; the Mahmoudieh canal, made by Mehemet Ali, connects Alexandria with the Nile.

Of the few remaining objects of antiquity the most prominent is Pompey's Pillar, as it is erroneously called. Of the so-called Cleopatra's Needles—two obelisks of the 16th century B. C., which long stood there—one was taken to England and erected on the Thames Embankment in 1878; and the other, presented by the Khedive, was set up in Central Park, New York, in 1881. Pop. (1907) 332,246.

**Alexandria**, city, port of entry, and county-seat of Alexandria co., Va.; on the Potomac river, the Pennsylvania and Southern railroads and trolley line connecting with Washington, D. C., and Mt. Vernon; 6 miles S. of Washington. The river here expands to the width of a mile, and gives the city an excellent harbor that will accommodate the largest ships. The city is an important trade center; has manufactures aggregating \$20,000,000 in value, annually; and is noted for its educational institutions, which include Washington High School, Potomac, Mt. Vernon and St. Mary's Academies, and, near by, the Theological Seminary and High School of the Diocese of Virginia (Protestant Episcopal). There are two National banks, public school property valued at \$35,000, and daily and weekly periodicals. General Braddock made his headquarters here in 1775, and Colonel Ellsworth was shot in the Marshall House, while removing a Confederate flag, in 1861. Pop. (1900) 14,528; (1910) 15,329.

**Alexandrian Codex**, an important manuscript of the sacred Scriptures in Greek, now in the British Museum. It is written on parchment, in finely formed uncial letters, and is without accents, marks of aspiration, or spaces between the words. Its

## Alexandrian Philosophy

probable date is the middle of the 5th century. With the exception of a few gaps, it contains the whole Bible in Greek (the Old Testament being in the translation of the Septuagint), along with the epistles of Clemens Romanus, of whose genuine epistle to the Corinthians it is the only manuscript extant. For purposes of Biblical criticism, the text of the Epistles of the New Testament is the most valuable part. This celebrated manuscript belonged, as early as 1098, to the library of the Patriarch of Alexandria. In 1628 it was sent as a present to Charles I. of England, by Cyrillus Lucaris, Patriarch of Constantinople, who declared that he had got it from Alexandria, where he had held the same office; and that it was written there appears from internal and external evidence.

**Alexandrian Library**, a remarkable collection of books, the largest of the ancient world, was founded by the first Ptolemy, and fostered by his son. It quickly grew, and, already in the time of the first Ptolemy, Demetrius Phalereus had 50,000 volumes or rolls under his care. During its most flourishing period, under the direction of Zenodotus, Aristarchus of Byzantium, Callimachus, Apollonius Rhodius, and others, it is said to have contained 490,000, or, according to another authority, including all duplicates, as many as 700,000 volumes. The greater part of this Library, which embraced the collected literature of Rome, Greece, India, and Egypt, was contained in the famous Museum, in the quarter of Alexandria called the Brucheion. During the siege of Alexandria by Julius Cæsar, this part of the Library was destroyed by fire; but it was afterward replaced by the collection of Pergamos, which was presented to Cleopatra by Mark Antony. The other part of the Library was kept in the Serapeum, the temple of Jupiter Serapis, where it remained till the time of Theodosius the Great. When this emperor permitted all the heathen temples in the Roman empire to be destroyed, the magnificent temple of Jupiter Serapis was not spared. A mob of fanatic Christians, led on by the Archbishop Theophilus, stormed and destroyed the temple, together, it is most likely, with the greater part of its literary treasures, in 391 A. D. It was at this time that the destruction of the Library was begun, and not at the taking of Alexandria by the Arabs, under the Caliph Omar, in 641, when its destruction was merely completed.

**Alexandrian Philosophy**, a school of philosophy which flourished in Alexandria as the central point of union between the Orient and Occident, and which was distinguished by the union of Grecian and Oriental views of the universe. It appeared in the last century before Christ and those im-



mediately following Christ; first, as a Judean-Alexandrian school, formed from the combination of the philosophy of Plato, the Stoics, and the Hebrews; the second, as a Neo-Pythagorean, from the union of the philosophy of Pythagoras and the wisdom of the Orient; and the third as a Neo-Platonic, formed by the union of Platonic and Oriental doctrines of emanation.

**Alexandrian School**, the common designation of a series of scientific endeavors which were founded and encouraged through the generosity of the Ptolemies, and which had their seat in Alexandria and continued for more than 700 years, from 300 B. C. to 500 A. D. The basis of these schools was the Museion (museum), a splendid institution in the part of the city called Brucheion, where the scientists lived and taught as pensioners at the public cost. For the use of these learned men two libraries were founded by the Ptolemies. See ALEXANDRIAN LIBRARY.

**Alexandropol** (formerly Gumri), an important fortress and the largest town in the Erivan district of Russian Armenia. It lies on a treeless plateau on the road from Erivan to Kars, and has accommodation for a garrison of 10,000 men. The stronghold gives the Russians complete command of the headwaters of the Euphrates. The silk trade is actively carried on in the town. Pop. (1897) 32,018.

**Alexis, Wilibald.** See HÄRING, GEORG WILHELM HEINRICH.

**Alexius Comnenus**, one of the ablest rulers of the Byzantine Empire, born at Constantinople in 1048. He was the nephew of the Emperor Isaac Comnenus, on whose abdication, in 1059, his own father refused the purple; and Alexius, having in youth given brilliant promise of military genius, was at length, in 1081, after four brief anarchic reigns, elevated by his soldiers to the throne. Gibbon graphically paints his position and achievements. He reigned for thirty-seven years; and had it been possible to preserve the weak and corrupt Byzantine Empire in its integrity, a ruler like Alexius might have achieved the task. He could only delay the inevitable doom. Historians differ as to the sincerity of his conduct toward the crusaders. His daughter, ANNA COMNENA (*q. v.*), who wrote his life, defends his "policy" with filial piety. He died in 1118.

**Alfa**, a variety of esparto (*q. v.*), grown in northern Africa. Its fiber is utilized in the manufacture of paper.

**Alfalfa**, an herbaceous plant (*Medicago sativa*) belonging to the natural order *Leguminosæ* (*q. v.*); also called lucerne. The plant is a native of Asia, but has been cultivated in Europe for more than 2,000

years. It was introduced into Mexico and South America by the Spaniards, but did not reach North America until 1854, when it was brought to California from Chile. Since that time it has become the most extensively cultivated forage crop in the United States, easily adapting itself to varying conditions of soil and climate, and has yielded successful results in opposite sections of the country from sea-level to heights of 7,000 feet. It flourishes best on rich, sandy, well-drained loams of calcareous nature. It will not grow on swampy land, and is more readily affected than are ordinary crops by cold and wet together. The plant is an upright, branching perennial, one to three feet high, with small purple flowers growing in dangling clusters. It is cut when coming into bloom, and yields from three to ten tons of hay per acre. Like other leguminous plants, it takes nitrogen from the air, while its deep-growing roots draw from the subsoil quantities of lime, phosphoric acid, potash, and other mineral matter which make it particularly valuable as a green manure. Alfalfa, whether green or cured as hay, is relished by all farm animals. Best nutritive results, however, are obtained by mixing it with root-crops and grain. Alfalfa is subject to two fungus diseases known as leaf-spot and root-rot, which must be guarded against or the crop will shortly suffer ruin. Consult: Coburn, "Alfalfa" (1901).

**Alfieri** (alf-yā'rē), **Vittorio, Count**, an Italian dramatist, born at Asti in Piedmont, Jan. 17, 1749. He came into his vast paternal inheritance at the age of fourteen, and two or three years afterward began a series of travels which extended over nearly all the European countries. His tragedies, "Cleopatra," "Polinice," "Antigone," "Agide," "Bruto," and several others, are founded on classic themes, and formed on the Hellenic model. "Saul," founded on Hebrew sacred history, but elaborated according to the canons of Grecian dramaturgy, was by far the most popular of Alfieri's dramas. The "Filippo" presents, in lineaments that could be drawn only by the hand of a master, the somber character of Philip II. of Spain. He wrote in all twenty-one tragedies and six comedies, and composed many sonnets; among his odes are five on American independence. His prose works comprise an essay on "Tyranny," a volume of "Essays on Literature and Government," and an "Autobiography." He died at Florence, Oct. 8, 1803. His style founded a new school in Italian drama. His works were first collected and published by the Countess of Albany (35 vols., Pisa, 1805-15), and thirteen of these volumes contain his posthumous writings.

**Alfonso**, or **Alphonso, I.** (El Conquistador, "The Conqueror"), earliest King of



Portugal, was the son of Henry of Burgundy, conqueror and first Count of Portugal. Born in 1110, he was but two years of age at his father's death, so that the management of affairs fell into the hands of his ambitious and dissolute mother, Theresa of Castile. Wresting the power from her in 1128, he turned his sword against Castile and the Moors, and defeated the latter, after a bloody struggle, at Ourique, July 25, 1139, proclaiming himself King of Portugal on the field of battle. The title was confirmed by the Pope three years later. After settling the succession, the privileges of the nobility, and the administration of justice at the Cortes of Lamego, with the help of some casual English crusaders he took Lisbon (1147), and, later, the whole of Galicia, Estremadura, and Elvas. He died at Coimbra, Dec. 6, 1185.

**Alfonso III.**, surnamed THE GREAT, King of Leon, Asturias, and Galicia, succeeded his father, Ordoño, in 866. After reducing to obedience his jealous and factious nobles, he turned his arms against other enemies, fought through more than 30 campaigns and gained numerous victories over the Moors, occupied Coimbra, and extended his territory as far as Portugal and Old Castile. But these constant wars entailed great expense and misery on his subjects, and resulted, in 888, in a popular rising, at the head of which was Alfonso's own son Garcias. But the active king quickly crushed the rebels, and threw his son into prison. A second conspiracy, instigated by the queen, was more successful, and Alfonso was obliged to abdicate the throne, and divide his territory among his three sons. But once again the old hero was called upon to save his country, and lead its armies against the invading Moors. After returning in triumph, he died at Zamora, 910.

**Alfonso V.**, King of Aragon and Navarre, but Alfonso I. of Naples and Sicily ("the Magnanimous"), succeeded his father in 1416, when but 15 years old. Summoned to her help by Queen Joanna II. of Naples, he defeated her foes, Sforza and Louis of Anjou, but lost her favor by throwing into prison her minion Caraccioli. The fickle queen now declared his rival Louis her successor. At her death in 1435, Alfonso resolved to claim the kingdom, but found himself opposed by Duke René of Lorraine, whom Joanna had appointed her successor after the death of Louis. Rome and Genoa sided with René, and the Genoese fleet attacked and defeated that of Alfonso, the monarch himself being taken prisoner. He was sent to Duke Philip of Milan, who, charmed by his manner and talents, soon set him at liberty, and even formed an alliance with him. After a five years' warfare, Alfonso was successful, and entering Naples in triumph, was recognized as its king by

the Pope. He patronized letters and the arts, and governed with prudence and justice. He died at Naples in 1458, leaving his hereditary dominions to his brother John, and Naples to his own son Ferdinand, who was legitimized by the Pope.

**Alfonso VI.**, King of Portugal, succeeded his father, John IV., in 1656, when but 13 years of age. For some years the government was in the hands of his mother, Louise de Guzman, a woman of great wisdom and prudence; but in 1662 the sickly and dissolute prince dismissed his mother from her office, only to fall as completely into the hands of his minister, Count Castel-Melhor. Yet Portugal was victorious in the war against Spain, spite of the incapacity of king and minister, although for this she had to thank her English and French allies. In 1666 Alfonso married a princess of Savoy, but the Queen was soon disgusted with her unworthy husband, and conspired with his brother Pedro against him. He was forced to surrender to the latter his crown, and to dissolve on his behalf what was a marriage merely in name. Alfonso died 12 years later (1683), a State prisoner at Cintra.

**Alfonso X.**, surnamed "the Astronomer," "the Philosopher," or "the Wise" (El Sabio), King of Leon and Castile, born in 1226; succeeded his father, Ferdinand III., in 1252. Elected as their king by part of the German princes in 1257, he had to be content with the empty honor, nor was he more successful in his hereditary claim to Suabia through his mother Beatrix, daughter of Philip of Suabia. He was more successful in his wars with the Moors, and his victories over them enabled him to unite Murcia with Castile. In 1271 he was able to crush an insurrection headed by his son Philip; but a second and successful rising, under another son, Sancho, in 1282, deprived him of his throne. Two years later, he died a fugitive at Seville. Alfonso was the founder of a Castilian national literature. He caused the first general history of Spain to be composed in the Castilian tongue by his historians, as well as a translation of the Old Testament to be made into the vernacular by Toledo Jews. He completed the well-known code of laws, "Leyes de las Partidas," which in 1501 became the universal law of the land; and he wrote several long poems, besides a work on chemistry, and another on philosophy. He sought to improve the Ptolemaic planetary tables, whose anomalies had struck observers even at that early time. For this purpose, he assembled at Toledo upward of 50 of the most celebrated astronomers of that age. His improved planetary tables, still known as the "Alfonsine Tables," were completed in 1252 at the cost of 40,000 ducats. The "Opus-



## Alfonso

culos Legales" of Alfonso were published by the Royal Academy of Madrid in 1836.

**Alfonso XII.**, King of Spain, the only son of Queen Isabella II. and her cousin, King Francis of Assisi, was born Nov. 28, 1857. He left Spain with his mother when she was driven from the throne by the revolution of



ALFONSO XII.

1868, and till 1874 resided partly in France, partly in Austria. He studied for a time at the English military college, Sandhurst, being then known as Prince of the Asturias. His mother had given up her claims to the throne in 1870 in his favor, and in 1874 Alfonso came forward himself as claimant, and in the end of the year was proclaimed by Gen. Martinez Campos as king. He was enthusiastically received, most of the Spaniards being by this time tired of the Republican Government, which had failed to put down the Carlist party. Alfonso was successful in bringing the Carlist struggle to an end (1876), and henceforth he reigned with little disturbance until his death in 1885. He married first his cousin Maria de las Mercedes, daughter of the Duke de Montpensier; second, Maria Christina, Archduchess of Austria.

**Alfonso XIII.**, King of Spain, son of the late Alphonso XII. and Maria Christina, daughter of the late Karl Ferdinand, Arch-Duke of Austria, born after his father's death, May 17, 1886, succeeding by his birth, being a male, his eldest sister. His mother was made Queen Regent during his minority. On May 17, 1902, the young king formally acceded to the throne and took the oath prescribed by the constitution, the queen regent having taken official leave of the ministry on the 12th. The United States was represented at the ceremony by Dr. Jabez L. M. Curry, special envoy and former minister to Spain. President Roosevelt sent the king a cordial message.

**Alford, Henry**, an English poet and miscellaneous writer, philologist, critic, artist,

## Alfred the Great

and preacher, born in London, Oct. 7, 1810. He became Dean of Canterbury in 1856. An accomplished man, his literary work attracted attention in several departments. Besides sermons and university lectures, he wrote "The School of the Heart, and Other Poems" (1835), his most popular volume of verse, "The Queen's English" (1866). He was best known by his celebrated edition of the Greek New Testament (1844-1852), which, incorporating the results of German Biblical scholarship, formed a landmark in New Testament study in England and America. He was the first editor of the "Contemporary Review." He died at Canterbury, Jan. 12, 1871.

**Alfred the Great**, King of England, and one of the most illustrious rulers on record; born in Wantage, in Berkshire, A. D. 849. He was the son of Ethelwolf, King of the West Saxons, and his wife Osburga or Osburh; and though the youngest of five sons, he succeeded to the crown on the death of his brother Ethelred, in 871, at a time when the Danes, or Northmen, who were formidable to the Saxons as early as 787, had extended their conquests and devastations very widely over the country. He took part in the victory of Ashdown, gained over them before his accession, and soon after that event he was the English leader in the battle of Wilton, which, though indecisive in result, led to a short period of peace.

Though still quite a young man he had already given decisive proofs of his generalship and courage, which were soon again to be called into requisition. The Danish encroachments were renewed in 876 and 877, and though the enemy twice made peace with Alfred and promised to leave his dominions, they returned in greater force in 878, and overran a great portion of the kingdom of the West Saxons, rendering for a short time all resistance vain. It is to this period that the well-known (but quite unauthentic) story belongs of Alfred hiding in the neatherd's hut, and allowing the cakes to burn.

When the people again began to arm against the enemy, Alfred fortified himself on an elevation or island (since called Athelney, or "isle of the nobles") formed by the confluence of the Parret and Tone rivers amid the marshes of Somerset, to which he summoned his faithful adherents, and in a few weeks was again able to take the field. It was during his abode here that he went, according to the story, disguised as a harper, into the camp of King Guthrum (or Guthorm), and, having ascertained that the Danes felt themselves secure, hastened back to his troops, led them against the enemy, and gained such a decided victory that 14 days afterward the Danes begged for peace. This battle took place in May,



## Alfred the Great

878, near Edington, in Wiltshire; the peace was made at Wedmore, near Athelney. Alfred allowed the Danes who were already in the country to remain there, on condition that they gave hostages, took a solemn oath to quit Wessex, and embraced Christianity. Their king, Guthrum, was baptized, with 30 of his followers, and ever afterward remained faithful to Alfred. The Danes were allotted that portion of the E. of England which is now occupied by the modern counties of Norfolk, Suffolk, Cambridge, and Lincoln.

Alfred's success against the Danes led to an immediate enlargement of his own hereditary dominions, and to the spread of his influence over the adjoining territories, so that in the course of a few years he made himself virtual ruler of all England, though never formally recognized as such. The short period of tranquillity which followed was employed by him in rebuilding the towns and forts that had suffered most during the war, the city of London in particular being occupied and fortified (in 886); in erecting new fortresses, and training his people in arms and agriculture; in improving the navy; in systematizing the laws and internal administration; and in literary labors.

He is also said to have divided the kingdom into counties, hundreds, and tithings, and to have made these tithings, etc., responsible, as far as possible, for all offenses committed within their bounds. But this system was in existence before, so that it is more probable that he only carried out a new survey of existing boundaries, and introduced certain alterations. He is also said, but upon evidence scarcely satisfactory, to have introduced the system of trial by jury. He protected the rights of the clergy, and founded monasteries at Shaftesbury and Athelney, where he induced learned men to gather.

In this age of ignorance and barbarism Alfred occupied himself with great zeal in literary pursuits and in the advancement of learning. As there was then in England scarcely one man capable of translating a word of Latin, he invited and encouraged learned foreigners to come to his court; and although it is a mere legend, if not a deliberate invention, that he founded the University of Oxford, he probably did something for the improvement of the monastic school which had previously existed in that place. He caused many manuscripts to be translated from Latin, and himself translated several works into Anglo-Saxon, such as Pope Gregory's "Pastoral Care," Boethius on the "Consolation of Philosophy," the "History of Orosius" (in both omitting and adding passages as he pleased), Bede's "Ecclesiastical History," and other works. He also compiled several original works in Anglo-Saxon, of which we may mention

## Alfred University

"Laws of the West Saxons." He laid the foundation of the British navy by causing galleys of 60 oars to be built, which were as strong as any ships at that time in use. Under his auspices discoveries were made in the N., and in his "Orosius" he extends that author's geographical outline by a chart of Germany, an account of the Baltic, and of the icy regions toward the N., which are remarkable for their accuracy, when we take into consideration the means then available for acquiring a knowledge of these places.

These peaceful labors were interrupted, about 894, by the last invasion of the Northmen in his reign, under the Viking Hastings, and after a struggle which lasted during three years, and which was rendered more desperate by the secession to the enemy of the Northumbrians and East Anglians, they were beaten in almost every engagement with the English, and in 897 their army being defeated part of them returned to the Continent. The rest were scattered throughout Northumbria and East Anglia where for some time they caused considerable disturbance by their piratical attacks on Alfred's territories. After a final desperate battle with the Danes on the S. coast, however, Alfred succeeded in permanently driving the invaders from his kingdom.

Having acquired and merited the love, gratitude, and veneration of his subjects, this illustrious prince died, Oct. 28, 901, in the 30th year of his reign. His history, considering the times in which he lived, presents one of the most perfect examples on record of the able and patriotic monarch united with the virtuous man. His disposition was gentle and amiable, and his bearing frank and affable toward all. To his enemies he was merciful and forgiving; and notwithstanding the incessant pains with which his body was racked, he never suffered his labors for the civilization and true glory of his country to be interrupted. Alfred had married, in 868, Alswith or Ealhs-with, the daughter of a Mercian nobleman; she died in 902 or 905. He left two sons: Edward, called the Elder, who succeeded him; and Ethelwerd, who died in 922; his daughters were Ethelfleda, married to Ethelred of Mercia, and famous for her campaign against the Danish five boroughs; Ethelgiva, abbess of Shaftesbury; and Elfhryth, married to Baldwin, Count of Flanders.

**Alfred University**, a co-educational (non-sectarian) institution in Alfred, N. Y.; organized in 1836; has grounds and buildings valued at over \$90,000; scientific apparatus, \$45,000; income, \$30,000; volumes in the library, 23,000; professors and instructors, 25; students, 250; number of graduates since organization, over 910.



**Algæ**, the general name for the seaweeds and similar plants, mostly growing in salt and fresh water. They vary greatly in shape, structure, and size. Sometimes they adhere to rocks, also to the bottom of



ALGÆ.

the sea and of lakes, and sometimes they float on the surface. Vast masses of gulfweed float in the Atlantic Ocean over an area called the Sargasso Sea. Some kinds are used for food, while others are used for making iodine and soda. They belong to the lower class of cryptogamia.

**Algebra**, that department of mathematics which enables one, by the aid of certain symbols, to generalize, and, therefore, to abbreviate, the methods of solving questions relating to numbers. It is now regarded as the most extensive department of mathematics. It was called by Isaac Newton universal arithmetic, employing letters of the alphabet as symbols of known or unknown quantities and signs ( $+$ ,  $-$ ,  $\sqrt{\quad}$ , etc.), to indicate addition, subtraction, and similar arithmetical processes. Of the letters, those near the beginning of the alphabet ( $a$ ,  $b$ ,  $c$ ,  $d$ , etc.) usually stand for known quantities, and those toward its end for unknown ones. The difference between algebra and arithmetic consists in the universality of the former, its conclusions being true for any number of specific cases, while the results of an arithmetical process can be applied to a single case only. It has been discovered that the number of solutions to an equation is equal to that of the highest power of  $x$  involved, which defines the degree of equation. Only in equations up to the fourth degree, inclusive, is it possible to obtain a solution, that is, only in the cases of the quadratic, cubic, and biquadratic equations can values of  $x$  be found in terms of the known quantities,  $a$ ,  $b$ ,  $c$ , etc. For equations of higher degree, it has been demonstrated that no finite value of  $x$  can be obtained in terms of the known quantities. In spite of this barrier, the theory of algebraic equations has developed enormously, especially in the latter half of the 19th century, the advance being made from the point of view of transformation of the variable, and the use of homogeneous expressions, which have led to the modern theory of invariants, covariants, etc. In the case of more than one variable, algebra to a consid-

erable extent coincides with modern geometry, the cases where two and three variables are employed corresponding to the geometry of plane curves and of surfaces, respectively. Another important branch of modern algebra is the theory of determinants. The earliest extant treatise on algebra is that of Diophantus (4th century A. D.). The Hindus transmitted the science to the Arabs, whose writings on the subject were brought to Italy by Leonardo Fibonacci (1202 A. D.) of Pisa. Considerable progress was made by the Italians, and in 1505 the equation of the third degree was successfully solved by Scipione del Ferro (Scipio Ferreus) of Bologna, though the solution is generally known as Cardan's. About the middle of the 6th century, algebra was brought into England, France and Germany. Viète (1540-1603), a Frenchman, introduced many improvements, one of which was the employment of letters to indicate known, as well as unknown, quantities. Among later investigators are Descartes, Cauchy, Galois, Fourier, Jacobi, Clebsch, Cayley, Hermite, and Sylvester. In recent years algebra has assumed such wide development and importance that to treat of it in all of its branches is impossible in a single article.

WILLIAM E. STORY.

**Algeciras**, or **Algeziras** (al-he-thē-ras), a seaport on Gibraltar Bay, Province of Cadiz, Spain; anciently known as Portus Albus. It was the first landing place of the Moors, who held it from 713 till 1344, when Alfonso XI. of Castile obtained possession of it after 20 months' siege. The city was entirely destroyed, remaining in ruins till 1760. In 1801 two engagements took place near Algeciras, between the English and the allied French and Spanish fleets. In the first, the English were repulsed, while in the second the allies were routed. Algeciras has a curious and beautiful aqueduct constructed by the Moors.

**Alger, Cyrus**, an American inventor, born in West Bridgewater, Mass., Nov. 11, 1781. He learned the iron foundry business, and in 1809 established himself in South Boston, where he soon made himself widely known by the excellence of the ordnance he manufactured. He supplied the United States Government with a large quantity of cannon-balls during the war of 1812; produced the first gun ever rifled in America, as well as the first perfect bronze cannon; and supervised the casting of a mortar which was the largest gun of cast-iron that had then been made in the United States. Subsequently he made improvements in the construction of time fuses for bomb-shells and grenades; patented a method of making cast-iron chilled rolls; and was the original designer of the cylinder stove. He died in Boston, Mass., Feb. 4, 1856.



**Alger, Horatio**, an American writer of juvenile books, born at Revere, Mass., Jan. 13, 1834; graduated from Harvard in 1852, settled in New York in 1866, and became interested in the condition of self-supporting boys, described in his series of more than 50 books, including "Ragged Dick," "Tattered Tom," "Luck and Pluck," which became very popular. Other works: "Nothing to Do: A Tilt at Our Best Society," a poem (1857); "Helen Ford," a novel (1860); a series of juvenile biographies of Webster, Lincoln, Garfield, etc.; and "The Young Salesman" (1896). He died in Natick, Mass., July 18, 1899.

**Alger, Russell Alexander**, an American merchant, capitalist, and politician, born in Lafayette, O., Feb. 27, 1836. He served in the Civil War, rising from a captaincy to the rank of brevet Major-General of Volunteers. He acquired a large fortune in Western enterprises, particularly the lumber business. He was Governor of Michigan from 1885 to 1887; a candidate for the Republican presidential nomination in 1888; Commander-in-Chief of the Grand Army of the Republic (1889-1890); and became Secretary of War in President McKinley's cabinet in 1897. Almost from the beginning of the American-Spanish War of 1898 he was the object of so much public censure for alleged shortcomings in his Department, that he resigned in 1899. In 1901 he published "The Spanish-American War"; in 1903 was elected United States senator. He died Jan. 24, 1907.

**Alger, William Rounseville**, an American Unitarian clergyman and writer, born at Freetown, Mass., Dec. 30, 1822. His chief works are "History of the Doctrine of a Future Life" (1863); "Genius of Solitude" and "Friendships of Women." He occupied pulpits in New York, Denver, Boston, and San Francisco. He died Feb. 7, 1905.

**Algeria**, a French colony in the N. of Africa; bounded on the N. by the Mediterranean, on the E. by Tunis, on the W. by Morocco, and on the S. by the desert of Sahara. The boundaries are not well defined, and many of the nominally dependent tribes in the more thinly peopled districts continue in a state of semi-independence. The country is divided into three provinces—Algiers, Oran and Constantine, of which the area and population are given as follows in official returns of March 4, 1906:

|                    | Sq. miles. | Pop. 1906 |
|--------------------|------------|-----------|
| Algiers, .....     | 65,929     | 1,596,333 |
| Oran, .....        | 44,616     | 1,099,597 |
| Constantine, ..... | 73,929     | 2,025,044 |
|                    | 184,474    | 4,720,974 |

The coast-line is about 550 miles in length; it is steep and rocky, and though the indentations are numerous the harbors are much exposed to the N. wind. The country

is traversed by the Atlas mountains, two chains of which—the Great Atlas bordering on the Sahara, and the Little or Maritime Atlas, between it and the sea—run parallel to the coast. The former attains a height of about 7,000 feet. The intervals are filled with lower ranges, and numerous transverse ranges connect the principal ones and run from them to the coast, forming elevated table-lands and inclosed valleys. The Shelif, which flows into the Mediterranean near Mostaganem, is by much the largest river; the Kibir, the Isser, the Seibus, etc., are also considerable. There are also, both on the coast and in the interior, extensive salt lakes or marshes, which dry up to a great extent in summer. The principal of these are Melrir, Shergi, and Gharbi. The country bordering on the coast, called the Tell, is generally hilly, though in some places a flat and fertile plain extends between the hills and the sea, and the hills are everywhere intersected by fruitful valleys. The principal maritime plains are the Matidjah, behind Algiers, the plain of Oran, and that of the Shelif. In the E. of Algeria, S. of that part of the Little Atlas which bears the name of Mount Aures, there is an extensive hot plain which sinks in the Shott Melrir below the sea-level. The principal oases of the Sahara region are El Wad, Tug-gurt, and Wargla.

About 9,000,000 acres in all are now under cultivation in Algeria, and produce good wheat, barley, oats, and pulse. After the various kinds of grain the olive is the most important object of cultivation in the country, while there are now over 290,000 acres laid down in vines. The cultivation of fine sorts of vegetables occupies a great deal of the attention of the colonists in the vicinity of the town of Algiers. The growth of cotton is declining. Tobacco, on the other hand, is becoming every year a more important agricultural product. Wine is annually produced to the amount of about 70,000,000 gallons. The production of raw silk is on the increase, but the quantity is still unimportant. The cultivation of the date palm is being extended very rapidly by artificial irrigation. A fiber called *alfa* (*Macrochloa arenaria*), a variety of esparto, has recently acquired great industrial importance, furnishing an excellent material for paper-making. It grows wild on the high plateaux over an area of more than 15,000 square miles. Agriculture in Algeria often suffers much from the ravages of locusts. In some years more than half of the crops is said to be destroyed by this insect. Another great enemy that settlers on fresh land have to deal with is the small fan palm (*Chamærops humilis*), which is found almost everywhere in Algeria, and is difficult and costly to extirpate. The forests of Algeria form one of the principal sources of wealth of the colony, and en-



gage the constant attention of the government. They are estimated to cover an area of about 8,700 square miles, but from time immemorial have been diminishing in extent every year, partly owing to the devastations of the natives, who used to burn down large tracts before the rainy season, in order to make the grass grow more abundantly and to render it more easily accessible to their flocks. Stringent measures have been taken with the view of repressing this practice, and are said to have had the best results. Among the trees that grow in the forests of Algiers are various sorts of pines, the Atlas cedar, oaks (including the sweet-acorn oak (*Quercus balota*) and the cork oak), the ash, myrtle, pistachio nut, mastic, carob, and wild olive.

Among the domestic quadrupeds of Algeria the horse occupies the first place. The Algerian horse is slender, light, and sinewy, and hence best adapted for racing and for military purposes. The mule, which the dry and hot climate suits well, is the animal largely used as a beast of burden. Horned cattle are reared everywhere and are remarkably abundant, but owing to the absence of rich pasture grass and good winter fodder are ill fleshed and yield hardly any milk. Sheep are numerous, and form almost the sole wealth of the most southerly tribes. Many are exported to France. Pigs were unknown in Algeria till after its conquest by the French.

The mineral wealth of Algeria is known to be very considerable, though hitherto it has not been utilized to any great extent. Iron and copper are found in great abundance in the Algerian mountains. As to the working of the mines, a commencement has been made with those of iron, lead, and copper. Valuable deposits of phosphate of lime exist and are now being exploited. Sulphur and antimony are not entirely neglected, and excellent lithographic stone is found. There are several mineral springs, and the ruins of baths prove that they were used by the ancient Romans.

The trade of Algeria has greatly increased under French rule, and more especially since its products were admitted into France duty free, which they were for the first time in 1851. France, Spain, and England are the countries with which the trade is principally carried on, and three-fourths of the whole trade is with France. The exports from this last country to Algeria are chiefly woven fabrics and manufactured goods of all sorts, grain, flour, wines, spirits, sugar, and articles of dress. The imports which it receives from Algeria are grain, sheep, cattle, wool, olive oil, raw hides, etc. England furnishes coal, cottons, iron, and metal wares, and receives barley, alfa, iron ore, lead ore, etc. The special commerce in 1900 was, imports, \$62,666,000; exports, \$45,872,800. Besides Algiers

the principal ports are Bona, Philippeville, Bougie, Oran, Shershel, Tenes, Mostaganem, and Nemours. The manufacturing industries of Algeria are naturally unimportant. They are chiefly confined to the making of morocco leather and the weaving of carpets, muslins, and silks. French money, weights, and measures are generally used. There is a daily service of steamers to France, and about 2,000 miles of railway, the principal lines being from Algiers to Oran and from Philippeville to Constantine. There is also a considerable network of telegraph lines, with more than 16,500 miles of wire.

*Peoples.*—The two principal native races inhabiting Algeria are Arabs and Berbers. The former, who inhabit chiefly the S. parts, are mostly true nomads, dwelling in tents and wandering from place to place. A large number of them, however, are settled in the Tell, where they carry on agriculture and have formed numerous villages. The Berber race, here called Kabyles, are the original inhabitants of the territory and still form a considerable part of the population. They are mainly distributed over the mountainous parts of the province of Constantine, but are not wanting in the plains and in the other provinces. They preserve the ancient Berber language, but use Arabic characters in writing. Part of them have already become mixed with Arab tribes, and this amalgamation is still going on. Among the less numerous races that inhabited the land before the French occupation, and still found there, are the Moors, a mixed race, partly descended from Arabic ancestors and partly from the ancient Mauretanians. They live in the towns and villages on or near the coast, and earn a scanty livelihood as petty tradesmen or mechanics. The Jews form a small but influential part of the population (about 45,000). Formerly they were subject to much oppression, but since their emancipation under French rule many of them have become wealthy and are increasing. Others to be mentioned are the Biskirh, an Arab race from the oasis of Biskarah; the Mozabites, an African (Berber) race belonging to the oasis bordering on the desert; and the Kolongis, who are the descendants of Turkish janizaries and native women, and are pretty numerous in Algiers and other towns. There are now hardly any pure Turks in Algeria. Except the Jews all the native races of Algeria are Mohammedans.

Since 1871 Algeria has been governed by a civil governor-general, who has supreme military authority and legislative powers, which he shares with a council appointed by the French government. The Sakara territory, inhabited by nomad tribes, is still under military rule. The three provinces are divided into 12 departments, each of which is under a prefect and sub-prefects. A council consisting of the prefects, the



archbishops, the military governor, and other members appointed by the French government, meets at Algiers under the presidency of the civil governor every October to deliberate on the affairs of the colony. Four kinds of taxes are levied on the natives: the *achour*, a tithe on cereals; the *hockor*, the rent of the land (not levied generally); the *zekkat*, an impost upon cattle; and the *lezma*, a sort of tax upon capital, levied only on the nomad tribes of Sahara. All the taxes are levied in money. The revenue and expenditure of the colony are about \$11,000,000 each annually. The military expenditure and the expenditure for the administration of justice and public worship are included in the general budget of France. Algeria is represented both in the senate and chamber of deputies of the mother country.

*History.*—The country now called Algeria was known to the Romans as Numidia. The two most powerful tribes were the Massyli to the E., and the Massæsyli to the W. Masinissa, prince of the former, took part with the Romans in their war with the Carthaginians, and was rewarded with the title of King of Numidia and the greater part of the territories of his rival Syphax, Prince of the Massæsyli, who had sided with the Carthaginians (202 B. C.). About 150 years later Juba, one of the successors of Masinissa, sided with Pompey against Cæsar, and his kingdom was annexed to the Roman province of Africa (46 B. C.). Algeria was valuable to the Romans for its supplies of grain. It flourished under their rule, and early received the Christian religion. Algeria was conquered by the Vandals in A. D. 430-431, and recovered by Belisarius for the Byzantine empire in 533-534. About the middle of the 7th century it was overrun by the Saracens, and after this time divided into numerous petty states, most of which relapsed into barbarism. The town of Algiers was founded about 935 by Yussef Ibn Zeiri, and the country successively fell under the Moorish dynasties of the Zeirides, Almoravides, and Almohades. After the overthrow of the empire of the Almohades by the Merinides, about 1269, Algeria broke up into a number of small independent territories. A separate kingdom grew up under a Merinide dynasty at Tlemcen in the W. of Oran, and the towns of Algiers, Oran, Bougie, and Tenes acknowledged at first no external authority, although they were ultimately rendered tributary by the kingdom of Tlemcen. The Moors and Jews who were driven out of Spain by Ferdinand and Isabella at the end of the 15th century settled in large numbers in Algeria, and revenged themselves on their persecutors by the practice of piracy. On this account various expeditions were made by Spain against Algeria, and by 1510 the greater part of the

country was made tributary. A few years later the Algerians, who disliked the Spanish yoke, invited to their assistance the Turkish pirate Horush (or Haruj) Barbarossa, who became Sultan of Algiers in 1516, and organized there a system of piracy which was long the terror of European commerce, and was never wholly suppressed till the French occupation. His brother and successor Hayraddin (Khair-ed-din) put Algiers under the protection of Turkey (about 1520). He fortified the town and made a strong mole to protect his ships. In this work he is said to have employed 30,000 Christian slaves for three years. The Algerian janizaries were regularly recruited in Turkey. About 1600 they obtained from the porte the right to choose among themselves a dey, who was to share the power with the pasha deputed by the sultan. From this time frequent disputes arose between the deys and pashas, till in 1710 the pasha was expelled and the dey became supreme ruler with a nominal dependence on the porte.

From this time the internal history of Algiers presents little remarkable beyond the frequent bloody revolutions of the seraglio accomplished by the janizaries, who allowed few deys to die a natural death. The depredations of the Algerian pirates were a continual source of irritation to the Christian powers, who sent a long series of expeditions against them. In 1815 a United States fleet defeated an Algerian one off Cartagena, and forced the dey to agree to a peace in which he recognized the American flag as inviolable. In 1816 Lord Exmouth led an expedition against the Algerians, which bombarded Algiers (Aug. 27-28), exacted a treaty according to which all the Christian slaves were at once released, the sums paid as ransom for Italian captives were restored, and the dey undertook for the future to treat all his prisoners of war as the European law of nations demanded. The piratical practices of the Algerians were nevertheless soon renewed, and went on till the French fitted out the final expedition of conquest in 1830. They gave a pledge to the British government that their occupation of the country was not to be final, but this was afterward withdrawn, and Great Britain acquiesced in its withdrawal on condition that Tunis and Morocco should not be disturbed. Algiers was occupied on July 5, and measures were soon after taken to subdue the interior. The dey (Hussein) had retired, and the country was without a government, but resistance was organized by Abd-el-Kader, an Arab chief whom the emergency had raised up. He began his warfare with the French by an attack on Oran in 1832, and after an obstinate struggle the French, in February, 1834, consented to a peace with him, in which they acknowledged him as ruling over all



the Arab tribes W. of the Shelif by the title of Emir of Maskara. This peace was, however, soon broken. In June, 1835, the French general Trezel, then commanding in Oran, headed an expedition against Abd-el-Kader, which terminated in the complete defeat of the French on the Makta (June 28). Drouet d'Erlon, the first governor-general, to whose weakness the advances of Abd-el-Kader were attributed, was now recalled, and was succeeded by Marshal Clauzel. Clauzel was successful in capturing Maskara, the center of Abd-el-Kader's power; but the failure of an expedition to the Tafna and the defeat of General d'Arlenges on this river in April, 1836, raised the influence of the emir to the highest pitch, and occasioned the outbreak of a petty warfare in other parts of the land. While this was happening in the W. Clauzel undertook an expedition against Constantine, which completely miscarried, and in consequence of this the marshal was recalled in February, 1837. General Damrémont, his successor, resolved first of all to effect at any cost the capture of Constantine, and in order to have his hands free made peace with Abd-el-Kader (May, 1837), leaving to him the whole of Western Algeria except some coast towns. On Oct. 13, Constantine was taken by storm. Damrémont, however, had been killed the previous day. The subjugation of the province of Constantine followed.

Meanwhile, Abd-el-Kader was gradually strengthening himself and preparing for another conflict with the French, and in November, 1838, he suddenly broke into French territory with a superior force. The French governor, Marshal Valée, found it expedient to confine himself to defensive operations, and for a time the supremacy of the French was endangered. In the autumn of 1841 Saida, the last fortress of Abd-el-Kader, fell into Bugeaud's hands, after which the only region that held out against the French was that bordering on Morocco. Early in the following year this also was conquered, and Abd-el-Kader found himself compelled to seek refuge in the adjoining empire. From Morocco Abd-el-Kader twice made a descent upon Algeria, on the second occasion defeating the French in two battles; and in 1844 he even succeeded in raising an army in Morocco to withstand the French. Bugeaud, however, crossed the frontier, and in August inflicted a severe defeat on this army at Isly, while the French fleet, under the Prince de Joinville, bombarded the towns on the coast. The Emperor of Morocco was at length compelled to agree to a treaty, in which he not only promised to refuse Abd-el-Kader his assistance, but even engaged to lend his assistance against him.

Reduced to extremities Abd-el-Kader surrendered on Dec. 27, 1847. Contrary to

the conditions of surrender he was at first taken to France and treated as a prisoner, but was afterward released on his personal engagement not to return to Algeria by Prince Louis Napoléon, when President of the French Republic. In 1848 Algeria obtained the right to send deputies to the French National Assembly. The country was yet far from subdued; the Kabyles in particular, and the Arabs in the S. made protracted resistance, and rose again and again in insurrection against the yoke which was attempted to be imposed on them. Algeria thus became a school for French generals. Pelissier and Canrobert repressed the rebellious Kabyles in 1849. In 1851 St. Arnaud subdued Little Kabylia. In 1852 Macmahon succeeded against Eastern Kabylia, and in 1856 Great Kabylia was subdued by General Randon. An Arab rebellion occurred in 1859. In 1864 Macmahon, who succeeded Pelissier as governor-general, put down another insurrection of the Arabs, and in 1865 a partial insurrection occurred in Oran. At this time the emperor, who had visited the colony, introduced considerable modifications into the government. Fresh disturbances broke out in the S. nearly every year till 1871, when, during the Franco-German War, a great effort was made to throw off the French yoke. It was, however, completely suppressed, and a civil government was in the same year established, instead of the obnoxious military government in the N. parts of the colony.

**Algiers**, city and capital of Algeria. It consists of a lower European town and an upper Moorish town. The first has a cathedral and an exchange. The latter contains several mosques and the Kasbah, the ancient fortress of the deys. It is strongly fortified, has two dry-docks, and a harbor inclosed by two moles. There are two islands opposite, from which it takes its name. The town is a favorite winter health resort. It has considerable trade; exports wine, wheat, coral, and olive oil. It was for a long time the chief rendezvous of the Algerian pirates; was bombarded by the British under Lord Exmouth, in 1816, and was taken by the French in 1830. Pop. (1906) 138,240.

**Algin**, a jelly-like substance found in marine algæ. It was discovered in 1881 by E. C. C. Stanford, of Glasgow. If the leaf-like thalli of a laminaria are immersed in water containing a little carbonate of soda, the whole cellular fabric of the plant becomes broken up in the course of 24 hours, forming a thick gelatinous mass containing about 2 per cent. of algin. This mass, after being cautiously heated, is filtered through coarse linen, and the cellulose left behind amounts, when dry, to from 10 to 15 per cent. of the air-dried plant. The solution which passes through the filter contains,



in addition to the algin in the form of alginate of soda, some mucilage and dextrine. When sulphuric or hydrochloric acid is added, the algin, or, more correctly speaking, the alginic acid, separates in flocks, and is easily washed and pressed into a compact cake not unlike new cheese. Chemically, it is a nitrogenous organic acid, and is the insoluble form of algin. When required for use in a soluble state, it is redissolved to saturation in solution of carbonate of soda, when alginate of soda is again formed. The properties of algin in the soluble form are those of a very viscous gum, drying up to a transparent elastic film. As a size or dressing for textile fabrics, algin goes further and does more work than starch or any of the ordinary gums, and has the advantage of being easily rendered insoluble in water. Algin makes an excellent thickening for soups, and, with the addition of a little gelatine or isinglass, is serviceable for jellies. The insoluble form of algin, in the dry state, resembles horn, and can be turned and polished. It is a by-product of the manufacture of iodine and is used in the preparation of photographic paper.

**Algoa Bay**, a bay on the S. E. coast of Cape Colony, Africa; about 420 miles E. of the Cape of Good Hope. At its entrance, formed by Cape Woody on the N. E. and Cape Recife on the S. W., it has a width of 33 miles. Its shelter is very valuable, as there is no other refuge for ships during the N. W. gales. The usual anchorage is off Port Elizabeth, at the mouth of the Baakens, where there is now a large and increasing trade.

**Algol**, a fixed star in Medusa's head, in the constellation Perseus. Technically of  $2\frac{1}{2}$  magnitude, it really varies from the 2d to the 4th magnitude in  $3\frac{1}{2}$  hours, remaining thus for about 20 minutes. In  $3\frac{1}{2}$  hours more it is again of the 2d magnitude, at which it continues for 2 days and 13 hours, after which the same series of changes takes place again. This variation is explained by the supposition that some invisible body revolves about Algol, partially eclipsing it. A study of the times of these eclipses has led to the supposition that Algol and its satellite may revolve every 150 years around some third body also as yet invisible and undiscovered, and that they are at a distance from each other of over 3,000,000 miles. W. H. PICKERING.

**Algonkian**, or **Algonquian**, an Indian linguistic stock, originally the most extensive in North America. It extended southward from Labrador to Pamlico Sound, N. C., and westward from Newfoundland to the Rocky Mountains, comprising about 40 tribes, each with a separate language and numerous dialects. Some of these tribes banded together into confederacies, the most important being the Abnaki or Illinois, Pow-

hatan, and Seksika or Blackfoot. The remaining tribes are the Micmac, Malecite, Massachuset, Wampanoag, Narraganset, Nipmuc, Pennacook, Pequot, Mohegan, Mohican, Metoac, and Wappinger, on the North Atlantic coast; Munsie, Leni-Lenape or Delaware, Shawano, Nanticoke, Conoy, Mattamuskeet, on the South Atlantic coast; Nascapi, Montagnais, Algonkian, Ottawa, Muskegon, Cree, Ojibwa, Misisaga, Miami, Piankishaw, Illinois, Sac, Fox, Kickapoo, Pottawotomi, Menomini, in the interior, and Atsina, Arapaho, and Cheyenne in the W. Tradition places the original home of all these tribes on the North Atlantic coast.

Constant wars with the English, French, and Dutch colonists depleted their numbers. Filled at first with the idea of freeing the soil from the whites, they afterward degenerated into mere mercenaries, fighting on either side for revenge or gain. After the War of 1812, in which they took the side of the British, the United States Government resolved to send them as far W. as possible. After 1840, few of them remained E. of the Mississippi. In Canada, they were not removed from their homes, but were limited as to territory. War and disease have thinned their number, until only 37,000 remain in the United States, and 63,000 in Canada. The chief occupations of the Algonkians were hunting, fishing, and corn raising. In character they were brave, strong, and intelligent, but lacking in steadfastness. They were not so united as the Iroquois, owing to the multiplicity of their languages.

**Alhama**, a town of Spain, on the Motril; 25 miles S. W. of the town of Granada. This place is celebrated for its warm medicinal (sulphur) baths and drinking waters, and also for its romantic situation between craggy mountains. The principal bath was a Moorish edifice, the smaller was circular in form and probably a Roman erection. The town was thrown completely into ruins by an earthquake shock in 1884. Washington Irving, in his "Chronicle of Granada," gives a spirited account of the taking of Alhama, "the key of Granada," from the Moors, by Rodrigo Ponce de Leon, Marquis of Cadiz, in February, 1482.

**Alhambra**, the famous palace of the Moorish kings of Granada, situated on a hill N. of the town of Granada. It is inclosed in a walled area of 35 acres. The chief entrance to the inclosure is by a horseshoe arch, called the Gate of Judgment, 28 feet high, surmounted by a square tower. From this a narrow passage leads to the Plaza de los Algibes, where, on the left, is the ruined Alcazaba, the fortress of the Alhambra, and on the right is an unfinished palace of Charles V. Behind the latter is the Alhambra. Outside, the palace is cold and plain looking, but within, in the



most ornate style of the East, are many halls, porticoes, courts, chambers, gardens, and mosaic pavements in red, blue, and yellow colors. The stone lacework is covered with inscriptions from the Koran and Arabic poetry. The Court of the Myrtles contains a large fish pond, and the famous Alhambra vase, discovered in the 16th century and dating from 1320. It is nearly 5 feet high, and is enameled in white, blue, and gold.

The Hall of the Ambassadors, the largest in the Alhambra, is contained within the tower of Comares, on the N. wall. The Court of the Lions is one of the most notable of the courts, having a length of 116 and a breadth of 66 feet. It is surrounded by a gallery supported by white marble pillars. Its pavements and walls are covered with colored tiles; and in its center is the Fountain of the Lions, an alabaster basin supported by 12 lions of white marble, out of whose mouths spouted the water from the basin. The Hall of the Abencerrages, the most beautiful one in the palace, is surrounded by an arcade with marble arches. This hall was the scene about 1480 of the massacre of the family of the Abencerrages, by King Boabdil. Opposite is the Hall of the Two Sisters, which takes its name from two large slabs of marble, each 15 feet long, which are embedded in the floor. The ceiling is made of about 5,000 stalactites, giving a curious and beautiful effect. The palace was begun by Ibn-l-Ahmar in 1248, and was completed by Mohammed III. in 1314. It was taken by the Spaniards in 1491, and was entered by Ferdinand and Isabella in 1492. It suffered at the hands of Charles V., and the French blew up several of its towers. It was partially restored by Queen Isabella in 1862, and in 1890 was damaged by fire. In spite of its neglected condition, the Alhambra is the most remarkable and most perfect specimen of Moorish art to be found in Europe.

**Ali**, the fourth Mohammedan caliph (656-661), surnamed "the Lion of God," a cousin of Mohammed, and the husband of the Prophet's daughter, Fatima. He suppressed a rebellion instigated by Ayesha, Mohammed's widow, but was outwitted in an arbitration with Moawiya, governor of Syria, who wrested the caliphate from him. Ali lost Egypt, Syria and Persia, and while raising a military force to regain his rights, was assassinated by one of the Karigite sect, formerly his supporters. His followers considered him a martyr, and upon the question of his claim to the caliphate the whole Moslem world was divided into two great religious parties, the Shialhs, who asserted his right, and the Sunnites, who disallowed it.

**Ali**, an adventurer, known as Ali Bey; originally an Abkhasian slave; born in

1728; rose to be a bey of the Mamelukes. He made himself independent of the Porte and was proclaimed Sultan of Egypt (1768). He conquered Syria and part of Arabia, but was defeated, in 1773, by a revolting army led by his son-in-law, and died a few days after of wounds or of poison.

**Alias**, in law, a term used to indicate the various names under which a person who attempts to conceal his true name and pass under a fictitious one is ascertained to have passed during the successive stages of his career.

**Alibi**, in law, a plea that the person accused of having committed a crime was elsewhere at the time when the breach of the law occurred. If he substantiate this, he is said to prove an alibi. In Scotland the defendant must give notice of a special defense of alibi, stating where he was when the crime was committed. In England and the United States this notice is not required.

**Alicante**, a seaport of Spain; capital of the Province of Alicante; the ancient Lucentum. It is situated at the foot of a cliff 850 feet high, which is crowned by the Fort of Santa Barbara. It has one of the best harbors on the Mediterranean, and carries on a considerable trade, exporting wine, fruit, esparto grass, etc. It was bombarded in 1873 by two vessels sent out by Cartagena insurgents. Pop. (1900) 50,142.

**Alien**, any person not legally within the jurisdiction of a country as one of its citizens. By the laws of the United States, the children of male citizens, whether born within the country or abroad, are held to be citizens; but all other foreign born individuals are aliens until made citizens by naturalization. In the United States aliens are nominally prohibited from acquiring title to real estate, but in practice they may own lands subject to proceedings by the State to determine the fact of alienage; and, moreover, in nearly all the States there are special provisions removing such restrictions from resident aliens who are in the course of naturalization. The rights of aliens to hold personal property and carry on trade are the same as those of citizens. In time of war, however, aliens belonging to the country of the enemy cannot make contracts with citizens or resort to the courts except as accorded such privileges by special treaties. Naturalized aliens are subject to political disabilities as follows: They are permanently disqualified for election as President or Vice-President, and they cannot become members of the National Senate or House of Representatives until they have been citizens for nine or seven years respectively. In Great Britain there is no discrimination whatever between aliens and



subjects as far as property rights are concerned. It is held by British law that the children of aliens born in Britain are natural born subjects. In all Christian countries the tendency of legislation concerning aliens shows increasing liberality, although it is still the policy of the Latin nations, in their colonies, to limit materially the trade advantages of foreigners.

**Ali Ferrough Bey** (äl'ē-fer-rög'), a Turkish diplomatist and author, born in Constantinople in 1865; was educated at the National University in Paris; became secretary of the embassies in London, Paris and Bucharest, counselor of the embassy in St. Petersburg, and, in 1895, minister to the United States. Among his publications are a "History of Turkey," and a "History of Arabia."

**Alighieri.** See DANTE.

**Aliment**, a term which includes everything serving as nutriment for organized beings. Generally, however, the word aliment is used for what serves as nutriment to animal life. In the present article we shall confine ourselves chiefly to the aliment of mankind. Man, it is well known, derives nourishment both from animal and vegetable substances. He eats fruits, both ripe and unripe, roots, leaves, flowers, and even the pith and bark of different plants, many different parts of animals, and the whole of some. Climate, custom, religion, the different degrees of want and civilization, give rise to an innumerable diversity of food and drink, from the repast of the cannibal savage to that of the Parisian epicure. Some nations abhor what others relish, and great want often renders acceptable what, under other circumstances, would have excited the greatest disgust. The flesh of dogs is commonly eaten in China. Locusts are eaten both in Asia and Africa; the negroes on the coast of Guinea relish lizards, mice, rats, snakes, caterpillars, and other reptiles and worms; and there are several classes of people who eat with a relish certain kinds of clay.

All kinds of aliment must contain nutritious substance, which, being extracted by the act of digestion, enters the blood, and effects by assimilation the repair of the body. Alimentary matter, therefore, must be similar to animal substance, or transmutable into such. In this respect alimentary substances differ from medicines, because the latter retain their peculiar qualities in spite of the organs of digestion, and will not assimilate with the animal substance, but act as foreign substances, serving to excite the activity of particular organs or systems of the body. All alimentary substances must, therefore, be composed in a greater or less degree of soluble parts, which easily lose their peculiar qualities in the process of digestion, and correspond to

the elements of the body. The aliments of animals are for the most part substances containing little oxygen and exhibiting a high degree of chemical combination, in which respects they differ from most substances that serve as sustenance for plants, which are generally highly oxidized and exhibit little chemical combination. According to the nature of their constituents most of the aliments of animals are divided into nitrogenous (consisting of carbon, hydrogen, and oxygen along with nitrogen, and also of sulphur and phosphorus), and anitrogenous (consisting of carbon, hydrogen, and oxygen without nitrogen). Water and salts are usually considered as forming a third group, and, in the widest sense of the word aliment, oxygen alone, which enters the blood in the lungs, forms a fourth. The articles used as food by man do not consist entirely of nutritious substances, but with few exceptions are compounds of various nutritious with indigestible and accordingly innutritious substances. The only nitrogenous aliments are albuminous substances, and these are contained chiefly in animal food (flesh, eggs, milk, cheese). The principal anitrogenous substance obtained as food from animals is fat. Sugar is so obtained in smaller quantities (in milk and eggs). Very few vegetable substances contain much albumen, while they are generally rich in starch. Among vegetable substances the richest in albumen are the legumes and wheat flour, which contain a good deal of gluten. Fats, sugar, water, and salts may pass without any change into the circulatory system; but albuminous substances cannot do so without being first rendered soluble and capable of absorption (in the stomach and intestines), and starch must be converted into sugar (by the action of the saliva and pancreatic juice). One of the objects of cooking is to make our food more susceptible of the operation of the masticatory and digestive fluids.

The relative importance of the various nutritious substances that are taken into the system and enter the blood depends on their chemical constitution. The albuminous substances are the most indispensable, inasmuch as they form the material by which the constant waste of the body is repaired, whence they are called by Liebig the substance-formers. But a part of the operation of albuminous nutriment may be performed equally well, and at less cost, by anitrogenous substances, that part being the maintenance of the temperature of the body. As is well known, the temperature of warm-blooded animals is considerably higher than the ordinary temperature of the surrounding air, in man about 98° F., and the uniformity of this temperature is maintained by the heat which is set free by the chemical processes (of oxidation)



which go on within the body. Now these processes take place as well with anitrogenous as with nitrogenous substances. The former are even preferable to the latter for the keeping up of these processes, inasmuch as they do not require to be digested before fulfilling that function, and they are hence called the heat-givers. The best heat-giver is fat. Albuminous matters are not only the substance-formers of the body; they also supply the vehicle for the oxygen, inasmuch as it is of such matters that the blood corpuscles are formed. The more red blood corpuscles an animal possesses, the more oxygen can it take into its system, and the more easily and rapidly can it carry on the process of oxidation and develop heat. Now only a part of the heat so developed passes away into the environment of the animal; another part is transformed within the body (in the muscles) into mechanical work. Hence it follows that the anitrogenous articles of food produce not merely heat but also work, but only with the assistance of albuminous matters, which, on the one hand, compose the working machine, and on the other hand, convey the oxygen necessary for oxidation.

Organs of digestion in a healthy state dissolve alimentary substances more easily, and take up the nutritious portions more abundantly, than those of which the strength has been impaired, so that they cannot resist the tendency of each substance to its peculiar chemical decomposition. The wholesome or unwholesome character of any aliment depends, therefore, in a great measure, on the state of the digestive organs in any given case. Sometimes a particular kind of food is called wholesome because it produces a beneficial effect of a particular character on the system of an individual. In this case, however, it is to be considered as a medicine, and can be called wholesome only for those whose systems are in the same condition. Very often a simple aliment is made indigestible by artificial cookery. The addition of too much spice makes many an innocent aliment injurious, because spices resist the action of the digestive organs, and produce an irritation of particular parts of the system. They were introduced as artificial stimulants of appetite. In any given case the digestive power of the individual is to be considered in order to determine whether a particular aliment is wholesome or not. In general, therefore, we can only say that that aliment is healthy which is easily soluble, and is suited to the power of digestion of the individual; and in order to render the aliment perfect, the nutritious parts must be mixed up with a certain quantity of innocent substance affording no nourishment, to fill the stomach, because there is no doubt that many people injure their health by taking too much nutritious food.

In this case the nutritious parts which cannot be dissolved act precisely like food which is in itself indigestible. Man is fitted to derive nourishment both from animal and vegetable aliment, but can live exclusively on either. Animal food most readily augments the solid parts of the blood, the fibrin, and therefore the strength of the muscular system, but disposes the body at the same time to inflammatory, putrid, and scorbutic diseases. On the contrary, vegetable food renders the blood lighter and more liquid, but forms weak fibers, and disposes the system to the diseases which spring from feebleness. The nations of the North incline generally more to animal aliments; those of the South and the Orientals, more to vegetable.

**Alimentary Canal**, the alimentary tube; the great tube or duct by which food is conveyed into the stomach, and from which the waste and undigested food is excreted. It consists of the mouth, the pharynx (throat), the œsophagus (gullet), the stomach, the small intestine (including the duodenum, jejunum and ileum), the large intestine (cæcum and colon), and the rectum, and is about 25 feet long. Into it open the ducts from the liver and from the pancreas, carrying respectively bile and pancreatic fluid.

**Alimony**, in law, the allowance, awarded out of her husband's estate, to which a wife is entitled on separation or divorce. Jurisdiction in this matter in England rested with the ecclesiastical court until 1857, when it was conferred upon a court of divorce. In the United States it is vested in the courts of equity. Alimony may be granted by the court during litigation, in which case it is known as *pendente lite* (during the suit); or at the conclusion of the suit, when it is called permanent. The former enables the wife to pursue the litigation, whether proceedings have been brought by or against her. The amount granted lies within the discretion of the court. Permanent alimony is a periodical allowance, awarded to the wife if the termination of the suit is favorable to her. By a writ of *ne exeat* (let him not depart), the court can prevent the husband from leaving the State without leaving sufficient security for payment. If the husband should remove to another State the wife can enforce her claim in the Federal courts.

**Alin, Oscar Josef**, a Swedish historian, born in 1846; professor in the University at Upsala. He instructed the Princess Victoria of Baden, afterward Crown Princess of Sweden, in Swedish history and literature. In 1888 he became a member of the Upper Chamber of the Parliament. He has written many monographs on the history of Sweden.



## Ali Pasha

**Ali Pasha**, a famous pasha of the *vilayet* of Janina; immortalized by Byron in the second canto of "Childe Harold." As the outcome of a half century's incessant warring against hostile tribes a considerable tract of territory was added to his dominion; but at length, the Ottoman court becoming jealous, he was assassinated at its command.

**Alis, Hippolyte Percher**, a French novelist and journalist, born at Coulevre, Oct. 7, 1857. He has contributed to various Paris journals, and is the author of several naturalistic novels, among which are "Hara-Kari" (1882); "A Daughter of the Soil" (1885); "Some Foolish People" (1889).

**Alishan, Leon M.**, an Armenian poet and historian, born in Constantinople, July 30, 1820. He studied in Venice, where he took orders in 1840, and was appointed professor in the College Raphael, of which he became director in 1848. Having taken charge of the Armenian College in Paris, in 1858, he returned to Venice in 1865 as director of St. Lazare. He is regarded by his countrymen as their leading poet. Among his numerous writings are "Poems Complete" (1857-1867); "Popular Songs of the Armenians" (1867); "Historical Monographs" (1870); "History and Geography of Armenia" (1885), which was seized and suppressed by the Turkish authorities.

**Alison, Archibald**, a Scottish writer, born in Edinburgh, Nov. 13, 1757. The charm of his pulpit oratory drew general attention to his published sermons; and by his "Essay on the Nature and Principles of Taste" and kindred themes, he won an acknowledged but inconspicuous position in literature. He died in Edinburgh, May 17, 1839.



SIR ARCHIBALD ALISON.

**Alison, Sir Archibald**, a Scottish historian, son of the above, born at Kenley, Shropshire, Dec. 29, 1792. His father having in 1800 accepted the pastorate of the

## Alison

Cowgate Episcopal Church, Alison became a student of the University of Edinburgh, and carried off the highest honors in Greek and mathematics. In 1814 he was admitted to the Scottish bar, but spent the next eight years in continental travel, and was an eye-witness of many of the exciting events which he has described. On his return he was appointed advocate-depute, which post he held till 1830. During this period he was constantly amassing and arranging the materials for his "Principles of the Criminal Law of Scotland," which appeared at Edinburgh in 1832, and is a standard authority both at home and abroad. In 1833 he issued a supplement to this work, "The Practice of the Criminal Law." He was appointed sheriff of Lanarkshire in 1834; in 1845 he was elected lord-rector of Marischal College, Aberdeen; and in 1851 a like honor was conferred on him by the students of the University of Glasgow. The Derby administration conferred a baronetcy on him in 1852, and in the following year he received the title of D. C. L. from Oxford. His *magnum opus*—"The History of Europe from 1789 to 1815" was first issued in 10 volumes in 1833-1842. He subsequently brought down the narrative to 1852, the date of the birth of the second French empire. This work displays great industry and research, is generally candid and accurate, but is open to the charge at once of prolixity and dryness. Its popularity, however, has been immense, as it filled a void in our historical literature, and edition after edition has been called for both in Great Britain and America; and it has been translated into French, German, Arabic, Hindustani, etc. Along with this work must be mentioned an "Atlas to Alison's History of Europe," illustrating in a series of 100 maps and plans the campaigns, battles, and sieges during the period embraced by the history (London, 1847-1848). Among Sir Archibald Alison's other productions are: "Principles of Population in Relation to Welfare of Humanity"; "Free Trade and Protection"; "England in 1815 and 1845"; "Life of the Duke of Marlborough"; and shortly before his last illness he was engaged upon a "Life of Lord Castlereagh." He died in Glasgow, May 23, 1867.

**Alison, Sir Archibald**, a British soldier; born in Edinburgh, Jan. 21, 1826. He served in the Crimean War, being present at the siege of Sebastopol; was in India during the mutiny, and commanded the European brigade in the Ashantee expedition of 1873-1874. In 1882 after the bombardment of Alexandria, he was in command of that place till the arrival of Lord Wolseley, by whom he was succeeded. He commanded the Highland brigade at Tel-el-Kebir, and was commander-in-chief in Egypt in 1882-1883. He wrote a treatise



which was entitled "On Army Organization" (1869). He died Feb. 5, 1907.

**Aliwal**, a village in India near the S. bank of the Sutlej. Here on Jan. 28, 1846, the British under Sir Harry Smith defeated a Sikh force with great slaughter after a severe engagement.

**Alwar**, a semi-independent State of India; its area is about 3,000 square miles, and it has a pop. of about 800,000. The capital is Alwar. Pop. 52,500.

**Alizarin**, the coloring matter used in the dyeing of Turkey red, exists in the madder root as a glucoside, which, when boiled with acids or alkalies, gives glucose and alizarin. But in 1869 Græbe and Liebermann discovered a method of manufacturing it from the coal-tar product anthracene; this synthesis being the first instance of the artificial production of a natural coloring matter. The manufacture of alizarin is now one of the most important branches of the coal-tar coloring industry, and threatens to put an end to the growing of madder root. The formula is,  $C_{14}H_8O_4 = C_{12}H_6(CO.OH)_2$ .

**Alkahest**, or **Alcahest**, the universal solvent of the alchemists. See **ALCHEMY**.

**Alkali**, a strong base, capable of neutralizing acids, so that the salts formed are either completely neutral, or, if the acid is weak, give alkaline reactions. It was formerly restricted to the hydrates of potassium, sodium, lithium and ammonium, but now includes the hydrates of alkaline earths (baryta, strontia and lime) and many organic substances. Alkalies are more or less soluble in water. They precipitate the heavy metals from most of their acid solutions. They turn reddened litmus blue, turmeric paper brown, and most vegetable purples green; they have a soapy taste, and form soaps with fats. The volatile alkalies are ammonia and the amines of organic chemistry; their salts are volatilized at a moderate heat. The term alkali usually means, in commerce, caustic soda or potash, impure,  $NaHO$  or  $KHO$ ; both are used in the arts for the manufacture of glass and soap, and for many other purposes. Caustic potash is used in surgery as a cautery.

**Alkalimetry**, the process of determining the purity of alkalies. Commercial potash and soda contain foreign substances, such as sulphate of potash, common salt, silicates, oxide of iron, water, etc., which diminish the percentage of real alkali. The alkalimeter furnishes a simple and ready means of determining the proportion of pure carbonate of potash or soda contained in any sample. It consists of a graduated glass tube, filled with diluted sulphuric acid, and containing as much absolute sulphuric acid as would neutralize a given weight, say 100 grains, of carbonate of pot-

ash. One hundred grains of the article to be judged of is then dissolved in water, and as much acid is gradually added to it from the tube as to neutralize the solution, that is, take up all the alkali. The purer the article, the more of the acid will be required; and if the tube, which is divided into 100 degrees, has been emptied to the 80°, the impure article contains 80 per cent. of pure carbonate of potash. The point at which neutralization is complete is determined by means of colored tests. Formerly, the two vegetable colors, litmus and turmeric, were alone used for this purpose, addition of an alkali rendering litmus blue and turmeric reddish brown; while under the influence of acids the former changes to a red, the latter to a yellow (red in the case of boracic acid). It is not, however, always easy to recognize the neutral point, and other indicators (as these coloring matters are called) have come into use. The chief of these are methyl-orange and phenolphthalein. A mixture of the alcoholic solutions of these substances imparts a pale yellow color to strictly neutral liquids, which is changed to deep red by the least trace of alkali, and to pink by a trace of acid.

This method of determining the strength of alkalies is called the alkalimetric process; but the alkalimeter is not confined in its use to the estimation of the strength of alkaline substances. It is likewise employed in the determination of the strength of acids, such as sulphuric acid, hydrochloric acid, nitric acid, and acetic acid or vinegar. For this end, the graduated instrument is charged with a solution of an alkali of known strength, such as a given weight of crystallized carbonate of soda (washing soda), dissolved in water, and according to the number of divisions of the liquid poured from the alkalimeter, the strength of the acid into which the alkaline liquid has been decanted is calculated. The latter application of this instrument is called acidimetry. Again, the same graduated glass tube has been recently employed in many other ways, such as the determination of the strength of a solution of silver, by charging the instrument with a known or standard solution of common salt. This mode of analysis is every day becoming of more and more importance, and, in fact, has given rise to a new department of analytical chemistry, which has been designated volumetric analysis.

**Alkaloid**, a substance resembling an alkali in properties. Alkaloids are natural organic bases containing nitrogen, and having high molecular weights. They occur in many plants, and some in animal tissues; they have not, except conine, been formed by synthesis. They are substitution com-



## Alkoran

pounds of ammonia; most are tertiary amines. They form salts with acids, and double salts with platinic chloride. They are generally crystalline bodies, soluble in hot alcohol, sparingly soluble in water. They have mostly a bitter taste, act powerfully on the animal system, and are used in medicine as quinine, morphine, and strychnine; they are often violent poisons. The names of most of the alkaloids end in *ine*, as, theine, which occurs in tea and coffee.

**Alkoran.** See KORAN.

**Allah** (compounded of the article *al* and *ilâh* — i. e., "the god," a word cognate with the Hebrew *Eloah*), the Arabic name of the supreme god among the heathen Arabs, adopted by Mohammed for the one true God. See MOHAMMED and MOHAMMEDANISM.

**Allahabad.** (1) A division of British India; has an area of 17,264 square miles, is one of the most fertile and populous portions of India. Pop. (1901) 5,535,803. (2) A district of the above division, lying around the junction of the Jumna and Ganges. Area 2,852 square miles. Pop. (1901) 1,487,904. (3) The capital of the division of Allahabad; at the confluence of the Ganges and Jumna; seat of government of the Northwestern Provinces; 72 miles W. of Benares. It is an important railway center, and carries on a large trade, especially in sugar, cotton, indigo, gold and silver ornaments, and furniture. It is a resort of Hindu pilgrims and the seat of an annual fair, called *magh melâ*, usually attended by about 250,000 persons. The native town is mostly mean and ill-built, but the European quarter is well laid out. Among the principal buildings are the fort founded by Akbar Khan in 1575, the Juma Masjid mosque, Sultan Khusru's caravansary, and the Muir Central College (1874). The town was taken by the British in 1765, and assigned by them to the titular Emperor of Delhi, but transferred to the Nawab of Oudh in 1771, who restored it to the British in 1801. It suffered severely during the mutiny of 1857. Pop. (1901) 172,032.

**Allain-Targé, Francois Henri René** (al-an-tar-zhâ'), a French politician, lawyer and journalist, born in 1832. He was admitted to the bar in 1853, and from 1861 to 1864 held the post of procureur-général at Angers. In 1868 he became editor of the "Avenir National," making a specialty of financial questions. He was elected in 1870 prefect of Maine and Loire; in 1871 and 1874 member of the Paris Municipal Council; Minister of Finance under Gambetta (1881), and Minister of the Interior under Brisson (1885). He decided in 1889 to abandon political life.

**Allan, David**, an eminent painter known as "the Scotch Hogarth," born in 1744. He studied art for 16 years in Rome, gain-

## Allegheny

ing a gold medal for historical composition in 1773. In 1777 he began to paint portraits in London, and in 1786 became the head of an academy of art at Edinburgh. Among his most celebrated pictures are "The Origin of Portraiture" and the illustrations for Allan Ramsay's "Gentle Shepherd." He died in 1796.

**Alleghanies**, a word used as synonymous with the APPALACHIAN MOUNTAINS (q. v.), sometimes applied only to that portion of the system which extends from Pennsylvania to North Carolina, and which forms the watershed between the Atlantic and the Mississippi. It is also used in a still more restricted sense. The ridges, 2,000 to 2,400 feet high, are remarkable for their parallelism and regularity, all the main valleys being longitudinal. Composed of stratified rocks of the Silurian, Devonian and Carboniferous ages, they are rich in coal, iron and limestone, and their forests supply valuable timber.

**Allegheny**, a former city in Allegheny co., Pa.; at the confluence of the Allegheny and Monongahela rivers; opposite the city of Pittsburg, with which it was consolidated in 1907. The union of the two cities, as the Greater Pittsburg, was so recent that, to preserve the distinctive interests of each, they are treated in this work as separate communities. See PITTSBURG. Allegheny has a total river frontage of over 33,000 feet; covers an area of nearly 5,000 acres; and has an undulating surface rising to a height of nearly 700 feet above low water mark.

**Business Interests.**—Allegheny is a distinctively manufacturing city, the principal plants being iron and steel rolling mills, cotton and woolen mills, foundries, machine shops, locomotive works, tanneries, air-brake and glass works, and flour mills. In 1900 there were reported 893 manufacturing establishments, employing \$50,122,503 capital and 21,844 persons, paying \$12,450,623 for wages and \$29,478,781 for materials; and having a combined output valued at \$54,136,967. There are 8 National banks, with an aggregate capital of \$1,000,000, and many private banking houses. The assessed property valuation in 1900 exceeded \$80,000,000.

**Public Interests.**—In 1899 the city had 162 miles of streets, of which 83 miles were paved; 79 miles of sewers; 135 miles of water mains; and electric lighting and water plants, both owned by the city. The noteworthy buildings include the Anderson and Carnegie Public Libraries, Western University of Pennsylvania, Allegheny Observatory, Western Penitentiary, Presbyterian, United Presbyterian, and St. John's Hospitals; Presbyterian, Reformed Presbyterian, and United Presbyterian Theological Seminaries: Allegheny Orphan Asylum;



Home of the Friendless, United States Arsenal, Humboldt, Washington, Armstrong, Union Soldiers', and Hampton Battery monuments; City Hall; the Davis Island movable dam, for the improvement of navigation; and, among more than 80 churches, St. Peter's (Roman Catholic), Trinity (Evangelical Lutheran), North Avenue (Methodist Episcopal), Second (United Presbyterian), and Sandusky Street (Baptist). Public school property exceeds \$2,000,000 in value, and over 33,000 pupils are enrolled.

*History.*—Allegheny was laid out as a town in 1738; created a borough in 1828, and chartered as a second class city in 1840. Pop. (1890) 105,287; (1900) 129,896.

JAMES G. WYMAN.

**Allegheny College**, a co-educational (Methodist Episcopal) institution in Meadville, Pa.; organized in 1815; has grounds and buildings valued at over \$500,000; scientific apparatus, \$35,000; volumes in the library, 25,000; productive funds, \$565,000; income, \$55,000; professors and instructors, 25; students, 425; number of graduates since organization, over 1,580.

**Allegheny River**, a river of Pennsylvania and New York; a headstream of the Ohio. It rises in Potter county, Pa., and joins the Monongahela at Pittsburg. Among its tributaries are French creek, Clarion, and Conemaugh rivers. Its length is about 400 miles, and it is navigable for about 150 miles above Pittsburg.

**Allegiance**, the duty owing from a citizen to the State or community which affords him protection. Natural or implied allegiance is the obedience which every native or naturalized citizen owes to the State or community in which he lives. By enjoying the benefits of a society he comes under an implied obligation to defend it. Express allegiance is the obligation arising from a promise or an oath. Local or temporary allegiance is the obedience which a foreigner owes to the laws of the country in which he lives. In the United States, allegiance is due first and principally to the Federal Constitution and Government, and second, to the State Constitution and government in and under which a citizen resides. When children of citizens of the United States are born in a foreign land, they still owe allegiance to the United States.

**Allegory**, a figurative presentation of a subject, which carries with it another meaning besides the literal one. It is as often used in painting, sculpture, and other imitative arts as in language, although it is usually considered rhetorical. Like the fable and the parable, it has an underlying moral, but is more fully carried out. It is metaphor extended to the minutest details, as in "Pilgrim's Progress." In all countries and ages, allegory has been found by the poets

a means of vividly setting before their readers the abstract virtues and vices that might otherwise be unintelligible. Personification of an idea has proved a sure way of making it understood. It is held by some that the whole of ancient mythology is formed on this plan. An excellent example of allegory is the comparison of Israel to the vine, in the 80th Psalm. The scholarly apostle, Paul, did not disregard the allegorical method. Modern writers have made abundant use of allegorical pictures as the simplest available means of rendering their thoughts alive to their readers.

**Allegri, Gregorio** (äl-ä'grē), an Italian composer, celebrated for a "Miserere," sung annually at the Sistine Chapel. He was born in 1587, and died in 1640. His "Miserere" was forbidden to be copied on pain of excommunication, but the composer Mozart wrote it out from memory after having heard it once.

**Allegro**, as adjective or adverb: (1) In ordinary language = gay, merry, cheerful. (Milton's "Allegro and Penseroso.") (2) In music = gay, joyful, mirthful, sprightly, and, by implication, quick in time. It is the fourth of the five grades of musical pace and character, largo, adagio, andante, allegro, presto.

**Allen, Charles Herbert**, an American diplomatist, born in Lowell, Mass., April 15, 1848; was graduated at Amherst College in 1869; became associated with his father in the lumber business in Lowell; served in both branches of the State Legislature, and in Congress in 1885-1889; was defeated as the Republican candidate for governor of Massachusetts in 1891; and succeeded Theodore Roosevelt as Assistant Secretary of the Navy, in May, 1898. On the passage by Congress of the Porto Rico Tariff and Civil Government bill, in April, 1900, the President appointed him the first civil governor of Porto Rico, an office which he resigned in July, 1901.

**Allen, Edward P.**, an American clergyman, born in Lowell, Mass., March 17, 1853; worked in the Lowell mills as a boy, acquiring his early education at an evening school and from local priests; was graduated at Mount St. Mary's College, Emmitsburg, Md., in 1878; took a course in theology; ordained a Roman Catholic priest in 1881; was president of Mount St. Mary's College in 1884-1897; and on May 16, of the last year, was consecrated fifth Bishop of Mobile, Ala.

**Allen, Elizabeth Akers**, an American poet, born (ELIZABETH CHASE) at Strong, Me., Oct. 9, 1832. She was married in 1860 to Paul Akers, the sculptor, who died in 1861, and in 1865 to E. M. Allen, of New York. Her first volume, "Forest Buds," appeared under the pen name of "Florence



Percy" (1855). Other works: "The Silver Bridge and Other Poems" (1866); a volume of "Poems" (1866), which contains "Rock Me to Sleep, Mother" (her authorship of this popular ballad, once disputed, is proved in the New York "Times," May 27, 1867); "The High Top Sweeting and Other Poems" (1891).

**Allen, Ethan**, an American Revolutionary hero, born at Litchfield, Conn., Jan. 10, 1737. His services in the War of Independence, as Colonel of the "Green Mountain



ETHAN ALLEN.

Boys," capturing Fort Ticonderoga "in the name of the Great Jehovah and the Continental Congress," his attack on Montreal, sufferings as a prisoner in England, skillful diplomacy in behalf of Vermont, etc., are well known. He wrote an account of his captivity (1799), "A Vindication of

Vermont" (1784), and "Allen's Theology, or the Oracles of Reason" (1784), in which he declared reason to be the only oracle of man. He died near Burlington, Vt., Feb. 12, 1789.

**Allen, George William**, a Canadian statesman, born in Toronto, in 1822; called to the bar in 1846; became Senator in 1867. For many years he was chairman of the Committee on Banking and Commerce. In 1891 he was made a member of the Queen's Privy Council for Canada. He presented the city of Toronto with the ground on which is built the Canadian Institute. He was for a long time Chancellor of the University of Toronto.

**Allen, Grant** (CHARLES GRANT BLAIR-FINDIE ALLEN), an English naturalist, essayist, and novelist, born in Kingston, Canada, Feb. 24, 1848. He graduated from Oxford, and was professor at Queen's College, Jamaica, until he settled in England. He early became a follower of Charles Darwin and Herbert Spencer, and was author of scientific essays in a light, picturesque, and attractive style. After 1883 he produced a large number of novels, many of which are based on a psychological theme. Probably the best among them are "Babylon" (1885), and "The Devil's Die" (1888). His latest is "Under Sealed Orders" (1896). He died Oct. 25, 1899.

**Allen, James Lane**, an American novelist, born near Lexington, Ky., in 1850. He graduated at Transylvania University, taught there for a time, and became sub-

sequently Professor of Latin and English in Bethany College. His fame rests mainly upon his powerful and popular novels of manners and people in the "blue grass" region and elsewhere, the best known being "Summer in Acready" (1896); "The Choir Invisible" (1897); "A Kentucky Cardinal," and "Aftermath."

**Allen, Joel Asaph**, an American mammalogist, born in Springfield, Mass., July 19, 1838. He went with Agassiz on his expedition to Brazil in 1865; became assistant in ornithology at the Cambridge Museum of Comparative Zoology in 1870, and was appointed curator of the department of vertebrate zoology in the American Museum of Natural History, New York, in 1885.

**Allen, Joseph Henry**, an American Unitarian minister, educator, historian, and essayist, born at Northboro, Mass., Aug. 21, 1820. His chief publications were: "Ten Discourses on Orthodoxy" (second edition, 1889); "Hebrew Men and Times" (second edition, 1879); "Outline of Christian History" (1884); "Our Liberal Movement in Theology" (1889); "Positive Religion, Essays, Fragments, and Hints" (1891). He was editor of the "Allen and Greenough Series" of Latin classics, of the "Unitarian Review," and the "History of Unitarianism." He died March 20, 1898.

**Allen, Thomas**, an American landscape and animal painter, born at St. Louis, Mo., Oct. 19, 1849. After an education in St. Louis, he graduated from the Royal Academy at Düsseldorf, Germany. He studied in France; exhibited his first picture at the Academy of Design in New York, and at the salons at Paris; finally became member of the Paint and Clay Club of Boston; vice-president of the Boston Art Students' Association; member of the committee of the School of Drawing and Painting of the Boston Museum of Fine Arts.

**Allen, William**, an American preacher and miscellaneous writer, born at Pittsfield, Mass., Jan. 2, 1784; died at Northampton, Mass., July 16, 1868. He became president of Dartmouth College in 1817, was president of Bowdoin College, 1820-1839. Of numerous works, both in prose and verse, the best known is "American Biographical and Historical Dictionary."

**Allen, William Henry**, an American naval officer, born at Providence, R. I., in 1784. He entered the navy in 1800, and was in some of the greatest naval battles in American history. For bravery displayed on the "Chesapeake" and "United States," he was made commander of the brig "Argus," in June, 1813. Having taken the American Minister to France, he went to the Irish Channel, where he did great damage to English commerce, capturing in a month 27 ships, one of which had a cargo worth \$500,000. In a few days the "Argus" was



## Alien

taken by the English brig "Pelican." In the battle Allen was shot, and died soon after (1813); was buried with military honors in Plymouth, England.

**Allen, William Henry**, an American educator, born March 27, 1808; educated at Bowdoin College; served several colleges as Professor of Latin, Greek, Chemistry, Natural Philosophy, and English Literature; President of Girard College, Philadelphia (1850-1862, and 1867-1882); and President of the American Bible Society from 1872 till his death, Aug 29, 1882.

**Allen, William Vincent**, an American politician, born in 1847; leader in the People's or Populist Party; became Senator from Nebraska in 1893. At the memorable special session of 1893, he took a prominent part in opposing the repeal of the Silver-Purchase Act, holding the floor of the Senate on one occasion for 15 consecutive hours. He was chairman of the Populist National Convention of 1896, and was instrumental in obtaining the indorsement of William Jennings Bryan by that body for President.

**Allen, Willis Boyd**, an American writer, born in Maine in 1855. Besides a collection of verse, entitled "In the Morning," he has written a large number of works for young people, among which are "The Red Mountain of Alaska," "Pine Cones" (1885); "Silver Rags" (1886); "Kelp" (1888), and "The Mammoth Hunters."

**Allenstein** (al'en-stin), a city in the district of Allenstein, Province of East Prussia, on the river Alle; founded in 1353; has iron foundries, machine works, match factory, breweries, trade and agricultural schools, cattle, and horse markets, and an insane asylum; trade in linen, hops, and wood. On Feb. 4, 1807, Soult defeated the rear guard of the Russian and Prussian army near the bridge over the Alle, between Allenstein and Gutstadt. Pop. (1891) 18,800.

**Allentown**, city and county-seat of Lehigh co., Pa.; on the Lehigh river and canal and several railroads; 60 miles N. of Philadelphia. It is built on high ground and is surrounded by a beautiful and fertile country. The city is noted for its manufacturing, which include blast furnaces, iron and steel rolling mills, wire works, hosiery and thread factories, silk works, and furniture and shoe factories. Allentown is the seat of Muhlenberg College (Lutheran): It has gas and electric light plants, 2 National banks, an assessed property valuation of over \$20,000,000, and several periodicals. Pop. (1900) 35,416; (1910) 51,916.

**All Fool's Day.** See APRIL.

**All-Hallows' Eve**, the 31st of October, the evening before All-Hallows. Till recently it was kept up (especially in Scotland) with ceremonies which have appar-

## Alligator

ently come down from Druidical times. Though connected with All-Saints' Day (1st of November), yet it seems to have been formerly a merry making to celebrate the end of autumn, and help to fortify the mind against the advent of winter.

**Alliance**, a city in Stark co., O.; on the Mahoning river and the Alliance and Northern and the Pennsylvania Co.'s railroads; 56 miles S. E. of Cleveland. It is in an agricultural region; is the seat of Mount Union College (Methodist Episcopal); and has a National bank, manufactories of drop forgings, steam hammers, boilers, white lead, terra cotta ware, and agricultural implements, and daily, weekly, and monthly periodicals. Pop. (1910) 15,083.

**Allibone, Samuel Austin**, an American bibliographer, born at Philadelphia, April 17, 1816. He was at one time librarian of the Lenox Library, New York. He was the author of a "Dictionary of English Literature, and British and American Authors" (3 vols., 1854-1871; supplement by Dr. John Foster, 2 vols., 1891); "Poetical Quotations," "Prose Quotations," etc. It took 20 years to write the Dictionary, which is familiar in libraries the world over wherever English is spoken. He died at Lucerne, Switzerland, Sept. 2, 1889.

**Alligator**, the name of a large reptile belonging to the order *Crocodylia* derived from a corruption of the Spanish *el lagarto*, that is the lizard, from the Latin *lacertus*, a lizard. These reptiles are confined to the rivers of the New World, in which they typically represent the crocodiles of the Eastern Hemisphere. The best-known species are the *Alligator lucius*, or alligator of the Southern States of North America; the cayman of Surinam and Guiana (*A. palpebrosus*), and the spectacled alligator (*A. sclerops*), found in Brazil. The alligators have the hind legs rounded, and the feet only partially webbed. Owen defines this genus as that in which the fourth tooth of the lower jaw is larger than the others, and forms a canine, while this tooth is received into a pit in the palatal surface of the upper jaw, and is thus entirely concealed when the mouth is shut. In the water the full-grown alligator is a formidable animal, on account of its great size and strength. It grows to the length of 15 or 20 feet, is covered above by a dense armor of horny scales, impenetrable to a musket ball, except about the head and shoulders, and has a huge mouth, armed with a row of strong, unequal, conical teeth. These reptiles swim or dart along through the water with wonderful celerity, impelled by their long, laterally-compressed, and powerful tails, which serve as very efficient oars. On land their motions are proportionally slow and embarrassed, because of the length



and unwieldiness of their bodies, the shortness of their limbs, and the small, false ribs, which reach from joint to joint of their necks, and render lateral motion very difficult. In addition to the usual number of ribs and false ribs, they are furnished with others, for the protection of the belly, which do not rise up to the spine. The lower jaw extends farther back than the skull, so that the neck must be somewhat bent when it is opened; the appearance thus produced has led to the very universal error of believing that the alligator moves its upper jaw, which is incapable of motion, except with the rest of the body.

Under the throat of this animal are two openings or pores, the excretory ducts from glands which pour out a strong, musky fluid, giving the alligator its peculiarly unpleasant smell. In the spring of the year, when the males are under the excitement of the sexual propensity, they frequently utter a loud roar, which, from its harshness and reverberation, resembles distant thunder, especially where numbers are at the same time engaged. At this period frequent and terrible battles take place between the males, which terminate in the discomfiture and retreat of one of the parties. At this season, also, an old champion is seen to dart forth on the surface of the water, in a straight line, at first as swiftly as lightning, gradually moving more slowly as he reaches the center of a lake; there he stops, inflates himself by inhaling air and water, which makes a loud rattling in his throat for a moment, till he ejects it with vast force from his mouth and nostrils, making a loud noise, and vibrating his tail vigorously in the air. Sometimes after thus inflating himself, with head and tail raised above the water, he whirls round till the waves are worked to foam and at length retires, leaving to others an opportunity of repeating similar exploits, which have been compared to an Indian warrior rehearsing his acts of bravery, and exhibiting his strength by gesticulation.

The females make their nests in a curious manner, on the banks of rivers, or lagoons, generally in the marshes, along which, at a short distance from the water, the nests are arranged somewhat like an encampment. They are obtuse cones four feet high, and about four feet in diameter at the base, built of mud and grass. A floor of such mortar is first spread upon the ground, on which a layer of eggs, having hard shells, and larger than those of a common hen, are deposited. Upon these another layer of mortar, seven or eight inches in thickness, is spread, and then another bed of eggs; and this is repeated nearly to the top. From 100 to 200 eggs may be found in one nest. It is not ascertained whether each female watches her own nest exclusively, or attends to more than her own brood. It is

unquestionable, however, that the females keep near the nests, and take the young under their vigilant care as soon as they are hatched, defending them with great perseverance and courage. The young may be seen following the mother through the water like a brood of chickens following a hen. When basking in the sun on shore, the young are heard whining and yelping about the mother, not unlike young puppies. In situations where alligators are not exposed to much disturbance the sites of the nests appear to be very much frequented, as the grass and reeds are beaten down for several acres around. The young, when first hatched, are very feeble and helpless, and are devoured by birds of prey, soft-shelled turtles, etc., as well as by the male alligators, until they grow old enough to defend themselves. As the eggs are also eagerly sought by vultures and other animals, the race would become speedily extinct, but for the great fecundity of the females.

The alligator is generally considered as disposed to retire from man, but this is only to be understood of alligators frequenting rivers or waters where they are frequently disturbed, or have learned to dread the injuries which man inflicts. In situations where they are seldom or never interrupted, they have shown a ferocity and perseverance in attacking individuals in boats, of the most alarming character; endeavoring to overturn them, or rearing their heads from the water, and snapping their jaws in a threatening manner. Bartram, who had made many interesting and valuable observations on the alligators, gives numerous instances of their daring and ferocious disposition, and himself very narrowly escaped with his life on several occasions. At present, alligators, though still numerous in Florida and Louisiana, are no longer regarded as very dangerous. Their numbers annually decrease as their haunts are intruded on by man, and at no distant period they must be nearly, if not quite, exterminated. In the winter the alligators spend a great part of their time in deep holes, which they make in the marshy banks of rivers, etc. They feed on fishes, reptiles, small quadrupeds (dogs if they can get them); or carrion, and, though very voracious, they are capable of existing a long time without food.

The cayman of South America is distinguished by the bony rings which surround its eyes, and by the absence of a membrane between its toes. It is smaller and not so fierce as others of the same species.

**Alligator Swamp**, an extensive marsh in North Carolina, occupying the greater part of the peninsula between Pamlico and Albemarle Sounds.

**Allingham, William**, an Irish poet, born at Ballyshannon, March 19, 1828. Having



for some years been an officer in the customs, he became assistant editor of "Fraser's Magazine," in 1871, and succeeded Froude as editor in 1874, when he also married Helen Paterson, the illustrator and water color artist. His graceful poems excel in descriptions of Irish scenery and life; some of them were illustrated by Rossetti, Kate Greenaway, and other distinguished artists. Prominent among his works is "Lawrence Bloomfield in Ireland" (1864), a narrative poem on contemporary Irish life. He died near London, Nov. 18, 1889.

**Allison, William Boyd**, an American legislator, born in Perry, O., March 2, 1829; was brought up on a farm; and subsequently educated at Allegheny College, Pa., and Western Reserve College, O. He practiced law in his native State till 1857, when he removed to Dubuque, Ia. In the early part of the Civil War he served on the governor's staff, and was actively engaged in raising troops for the Union army. In 1863-1871 he was a representative in Congress; and on March 4, 1873, entered the United States Senate as a Republican, to which he was re-elected, 1878, 1884, 1890, 1896, and 1903. He was a delegate to the Republican National Convention in Chicago, in 1860; and several times was a conspicuous candidate for the presidential nomination of his party. In the session of the Senate, beginning Dec. 4, 1899, he was Chairman of the Committee on Appropriations. See **BLAND SILVER BILL**. He died Aug. 8, 1908.

**Alliteration**, the succession or frequent occurrence of words beginning with the same letter. In the older Scandinavian, German, and Anglo-Saxon poetry it served instead of rhyme. It is found in early English poetry with the same function. It had as thus used a certain regularity of accent and emphasis. In "Piers Plowman," the line is constructed with two hemistichs, the former with two words beginning with the alliterative letter, and the latter with one, thus:

"Her robe was full rich with red scarlet  
engreyned."

The poetry of widely separated nations exhibits this device, it being found in India and in Finland. It still remains in the Icelandic poetry. Early in the 17th century, English writers ran to great extravagance in the use of alliteration, both in prose and poetry. It is said that preachers from their pulpits addressed their hearers as "chickens of the church," and "sweet swallows of salvation." No other device of composition so easily lends itself to fanciful conceits or ingenious trifling. The ease with which devices may be marshaled would hardly tend to make the ordinary reader appreciative of Churchill's description of himself as one

"Who often, but without success, had prayed  
For apt alliteration's artful aid."

Apart from a certain music or petty rhythm, alliteration as a device of composition is hardly superior to paronomasia, though to be found at times in the works of all the great poets.

**Allobroges**, in ancient history, a warlike people of Gaul, who inhabited the territory between the Rhone and the Isar, extending to Lake Geneva. They appear in the annals of Hannibal's expedition to Gaul (218 B. C.), and, although subjugated and made tributary to Rome by Quintus Fabius Maximus, were always ready for revolt.

**Allodium**, or **Allodial Tenure**, the absolute ownership of landed property unburdened by any rent or service due a superior. In most European countries where feudal tenure arose, it grew up by individual surrender of allodial tenure; consequently allodial tenure continued in some measure to exist along with the other. In England the feudal tenure was established by one universal national act, at the Council of Sarum; hence arose the legal fiction that all land belongs to the crown. Allodial tenure, however, is said to exist in the Orkney and Shetland Islands, which once belonged to Denmark. In the United States and in the British colonies the land tenure is allodial.

**Allopathy**, a system of medicine — that ordinarily practiced — the object of which is to produce in the bodily frame another condition of things than that in or from which the disease has originated. If this can be done the disease, it is inferred, will cease. Allopathy is opposed to homœopathy, which aims at curing diseases by producing in antagonism to them symptoms similar to those which they produce; the homœopathic doctrine being that "like is cured by like."

**Allophylian**, in ethnology, a term introduced by Prichard to characterize the nations or races of Europe and Asia not belonging to the Indo-European, the Syro-Arabian, or the Egyptian races. It has all but fallen into disuse, having been superseded by Turanian.

**Allotropic**, pertaining to allotropy; existing in diverse states, as the diamond in the form of the hardest of minerals, and also of charcoal.

**Allotropy**, or **Allatropy**, the name given by Berzelius to the variation of properties which is observed in many substances. For instance, there are some minerals which crystallize in two distinct and unallied forms of crystals. This dimorphism is a case of allotropy. So, also, there is a variety of sulphur which is soluble, and another which is insoluble: and a common, and again an amorphous, phosphorus differing in their qualities.

**Alloway**, Burns' birthplace, and the scene of his "Tam o' Shanter," lies on the right bank of the "bonny Doon" 2 miles S. of the



town of Ayr. The "auld clay biggin," in which the poet was born on Jan. 25, 1759, was in 1880 converted into a Burns Museum. The "haunted kirk" still stands, a roofless ruin, near the "auld brig;" and close by is the Burns monument (1820).

**Alloway, Thomas Jefferson**, a Canadian surgeon, born in Ireland in 1847; was graduated at the Medical Department of McGill University in 1869; spent a year in advance study in London; served three years in the British navy; and in 1894, became Gynæcologist-in-Chief to the Montreal General Hospital and Assistant Professor of Gynæcology in McGill University. Dr. Alloway has made a world-wide reputation in his special line and has written much about it.

**Alloy**, a compound or mixture of two or more metals. When mercury is mixed with another metal, the compound is termed an amalgam. All alloys retain the essential properties of metals. They possess metallic luster and conduct heat and electricity well. Alloys are divided into three groups: (1) Those formed by the metals lead, tin, zinc, and cadmium, which impart to their alloys their own physical properties in the proportions in which they themselves are contained in the alloy. (2) Those formed by almost all other metals. (3) Those which contain metals found in both these groups of alloys.

In every alloy the specific heat and the coefficient of expansion are always the means of those of its component metals. But in other physical properties a variation takes place. This is the case with specific gravity, which, in alloys of the first group, is the mean of their constituent metals; but, in those of the second group, it is always greater or less than the mean specific gravity of their constituents. The increase in density indicates that the metals have contracted; in other words, that the metallic molecules have approached one another more closely; while the decrease in density denotes a separation of the molecules to greater distances from one another. Again, in alloys of the first group, the conducting power for electricity is exactly proportional to the relative volumes of the component metals; while in alloys of the second group the case is different. If lead, tin, zinc, or cadmium be mixed with any of the metals from which alloys in the second group are formed, this alloy has its coefficient of elasticity much increased. Thus coils of copper or silver wire are made straight by weights by which a coil of brass or gun-metal wire will scarcely be altered in shape.

In some instances, when two melted metals are mixed together to form an alloy, an evolution of heat occurs which is believed to indicate that a chemical compound has been formed. This is the case with copper and zinc, copper and aluminum, platinum

and tin, etc. Platinum by itself is insoluble in nitric acid, but if it be alloyed with silver the compound is completely dissolved. Silver readily dissolves in nitric acid, but will not do so when mixed with a large quantity of gold. The strength or cohesion of an alloy is generally greater than that of the mean cohesion of the metals contained therein or even of that of the most cohesive of its constituents. Thus, the breaking weight of a bar of copper or tin is very much lower than the breaking weight of a bar of the same size composed of certain alloys of tin and copper.

The most useful alloy in the arts is brass. This compound metal is next to iron in importance. Several kinds are made, varying in composition from equal parts of copper and zinc to five parts of copper with one of zinc. According to the proportions of these metals in the alloy it is called sheet brass, Pinchbeck brass, Dutch brass or Dutch metal, ordinary yellow brass, Muntz's metal or ship-sheathing brass, and by several and other names.

There are some important alloys of copper and tin, among them, bronze, gun metal, bell metal and speculum metal. In these the proportions vary from equal parts of copper and tin to 10 parts of copper with 1 of tin. The most cohesive, that is, the strongest of them, is a bronze consisting of 6 parts of copper to 1 of tin. Phosphor bronze is an invention of recent years. The addition of from 0.25 to 2.5 per cent. of phosphorus to a bronze containing from 7 to 8 per cent. of tin, gives it greater hardness, elasticity and toughness. This alloy is now much used for parts of machinery. Britannia metal generally consists of about 92 parts of tin, 8 of antimony, and 2 of copper. This is a softer metal than German silver, but both are largely manufactured into such objects as teapots, jugs, spoons, and the like, many of them being plated with silver. Nickel-copper alloys are used in the United States, Belgium and Germany, for coins.

Pewter is a tin alloy which was more used formerly than now. Its composition varies. Commonly it consists of 4 parts of tin to 1 of lead, but sometimes it is tin with a little copper. Type metal is a compound of 50 parts of lead, 25 of antimony, and 25 of tin, but it varies slightly. Fusible metal melts at low temperatures; one kind is composed of 3 parts of tin, 5 of lead, and 8 of bismuth, and melts in hot water. This alloy is now a good deal employed in stereotyping, and in obtaining copies of woodcuts. Albion metal, which is largely used in some minor Birmingham manufactures, is an example of two metals combined by pressure, and, therefore, is not, strictly speaking, an alloy. It consists of tin laid on lead, the two metals being



## Alloy

made to cohere by passing them between rollers. White, or anti-friction, metal, recently much employed for certain kinds of machinery bearings, has, in one variety, a composition of 85 parts of tin, 10 of antimony, and 5 of copper.

Aluminum bronze, very closely resembling gold in appearance, is much used for pencil-cases, chains, and some larger objects. A compound of silver and aluminum is sometimes used for watch springs, and for spoons and forks. Dentists use a very ductile alloy composed of 2 parts by weight of silver and 1 of platinum. A metal formed of 9 parts of platinum and 1 part of iridium has recently been employed for the standard meter measures by the Parisian commission for the international metrical system. An alloy of osmium and iridium, which is not attacked by acids, is employed for tipping gold pens, and sometimes also for the bearings of the mariner's compass. Pure silver is too soft to be used for anything which is to be much handled. A little copper imparts to it greater hardness and toughness, and makes it more easily fusible.

When gold is to be used for coins, jewelry, or plate, it requires to be alloyed with copper or silver or with both, in order to harden it. Like silver, it is too soft when pure. There are five legal standards for articles made of gold — i. e., alloyed gold apart from coin. These are called 22, 18, 15, 12 and 9 carat gold. That is to say, these figures represent the number of parts of pure gold in every 24 parts of the alloy used by the goldsmith or jeweler. English sovereigns are made of a mixture of 22 parts of gold to 2 of copper, and this is called 22-carat or standard gold. In Germany, Italy and the United States, standard gold for the coinage is 21.6 carats. Gold jewelry usually contains both copper and silver, and, according to the proportion of the constituents, the objects have different shades of yellow.

In the United States, it is declared by law that the standard for both gold and silver coins shall be such, that of 1,000 parts, by weight, 900 shall be of pure metal and 100 of alloy. Until lately, it was provided that the alloy of gold coins might be of either copper or silver; but by a recent regulation, only copper is used in the alloy either of silver or gold coins.

A statement of the average proportions in which the metals enter the best known alloys, the composition of which is generally very variable, is given in the following table:

|                             |                                       |
|-----------------------------|---------------------------------------|
| Coinage of gold.....        | { Gold, 90.<br>Copper, 10.            |
| Gold jewelry and plate..... | { Gold, 75 to 92.<br>Copper, 25 to 8. |
| Silver coinage.....         | { Silver, 90.<br>Copper, 10.          |
| Silver vessels .....        | { Silver 95.<br>Copper, 5.            |

## Allspice

|                             |   |
|-----------------------------|---|
| Silver jewelry .....        | { Silver, 80.<br>Copper, 20.                |
| Aluminum bronze .....       | { Copper, 90 to 95.<br>Aluminum, 10 to 5.   |
| Bronze coins, medals .....  | { Tin, 4 to 6.<br>Zinc, 1 to 5.             |
| Bronze cannon.....          | { Copper, 90. -<br>Tin, 10.                 |
| Bronze bells .....          | { Copper, 78.<br>Tin, 22                    |
| Bronze cymbals .....        | { Copper, 80.<br>Tin, 20.                   |
| Specula of telescopes ..... | { Copper, 67.<br>Tin, 33.                   |
| Pinchbeck .....             | { Copper, 90.<br>Zinc, 10.                  |
| Brass .....                 | { Copper, 67 to 72.<br>Zinc, 33 to 28.      |
| German silver .....         | { Copper, 50.<br>Zinc, 25.<br>Nickel, 25.   |
| Type metal .....            | { Lead, 80.<br>Antimony, 20.<br>Tin, 100.   |
| English metal.....          | { Antimony, 8.<br>Bismuth, 1.<br>Copper, 4. |
| Pewter .....                | { Tin, 92.<br>Lead, 8.                      |
| Liquid measures.....        | { Tin, 82.<br>Lead, 18.                     |
| Plumbers' solder .....      | { Tin, 67.<br>Lead, 33.                     |

**All-Saints' Bay**, in the State of Bahia, on the coast of Brazil, forms a superb natural harbor, in which the navies of the whole world might ride at anchor. Its length from N. to S. is 37 miles; its breadth from E. to W., 27. The town of Bahia lies just within it.

**All-Saints' Day**, a festival instituted by Pope Boniface IV., early in the 7th century, on the occasion of his transforming the Roman heathen Pantheon into a Christian temple or church, and consecrating it to the Virgin Mary and all the martyrs. It did not take root for two centuries later, but once having done so, it soon spread through the Western Church. It is kept by the Churches of England, Rome, etc., on the 1st of November. It is designed, as its name implies, to honor all saints, or at least those no longer living on earth. It was formerly called All-hallows. In many American Churches a custom has grown up of making the Sunday nearest the 1st of November the occasion of a service in memory of those who have died during the year.

**All-Souls' Day**, the day on which the Church of Rome commemorates all the faithful deceased. It was first enjoined in the 11th century by Oidlon, Abbot of Cluny, on the monastic order of which he was the head, and soon afterward came to be adopted by the Church generally. It is held on the 2d of November.

**Allspice**, a kind of pepper, consisting of the dried berries of *pimenta officinalis* (*myrtus pimenta* of Linnæus, *eugenia pimenta* of De Candolle), a tree belonging to the order *myrtaceæ* (myrtle blooms). It is imported almost entirely from Jamaica, and is hence called Jamaica pepper. It is



termed also pimento, from Spanish *pimienta* = pepper; its berries in shape and flavor resembling peppercorns. The trees are cultivated in Jamaica in plantations called pimento walks. Their unripe fruits, and, to a lesser extent, all parts of them, abound in an essential oil, which has the same composition as oil of cloves; of this the berries yield from 3 to 5 per cent. It is a powerful irritant, and is often used to allay toothache. The bruised berries are carminative; they stimulate the stomach, promote digestion, and relieve flatulency. The allspice imported into this country is derived from *pimenta officinalis*, and not from *pimenta acris*. The latter affords a product somewhat similar, which is occasionally used as a substitute for the other. Hence the allspice-tree, properly so called, is the *pimenta officinalis*.

The word is also the English name of the genus *calycanthus*, and especially of *C. floridus*, which has a scent like the pimento-tree, grows in Carolina, and is often called the Carolina allspice. Lindley, in his "Natural System of Botany," termed the order *calycanthaceæ* the Carolina allspice tribe; but in his "Vegetable Kingdom" he altered the designation to *calycanths*. Japan allspice is the English name of the genus *chimonanthus*, which belongs to the *calycanthaceæ*; wild allspice is benzoin odoriferum, a species of the laurel order.

**Allston, Washington**, an eminent American painter, poet, and romancer, born at Waceamaw, S. C., Nov. 5, 1779; graduated at Harvard in 1800; studied at the Royal Academy, London, and in Rome, and returned to Boston in 1809. He is the author of "The Sylph of the Seasons, and Other Poems" (1813); "Monaldi," a romance (1841), and "Lectures on Art and Poems" (1850). See his "Life" by Flagg. He died in Cambridge, Mass., July 9, 1843.

**Alluvium**, the act or process of washing away soil, gravel, rocks, etc., and depositing the débris in other places; also, the materials thus deposited.

In geology the form of the word is *alluvium*, or, rarely, *alluvion*.

Formerly the word applied to the gravel, mud, sand, etc., deposited by water subsequently to the Noachian deluge. It was opposed to *diluvium*, supposed to be laid down by the deluge itself, or, in the opinion of others, by some great wave or series of waves originated by the sudden upheaval of large tracts of land or some other potent cause, different from the comparatively tranquil action of water which goes on day by day.

Now alluvium is especially employed to designate the transported matter laid down by fresh water during the Pleistocene and recent periods. Thus it indicates partly a process of mechanical operation, and partly

a date or period. It should not be forgotten that the former has gone on through all bygone geological ages, and has not been confined to any one time. Many of the hardest and most compact rocks were once loosely-cohering débris laid down by water. The most typical example of alluvium may be seen in the deltas of the Nile, Ganges, Mississippi, and many other rivers. Some rivers have alluviums of different ages on the slopes down into their valleys. The more modern of these belong to the recent period, as do the organic or other remains which they contain, while the older (as those of the Somme, Thames, Ouse, etc.), which are of Pleistocene age, inclose more or less rudely chipped flint implements, with the remains of mammals either locally or everywhere extinct. Though in many cases it is possible clearly to separate alluviums of different ages, yet the tendency of each new one is to tear up, redistribute, and confound all its predecessors.

Volcanic alluvium is sand, ashes, etc., which, after being emitted from a volcano, come under the action of water, and are by it redeposited, as was the case with the materials which entered and filled the interior of houses at Pompeii.

Marine alluvium is alluvium produced by inundations of the sea, such as those which have from time to time overflowed the eastern coast of India.

In English law, the form of the word generally used is *alluvion*, and in Scotch law *alluvio*. In both of these the enactment is, that if an "eyott," or little island, arise in a river midway between the two banks, it belongs in common to the proprietors on the opposite banks; but if it arise nearer one side, then it belongs to the proprietor whose lands it there adjoins. If a sudden inundation cut off part of a proprietor's land, or transfer the materials to that of another, he shall be recompensed by obtaining what the river has deposited in another place; but if the process be a gradual one, there is no redress.

**Alma**, a river in the Crimea, rising at the foot of the Tchadir Dag, and flowing westward into the Bay of Kalamita, about half way between Eupatoria and Sebastopol. On the steep banks of the stream, through the channel of which the British troops waded amid a shower of bullets, a brilliant victory was won on Sept. 20, 1854, by the allied armies of England and France, under Lord Raglan and Marshal St. Arnaud, over the Russian army commanded by Prince Menschikoff. It was the first battle of the Crimean War.

**Alma College**, a co-educational institution in Alma, Mich., organized under the auspices of the Presbyterian Church in 1887; has grounds and buildings valued at



over \$150,000; endowment, \$390,000; income, \$48,000; volumes in the library, 22,000; professors and instructors, 25; students, 300; graduates since organization, over 300.

**Almaden** (al-mä-dän'), a town in Spain, 50 miles S. W. of Ciudad Real, situated in the chain of the Sierra Morena. Pop. 7,755. It is famous for its 12 rich quicksilver mines, employing about 4,000 miners, and yielding an annual output of 2,500,000 pounds. The present mines, which have been carried to a depth of 1,170 feet, date from the 17th century; but quicksilver was largely worked here by the Romans in the time of Pliny. Crown property, they were rented by the Fuggers of Augsburg (1525-1645), and by the firm of Rothschild (1836-1863), but are now again carried on by the government.

**Almagest**, a name of honor conferred on a book treating of geometry and astronomy, published by the celebrated Alexandrian geographer and astronomer Ptolemy.

"That saith this proverbe in his *Almagest*;  
Of alle men his wisdom is highest."

Chaucer's "Canterbury Tales," v, 907, 908.

"On cross, and character, and talisman,  
And *almagest*, and altar, nothing bright."

Scott's "The Lay of the Last Minstrel," vi, 17.

**Almagro, Diego d'** (al-mä'-grō), a Spanish conquistador, was born in 1464 or 1475, and was a foundling who derived his name from the town near which he was found. After serving in the army, he sailed to seek his fortune in the New World, where he amassed considerable wealth by plunder, and became one of the leading members of the young colony of Darien. In 1522 he formed, with Pizarro, the design of conquering Peru—an undertaking crowned 10 years afterward with marvellous success. Receiving permission from the Spanish court to conquer for himself a special province S. of Pizarro's territory, he marched on Chile in 1536, penetrated as far as the Coquimbo, and returned in 1537, just when the Peruvians had flown to arms and shut up the Spaniards in Cuzco and Lima. As these towns lay S. of Pizarro's district, they were claimed by Almagro. He dispersed the Peruvian army before Cuzco, and advanced against Lima, hoping to make himself sole master of the country. But on April 6, 1538, he was defeated in a desperate engagement with the Spaniards under Pizarro near Cuzco; and on the 26th he was strangled in prison, and his corpse beheaded in the market place of Cuzco. His half-caste son, Diego, collecting some hundreds of his father's followers, stormed Pizarro's palace, and slew him (1541); then proclaimed himself captain-general of Peru; but, de-

feated in the bloody battle of Chupas Sept. 16, 1542, he was executed along with 40 of his companions.

**Almamoun, Almamun, Almamown, or Abdallah**, Caliph of Bagdad, son of Haroun-al-Raschid, born in 786, succeeded his brother Al-Amin 814, and died in 833. He reigned with great wisdom and ability, but his liberal religious views nearly cost him his throne, through a revolt of the stricter Mussulmans. On the restoration of peace he devoted all his energies to the fostering of learning. Bagdad became a meeting place for world-renowned scholars, who were allowed to teach in the famous college of Khorassan, without regard to creed. Almamoun was proficient in mathematics and astronomy. Wars with the Greek Emperor Theophilus seriously disturbed his later years; and revolts in Spain and Africa foreshadowed the breaking up of the caliphate. He wrote, among other works, "Inquiries into the Koran," "Signs of Prophecy," and "Rhetoric of the Priests and Panegyrists of the Caliph."

**Almanac**, an annual compilation, based on the calendar, embracing information pertinent to the various days of the year, the seasons, etc., with astronomical calculations and miscellaneous intelligence more or less detailed, according to the special purpose for which it is prepared. Before the invention of printing there was no satisfactory method of distributing to the public systematically arranged information about the calendar for the year and the forthcoming astronomical phenomena; but different ingenious devices were employed by the people. One of the most celebrated of these was the so-called clog almanac, a four-sided stick of wood, upon which the Sundays and other fixed days were notched, and the characters were inscribed to distinguish them. It is supposed to have originated with the Danes and was still in use in rural households of the N. of England at the end of the 17th century.

The oldest printed almanac is attributed to George von Purbach, of Vienna, in the middle of the 15th century, and entitled "Pro Annis Pluribus." King Matthias Corvinus employed Johann Regiomontanus, in 1474, to compile an almanac, which was printed in Latin and in German. Almanacs were issued by a printer named Engel, beginning with the year 1491. Stöfler, Tübingen, published almanacs at irregular intervals. Yearly almanacs were printed somewhere in the course of the 16th century. In the 17th century all sorts of astrological and meteorological information and other kinds of news were published in the almanacs and took the place, in a measure, of the newspaper of to-day. The "Almanach Royal," which began to be published in 1679 in Paris, contained notices in re-



gard to posts, court festivals, masses, markets, etc. In 1699 the genealogy of the royal house and enumeration of the higher clergy were added. This form of almanac was imitated in Prussia in 1700, in Saxony in 1728, and, under the title of "Royal Almanac," in England in 1730. Shortly afterward almanacs prepared for the people began to appear, containing, instead of official information, short stories, anecdotes, poems, and all sorts of information.

In England, King James I. gave the monopoly of almanac printing to the Universities and the Stationers' Company, but the former were no more than sleeping partners in the concern, and were, therefore, only partially disgraced by the extent to which astrological predictions were issued in their works. For 200 years after the granting of the monopoly, formal astrological prophecies were a principal feature of the British almanacs. The most successful was Francis Moore's, styled by its author "Vox Stellarum" ("Voice of the Stars"), which was begun in 1698 and is said to have attained a circulation of 500,000. "Poor Robin's Almanac," first published in 1663 and continued until 1828, was compiled for readers who were accustomed to scoff at the common prophetic annuals of the times, and was characterized by coarse witticisms and rather lugubrious attempts at humor. The poet Herrick is credited with having a hand in its early numbers. Another famous publication was the almanac issued by John Partridge, "cobbler, starmonger, and quack," whose pretensions provoked Swift's satire, "Predictions for the Year 1708, etc."

The first American almanac was that of William Pierce, of Cambridge, published in 1639. The most famous of American almanacs was "Poor Richard's," published in Philadelphia by Benjamin Franklin under the pseudonym of Richard Saunders. This almanac was probably imitated from that of Thomas of Dedham, Mass., which was kept for a good many years and contains many pleasant and witty verses, jests and sayings. The information printed in these almanacs seems to have been the only means of carrying news to the more distant parts of the country.

Some of the almanacs that are regularly published every year are extremely useful, and are indeed almost indispensable to men engaged in official, mercantile, literary, or professional business. Such in Great Britain are Thom's "Official Directory of the United Kingdom," the "British Almanac" with its "Companion," Oliver & Boyd's "Edinburgh Almanac," and Whitaker's "Almanac." In the United States "The American Almanac" appeared between 1830-1861, and a second publication under the same name was edited for several years

by Ainsworth R. Spofford. Several of the largest newspapers in the United States now issue almanacs which are marvels of condensed information.

The "Almanach de Gotha," which has appeared at Gotha since 1764, contains in small bulk a wonderful quantity of information regarding the reigning families and governments, the finances, commerce, populations, etc., of the different States throughout the world. It is published both in a French and in a German edition. "The Nautical Almanac" is an important work published annually by the British Government, two or three years in advance, in which is contained much useful astronomical matter, more especially the distances of the moon from the sun, and from certain fixed stars, for every three hours of apparent time, adapted to the meridian of the Royal Observatory, Greenwich. By comparing these with the distances carefully observed at sea the mariner may, with comparative ease, infer his longitude to a degree of accuracy unattainable in any other way, and sufficient for most nautical purposes. This almanac was commenced in 1767 by Dr. Maskelyne, astronomer royal. The French "Connaissance des Temps" is published with the same views as the English "Nautical Almanac," and nearly on the same plan. It commenced in 1679. Of a similar character is the "Astronomisches Jahrbuch," published at Berlin. The "American Ephemeris and Nautical Almanac" is issued annually since 1855 by the Bureau of Navigation of the United States.

**Almansur**, or **Almanzor**, **Abu-Mohammed** (al-man-sör'), a famous Arab commander, born in Andalusia, A. D., 939. Engaged in over 50 expeditions against the Spaniards, he was defeated but once. The Kings of Leon and Navarre and the Count of Castile overthrew him at the noted battle of Calatanazor, 998. He died in 1002.

**Almansur** ("the Victorious"), the title assumed by Abu-Jafar, the second caliph of the house of the Abbassides, who succeeded his brother in 754. Warfare, treachery, murder were his steps to the throne, and his whole rule was as cruel as its beginning. He especially persecuted the Christians in Syria and Egypt. In war against external foes he had but little success, Spain and Africa falling away from the Eastern caliphate. He removed the seat of government from Kufa to Bagdad, which he built (764) at immense cost, raising the money by oppressive taxation. He introduced the pernicious custom of making his freed slaves, mostly foreigners, rulers of provinces. The best feature in his character was his patronage of learning. He caused the "Elements" of Euclid to be translated from the Syriac, and the famous fables of Bidpai from the Persian. **Alman-**



sur died in 775 during a pilgrimage to Mecca, at the age of almost 70.

**Alma-Tadema, Sir Lawrence**, a distinguished figure painter, born in Friesland, Jan. 8, 1836; educated principally at the Antwerp Academy; elected to the Royal Academy, London, in 1879; officer of the Legion of Honor, 1878; and member of the leading academies of Europe; studio in London. His paintings show a fondness for Greek and Roman subjects, and have won many honors for him. Among the best known are "Roman Dance;" "Bacchante;" "In the Tepidarium;" "Antony and Cleopatra;" and "An Audience at Agrippa's." He was knighted in 1899.

**Almeh, Alme, or Almai** (Arabic *alim*, wise, learned), a class of Egyptian singing girls in attendance at festivals, entertainments, or funerals.

**Almeida** (al-mā'ē-da), one of the strongest fortified places in Portugal, is situated on the river Coa, on the Spanish frontier, in the province of Beira. In 1762 it was captured by the Spaniards, but soon restored. In 1810 it was defended against Marshal Massena by an English officer until the explosion of a powder magazine compelled him to capitulate. Pop. 1,680.

**Almeida, Don Francesco d'**, first Portuguese Viceroy of the Indies, was born in 14—. When Albuquerque appeared to supersede Almeida as Viceroy, the latter refused to surrender the office. He imprisoned Albuquerque for some months, but finally resigned his office to his successor, and set out on his voyage home, but he was slain in a fight with savages in the South of Africa, in 1510.

**Almeida-Garrett, João Baptista de Silva Leitao de**, a distinguished Portuguese poet, dramatist, and politician, born in Oporto, Feb. 4, 1799; studied law at Coimbra, and, joining the democratic movement in 1820, became Minister of Public Instruction when scarcely 21, but, on the restoration in 1823, was banished and went to England. He subsequently returned, and experienced many vicissitudes owing to his political activity. As a man of letters he endeavored to free Portuguese poetry from the shackles of pseudo-classicism and to inspire it with new life by basing it on national forms and traditions. His efforts were also directed toward the creation of a purely national drama. His principal works are "Catão," a tragedy (1820), among the best in Portuguese literature; "Camões," a romantic epic (1825), glorifying the life and death of Portugal's greatest poet; "Dona Branca," a satirical epic (1826), scoring monasticism; "Adozinda," a lyrical epic (1828); "Bernal Francez," a cycle of romances (1829); "Auto de Gil Vicente" (1838), pronounced the first purely Portuguese drama; "O Arco

de Sant' Anna," a historical novel (1846); "Romancerio," a collection of Portuguese ballads (3 vols., 1851-1853). He died in Lisbon, Dec. 10, 1854.

**Almeria** (al-mā-rē'a), a fortified seaport of Southern Spain, capital of the Province of Almeria, near the mouth of a river and on the gulf of same name, with no building of consequence except a Gothic cathedral, but with an important trade, exporting lead, esparto, barilla, etc. The Province, which has an area of 3,300 square miles, is mountainous, and rich in minerals. Pop. town (1900) 47,326; Province 359,013.

**Almohades** (al-mō-hā'dāz), the name of a Moslem dynasty that ruled in Africa and Spain during the 12th and 13th centuries. The word is Arabic, signifying "worshippers of the one true God," and was assumed as a term of distinction. This sect, which at first was religious rather than political, was founded among the Atlas Mountains by Ibn Tomrul Abdallah, and, in 1146, under the leadership of Abd-ul-Mumen, put an end by the conquest of Morocco to the empire of the Almoravides in Africa, and next extended its career of conquest to Spain. Under Jakub Almansor they won, in 1195, at Alarcos, a great victory over the Castilians. In 1210 Mohammed, the successor of Jakub, went with a great army to Spain, but was overthrown in 1212 by the united kings of Castile, Aragon, and Navarre, in the famous battle of Navas de Tolosa, in which it is said that 100,000 Moors were left upon the field. This great defeat was the beginning of the downfall of Moorish power in Spain; its most immediate result was the disappearance of the Almohades from the peninsula. The empire of the Almohades in Africa was brought to an end in 1269, through revolts of the nomadic tribes.

**Almond**, the fruit of the almond tree, the *Amygdalus communis*, a tree which grows usually to the height of 12 or 14 feet. Its pink flowers, composed of five petals, grow in pairs, and appear very early in spring. The leaves are oval, pointed, and delicately serrated at the edges. Its flowers are remarkably beautiful, and form a great ornament of English shrubberies. The common or sweet almond is a soft and pleasantly-flavored kernel, contained in a nut, which is of flattish shape, and has a tender shell, with numerous small holes on the outside. Though known to the ancients from the most remote period of antiquity, the almond tree has been cultivated in England only since 1562, and this almost wholly on account of the beautiful appearance of its flowers, since the climate of Great Britain is not sufficiently warm for the fruit to be perfected. The almonds which are consumed in that country and the United States are imported, sometimes in the shell,



and often without, from France, Spain, Italy, and the Levant. The Jordan almonds, which come from Malaga, are the best sweet almonds imported.

Some preparations of almonds are used in medicine, particularly that called milk of almonds, which is formed of pounded almonds, loaf sugar, and water, well mixed together. Bitter almonds resemble in all respects the sweet almonds, both in the appearance of the kernels themselves and of the trees which produce them, excepting a slight difference in the size of the flowers and fruit. Like the sweet almonds, they yield a large portion of oil. This has no bitterness, but the substance that remains after the pressure is intensely bitter. If these almonds be eaten freely, they occasion sickness and vomiting. By confectioners they are much used to give flavor to biscuits and other articles. The substance which gives their peculiar flavor to bitter almonds, and to the kernels of peaches, apricots, etc., is prussic acid. This acid does not exist ready formed in the almond, but when that fruit is subjected to the action of saliva a chemical reaction is set up between two of the constituents of the almond—namely, amygdalin and emulsin—whereby prussic acid is produced.

**Almond-Oil, Bitter Almond-Oil, or Benzoic Aldehyde**, in chemistry, an oil obtained by pressing almonds. The oil of bitter almonds, at least when impure, is very poisonous. It has, however, been used as a cure in intermittent fever. It produces urticaria. It also relieves intoxication.

**Almoner**, a person whose office it is to distribute alms. It was first given to such a functionary in a religious house, there being an ancient canon which especially enjoined each monastery to spend a tenth part of its income in alms to the poor. By an ancient canon, also, all bishops were required to keep almoners. Kings, queens, princes and other people of rank had similar functionaries.

**Almonte, Juan Nepomuceno** (al-môn'tè), a Mexican general, believed to be the son of the priest Morelo, born in 1804. As a boy he took part in the war for independence. In 1824, he went to London as attaché to the Mexican embassy, and, after his return, became a member of Congress. In 1832 he was appointed chargé d'affaires at London, then in Peru. He entered the army and served under Santa Ana in Texas in 1836. After that he became Minister of War under Bustamante, and, in 1841, was sent to Washington. When, at the end of 1845, Paredes was at the head of Mexican affairs, Almonte again became Minister of War, and was a second time sent as minister to the United States, soon afterward. He took part in the battles of Buena Vista and

Cerro Gordo in 1847. In 1853 he was again sent to Washington, and, in 1857, to Paris. In 1861, when Juarez attained power, he deposed Almonte, who, led by party hatred and ambition, invited the French expedition to Mexico. In the beginning of 1862 he joined the French troops of occupation at Vera Cruz; but, as the Mexicans saw in him only a tool of the French plans, they renounced the idea of making him French dictator, supported by French bayonets. The French general, himself, deprived him of power, but when, on the 10th of June, 1863, he reached the City of Mexico with the French, he was placed by the conquerors at the head of the Regency of the Mexican Empire. The Emperor Maximilian appointed him field-marshal, but, after Maximilian's death, he fled to Europe, and died in Paris, March 22, 1869.

**Almquist, Karl Jonas Ludvig** (älm'-kvist), a notable Swedish poet, novelist and miscellaneous writer, born in Stockholm, Nov. 28, 1793. A writer of great versatility, author of a series of educational works, treatises on the mental, moral, and political sciences, on philology, religion, mathematics, philosophy, and national economy, etc., of novels and tales, dramas, poems, lyric and epical. "The Book of the Rose," a collection of dramatic and lyric pieces, is his best known work. "It's All Right" and "The Palace," novels, "Araminta May" and "Skällnora's Will," tales, are also popular. He died in Bremen, Sept. 26, 1866.

**Alms**, pity, mercy; charity, from *eleeo*, to have pity; *eleos*, pity. Thus, alms in English, when traced to its origin, is really the Greek word *eleemosyne* corrupted; and the fact that so long a Greek word should have been worn away into so short an English one is fitted to suggest that during the Middle Ages it can scarcely ever have been out of people's lips. The continental nations have not yet succeeded in reducing the six Greek syllables into less than three or two; we have cut it away into a monosyllable, not susceptible of much further reduction.

In ordinary language, money, food, clothing, or anything else given as a gratuity to relieve the poor.

In law, reasonable alms are a certain portion of the estates of intestate persons allotted to the poor.

A tenure by free alms, or frank almoyne, is a tenure of property which is liable to no rent or service. The term is especially applied to lands or other property left to churches or religious houses on condition of praying for the soul of the donor. Many of the old monasteries and religious houses in England obtained lands in this way, which were free from all rent or service. In the United States churches, schools and charitable institutions are free from taxation.



**Almucantar, Almucanter, Almacanter, or Almocantar**, a circle drawn parallel to the horizon; generally used in the plural for a series of parallel circles drawn through the several degrees of the meridian. They are the same as what are now called parallels of altitude.

**Almucantar's Staff**, an instrument commonly made of pear tree or box, with an arc of  $15^\circ$ , used to take observations of the sun about the time of its rising and setting, in order to find the amplitude, and, consequently, the variation of the compass.

**Alnus**, a genus of plants belonging to the order *betulaceæ* (birch-worts). The flowers are monœceous and amentaceous. In the barren ones the scale of the catkin is three-lobed, with three flowers; the perianth is four partite; the stamina, four. In those which are fertile the scale of the catkin is subtrifid with three flowers, and there is no perianth. The ovary is two-celled, two-ovuled, but only one ovule reaches perfection.

**Aloadin**, Prince of the Assassins, or Arsacides; commonly called the "Old Man of the Mountain." He was the Sheik of a Syrian tribe, professing Mohammedanism, but blindly devoted to the will of their chief. The word "assassin" is derived from the followers of Aloadin, of whom many fabulous stories are narrated.

**Aloe**, any species of the genus described under botany (below), or even of one, such as agave, with a close analogy to it. The American aloe is the agave americana, an amaryllid. The aloe of Scripture is probably the agallochum. Royle believes that the reason why the aloe proper and the agallochum became confounded was that *alloch*, *alloet*, or *allich*, the Arabic name of the latter, closely resembled *clwa*, the appellation given to the former in various Hindu tongues.

In botany, a genus of plants belonging to the order *liliaceæ*, or lily-worts, and constituting the typical genus of the section called *aloinæ*. The species are succulent herbs, shrubs, or even trees, with erect spikes or clusters of flowers. They are used in the West Indies for hedges; the juice is purgative, and the fibers are made into cordage or coarse cloth.

**Aloes**, the inspissated juice of the aloe. The cut leaves of the plant are put into a tub, the juice collected from them, and either boiled to a proper consistence or exposed to the sun till the fluid part evaporates. There are four principal kinds, two officinal. (1) Barbadoes aloes (*aloe barbadensis*), formed from the juice of the cut-leaf of *aloe vulgaris*. It is imported in gourds, and has a dull yellowish brown

opaque color, breaks with a dull conchoidal fracture, shows crystals under the microscope, has a nauseous odor, and is soluble in proof spirit. (2) Socotrine aloes (*aloe socotrina*), the produce of several species of aloes; it occurs in reddish brown masses, and breaks with a vitreous fracture. Its powder is a bright orange color. It has a fruity smell. It comes from Bombay. (3) Hepatic aloes, or East India aloes, non-official, is liver colored; its powder is yellow. (4) Cape aloes, the produce of *aloe spicata* and other non-official species, is a greenish brown color; this is given to horses. An inferior variety is called caballine aloes.

Aloes acts as a purgative, affecting chiefly the lower part of the intestinal canal. It increases the flow of the bile; it often produces griping when given alone, and sometimes causes hæmorrhoids. The watery extract of aloes is free from these objectionable properties. Cape aloes is less purgative. The use of aloes is not followed by constipation. Aloes has a very bitter taste.



ALOE SOCOTRINA.

**Aloes Wood** (sometimes called also eagle wood, calambac, paradise wood, or agallochum), the heart wood of *aquilaria ovata* and *aloes agallochum*, trees of the order *aquilariaceæ*, natives of the tropical parts of Asia, and supposed to be the aloes or lign-aloes of the Bible. They are large, spreading trees. Aloes wood contains a dark colored, fragrant, resinous substance, and is much prized in the East as a medicine, and for the pleasant odor which it diffuses in burning. The resinous substance is found only in the inner part of the trunk and branches; the younger wood is white, and almost scentless; hence the pure aloes wood is sometimes obtained by burying the stems, when the sap wood decays away, leaving the resinous core intact. A similar substance, still more esteemed, is obtained in the southeastern parts of Asia and the adjacent islands, from the central part of the trunk of *aloexylon agallochum*, of the natural order *leguminosæ*, sub-order *cæsalpinceæ*. This tree is found in Cochin-China and the



## Alogians

Moluccas, where a character of sacredness is attached to it. Its fragrant wood is not only much prized in the East as a perfume, but many medicinal virtues are ascribed to it. The ancients ascribed to it similar virtues, and so valued it for these and its fragrance that Herodotus says it once sold for more than its weight in gold. As it admits of a high polish, and exhibits a beautiful graining, precious gems were set in it; and it was cut into fantastic forms and worn in head-dresses, etc. It was early used to perfume apartments, and Napoleon I. used it as a perfume in his palaces. The fragrance continues undiminished for years. *Lign aloes* is a corruption of *lignum aloes* (aloes wood).

**Alogians**, in Church history, a sect which arose toward the end of the 2d century; they denied that Christ was the Logos, rejected John's Gospel and the Apocalypse, and considered that the miraculous gifts mentioned in the New Testament had ceased to exist in the Church.

**Alopecia**, a variety of baldness in which the hair falls off from the beard and eyebrows, as well as the scalp.

**Alosa**, a genus of fishes, of the family *clupeidæ*. It contains two British species, the *A. finta*, or Twaite shad, and the *A. communis*, or allice shad. The shads resemble herrings in their form and structure, but are so much larger than the well known species that they have been popularly called the mother of herrings. The Twaite shad enters the Thames and other rivers in May, and spawns there in July. The allice shad is rare in the Thames. The American species, *culpea sapidissima*, is abundant on the Atlantic coast, and ascends the larger rivers in the spring to spawn.

**Alpaca**, the name given to a species of llama, which has for a long time back been domesticated in Peru. It was first found by Pizarro, and was afterward scientifically described in 1590 by Acosta. Its modern zoölogical name is *auchenia paco*. It has a long, fine fleece, valuable in the woolen manufacture. There is a second species of llama in Peru, but its fleece is short, and, therefore, much less valuable. Also a cloth woven from the wool of the alpaca. It is finer and stronger than cotton, and less costly than most silks.

**Alpes, Basses** (bäs-älp), a Department in the S. E. of France, one of the four formed out of the old Provence; divided into five *arrondissements*, Barcelonnette, Castellane, Digne, Forcalquier, and Sisteron; capital, Digne. It is a mountainous region, the E. portion belonging to the crystalline Alps, with summits rising to upward of 11,000 feet; the W. portion to the limestone Alps. This latter portion is one of the most arid and desolate in France,

## Alpes, Hautes

and, indeed, in Europe; its valleys filled with tumbled rocks rent from the mountainsides, the slopes of which have to a large extent been deprived of their soil and vegetation by torrential waters. West of the Durance, the principal river of the Department, a chain of the limestone Alps runs westward under the name of the Montagne de Lure. The Durance partly bounds the Department on the N. Its principal tributaries, all on the left bank, are the Ubaye in the N., leading up to the Col d'Argentière, the Bléonne, the Asse, and the Verdon, which partly separates Basses Alpes from Var. None of these rivers is navigable. The principal wealth of the higher parts of the Department consists in its mountain pastures, to which every spring large numbers of sheep from the lower Rhone are led. Cattle, horses, mules, and asses are also reared. Cereals are grown in many places, and in the southern districts olives and great quantities of almonds are produced, and the silkworm is reared. Area 2,685 square miles. Pop. (1906) 113,126.

**Alpes, Hautes** (hôt-alp), a Department in the S. E. of France, adjoining the Italian frontier, formed almost entirely from the Dauphiné, but including a small part of the old Provence in the S.; divided into three *arrondissements*, Gap, Briançon, and Embrun; capital, Gap. In physical features it corresponds closely with Basses Alpes. Here also the mountain slopes of the limestone Alps have been devastated by torrents, but reafforestation is being slowly but successfully carried out. In the N., on the borders of the Department of Isère, the granitic mass of Pelvoux rises to the height of 13,460 feet, out of the limestone Alps. At its northern base runs the road from Grenoble by the Col du Lautaret (6,800 feet) to Briançon and the Col de Genève. The principal river is the Durance, which partly separates it from Basses Alpes, and, among its tributaries are the Buech, which flows from N. to S. in the W., its valley being traversed by the railway from Grenoble to Sisteron; and the Guil, a small left bank tributary, in the extreme E., which leads up to the Col de la Traversette. About the middle of the Department a line of valleys belonging to different river basins runs from N. to S., and is traversed by a road leading from Grenoble to Sisteron by Gap. From the N. part of this line of valleys the beautiful valley of Valgodemar leads E. to the southern base of Pelvoux, and on the E. side of a dividing ridge is continued by the Vellouise. The Department is the poorest in France in natural resources. Its principal wealth consists in its mountain pastures, on which fine merino sheep are reared. Marble of all



shades is abundant, and there is a considerable extent of anthracite near Briançon. Area 2,158 square miles. Pop (1906) 107,498.

**Alpes Maritimes** (älp mär-ê-tēm'), a Department in the extreme S. E. of France formed mainly from the Province of Nice, ceded by Italy in 1860, but containing also the *arrondissement* of Grasse, detached from Var; divided into three *arrondissements*, Nice, Grasse, and Puget-Théniers; capital, Nice. The physical features are similar to those of Basses and Hautes Alpes. The limestone region in the S. W. is specially remarkable for its magnificent scenery, its deep and dark defiles or clus, and its numerous swallow-holes, in which streams disappear to reappear in fine springs. The mildness of the climate has caused several places on the coast to become favorable health resorts, especially Cannes, Antibes, Nice, and Mentone. The Department surrounds on the land side the principality of Monaco. Among the products are vines, mulberries, olives, oranges and citrons. Flowers are cultivated on a large scale for the making of perfumes, which forms the principal industry of the Department. Area, 1,482 square miles. Pop. (1906) 334,007. For the whole mountain range, see ALPS.

**Alpha and Omega**, the first and last letters of the Greek alphabet, sometimes used to signify the beginning and the end, or the first and the last of anything; also as a symbol of the Divine Being. They were also formerly the symbol of Christianity, and engraved accordingly on the tombs of the ancient Christians.

**Alphabet**, so called from *alpha* and *beta*, the first two Greek letters, is the name given to a set of graphic signs, called letters, denoting elementary sounds, by the combination of which words can be visibly represented. Nearly 200 alphabets, ancient and modern, are known, of which about 50 are now in use. Most of them are developments from the primitive Phœnician alphabet, which was itself ultimately derived from the Egyptian hieroglyphic picture-writing.

All writing was in its origin pictorial. It began with ideograms, which developed into phonograms. Ideograms are pictures or symbols intended to represent either things or abstract ideas. Phonograms are the graphic symbols of sounds. They are either verbal, standing for entire words; or syllabic, denoting the articulations of which words are composed; or alphabetic, representing the elementary sounds into which syllables can be resolved.

Five independent systems of ideographic writing have been invented: (1) The Cuneiform, which arose in the valley of the

Euphrates, and developed into the Achæmenian syllabaries. (2) The Chinese, out of which the Japanese syllabaries have arisen. (3) The Hittite, which was the probable source of the Cypriote syllabary. (4) The Mexican picture writing. (5) The Egyptian hieroglyphics, from which the Phœnician alphabet was derived.

The Egyptian hieroglyphic picture writing may be traced back, by means of inscriptions, for more than 6,000 years, to the time of the second Egyptian dynasty, when it already appears in great perfection, arguing a long period of antecedent development. Of the 400 Egyptian phonograms, about 45 attained an alphabetic character—that is, they either denoted vowels, or could be associated with more than one vowel sound. Out of these alphabetic signs our own letters have grown. The transition to a pure alphabetic writing was made when the Phœnicians rejected the unnecessary portions of the complicated Egyptian system, the ideograms, the verbal phonograms, and the syllabic signs, and selected from the 45 variant symbols of elementary sounds a single sign for each of the 22 consonants found in Semitic speech. In 1859 De Rouge pointed out that the prototypes of the Phœnician letters must be sought, not in the hieroglyphics of the monuments, but in certain cursive “hieratic” or priestly characters, so extremely ancient that they had already fallen into disuse at the time of the Hebrew exodus. This form of hieratic writing is known to us almost exclusively from a single manuscript, the Papyrus Prissé, as it is called, which was found in a tomb belonging to the 11th dynasty, and is, therefore, much older than the shepherd kings.

A knowledge of alphabetical writing must have been obtained by the Greeks from the Phœnician trading settlements in the Ægean as early as the 10th century B. C. At the date of the oldest Greek inscriptions which were extant, three vowels, *alpha*, *epilson*, and *omicron*, had already been evolved out of the Phœnician breaths, *aleph*, *he*, and *‘ayin*, and two, *iota* and *upsilon*, from the semi-consonants *yod* and *vau*. The forms of the letters had undergone hardly any change, and the direction of the writing is still retrograde, from right to left, as in the Semitic scripts. Before the close of the 7th century, the more convenient plan of writing all the lines from left to right was adopted.

By the middle of the 6th century, the Greek alphabet had in all essential respects attained its final development. About the 3d century B. C., the lapidary characters, corresponding to the capitals in Greek printed books, began to be replaced by more rounded forms, called uncials, while cursive forms were used for correspondence. Finally, between the 7th and 9th centuries



Alphabet

Alphabet

ALPHABETS.

|    | EGYPTIAN  |    | PHOEN-<br>ICIAN | GREEK |   |    |     | LATIN |    |            | HEBREW |
|----|---|----|-----------------|-------|---|----|-----|-------|----|------------|--------|
| 1  |    | 𐦎  | 𐤀               | Α     | Α | λ  | α   | A     | A  | α α α      | א      |
| 2  |    | 𐦏  | 𐤁               | Β     | Β | β  | β   | Β     | Β  | Β β        | ב      |
| 3  |    | 𐦐  | 𐤂               | Γ     | Γ | γ  | γ   | Γ     | Γ  | {C c c̄ g} | ג      |
| 4  |    | 𐦑  | 𐤃               | Δ     | Δ | Δ  | δ   | Δ     | Δ  | δ δ δ      | ד      |
| 5  |    | 𐦒  | 𐤄               | Ε     | Ε | Ε  | ε   | Ε     | Ε  | ε ε ε      | ה      |
| 6  |   | 𐦓  | 𐤅               | Υ     | Υ | Ϝ  | ϝ   | Ϝ     | Ϝ  | ϝ ϝ ϝ      | ו      |
| 7  |  | 𐦔  | 𐤆               | Ι     | Ι | Ζ  | ζ   | Ι     | Ι  | ζ ζ        | ז      |
| 8  |  | 𐦕  | 𐤇               | Η     | Η | Η  | η η | Η     | Η  | η η η      | ח      |
| 9  |  | 𐦖  | 𐤈               | Θ     | Θ | Θ  | θ θ | Θ     |    |            | ט      |
| 10 |  | 𐦗  | 𐤉               | Ι     | Ι | Ι  | ι   | Ι     | Ι  | ι ι        | י      |
| 11 |  | 𐦘  | 𐤊               | Κ     | Κ | Κ  | κ κ | Κ     | Κ  | κ κ κ      | כ      |
| 12 |  | 𐦙  | 𐤋               | Λ     | Λ | Λ  | λ λ | Λ     | Λ  | λ λ λ      | ל      |
| 13 |  | 𐦚  | 𐤌               | Μ     | Μ | Μ  | μ μ | Μ     | Μ  | μ μ μ      | מ      |
| 14 |  | 𐦛  | 𐤍               | Ν     | Ν | Ν  | ν ν | Ν     | Ν  | ν ν ν      | נ      |
| 15 |  | 𐦜  | 𐤎               | Ξ     | Ξ | Ξ  | ξ ξ | Ξ     | +  | x x        | ס      |
| 16 |   |    | 𐤏               | Ο     | Ο | Ο  | ο   | Ο     |    |            | ע      |
| 17 |  | 𐦝  | 𐤐               | Π     | Π | Π  | π π | Π     | Π  | π π π      | פ      |
| 18 |  | 𐦞  | 𐤑               | Μ     |   |    | Ϟ   | Μ     |    |            | צ      |
| 19 |  | 𐦟  | 𐤒               | Φ     | Φ | Φ  |     | Φ     | Q  | q q        | ק      |
| 20 |  | 𐦠  | 𐤓               | Ρ     | Ρ | Ρ  | ρ ρ | Ρ     | R  | ρ ρ        | ר      |
| 21 |  | 𐦡  | 𐤔               | Σ     | Σ | Σ  | σ σ | Σ     | S  | σ σ σ      | ש      |
| 22 |  | 𐦢  | 𐤕               | Τ     | Τ | Τ  | τ τ | Τ     | T  | τ τ τ      | ת      |
|    | I   | II | III             | IV    | V | VI | VII | VIII  | IX | X          | XI     |



## Alphabet

**A. D.**, the minuscules, which are the small letters of our printed Greek books, were evolved from a combination of uncials and cursives.

The Greek alphabet was the source, not only of the Latin, but of the other national alphabets of Europe. The Runes, which formed the alphabet of the Scandinavian nations, were based on early forms of the Greek letters, which, as Dr. Isaac Taylor has shown, were obtained about the 6th century B. C. from Greek colonies on the Black Sea, by Gothic tribes who then inhabited the region. In our own alphabet, the order of the letters does not differ very greatly from the Phœnician arrangement, but the few changes are historically instructive. The last Phœnician letter was *t*, which in our alphabet is followed by six letters, *u*, *v*, *w*, *x*, *y*, *z*. Of these, *u* dates from the 9th century B. C., having been differentiated by the Greeks out of *F*, and placed after *t*, the last of the old letters. Originally, *u* and *v* were only the medial and initial forms of the same letter. In the 10th century A. D. the first came to be used for the vowel, and the second for the consonant, because in Latin words the consonant usually occurs at the beginning, and the vowel in the middle of words, and the two forms were regarded as separate letters, and placed side by side in the alphabet. In the time of Cicero, the Romans borrowed *Y* from the Greek alphabet, to denote the the sound of *upsilon*, and placed it at the end of the alphabet after *X*. Soon afterward, *Z* was also borrowed from the Greek alphabet and placed after *Y*. It was introduced into the English alphabet from the French in the 15th century, being only used in English, as in Latin, to spell words of foreign origin. The letters *I* and *J*, like *U* and *V*, were the medial and initial forms of the same letter; but since the consonantal sound usually occurs at the beginning of words, and the vowel sound in the middle, *J* was conveniently appropriated in the 15th century for the consonant, and *I* for the vowel. The dot of *j*, which is needless, is a mere survival, showing that the two forms were differentiated after the practice of dotting the *i* had come into vogue. In the 11th century, the letter was accented, *í*, for convenience, when it came next to *u*, *m*, or *n*; in the 14th, the accent was changed to a dot; and it was only in the 15th that the dot became universal. In the Latin and English alphabets, the seventh letter is *g*; while in the Phœnician, as well as in the Greek, the seventh letter is *z*.

Our letters are named on the same principle as in the Latin alphabet. The vowels are called by their sounds; the consonants, by the sound of the letter combined with the easiest vowel, which, for convenience of utterance, precedes the continuants and follows the explosives.

## Alpine Plants

### ORIGIN OF THE ALPHABET.

- I. Egyptian Hieroglyphics, facing to the left.
- II. Egyptian Hieratic characters, facing to the right.
- III. The oldest Phœnician letters, mostly from the Baal Lebanon inscription.
- IV. The oldest Greek letters, from inscriptions at Thera and Athens, reading from right to left.
- V. The lapidary Greek alphabet at the time of the Persian war, reading from left to right.
- VI. Greek uncials, from the Codex Alexandrinus, about 400 A. D.
- VII. Greek minuscules.
- VIII. The old alphabet of Italy.
- IX. Lapidary Latin alphabet at the time of Cicero.
- X. Latin uncials and minuscules.
- XI. Modern square Hebrew, derived from the Phœnician letters.

**Alpheus** (al-fē'us), the principal river of Peloponnesus (Morea), rising in the S. E. of Arcadia, and flowing past the famous Olympia westward into the Ionic Sea. In its passage through Arcadia, a country consisting of cavernous limestone, it repeatedly disappears underground and rises again. With this fact was connected a remarkable myth. The river god Alpheus was said to have become enamored of the nymph Arethusa while bathing in his stream. To escape him, she prayed to Artemis, who changed her into a fountain, and opened up an underground passage for her to Ortygia, a small Sicilian island in the harbor of Syracuse. The river still pursued the nymph, passing from Greece to Sicily below the sea, without mingling his waters with it, and appearing in the spring that bubbles up by the shore, close by the fountain of Arethusa.

**Alphonsin**, an instrument invented by Alphonso Ferri, a Neapolitan physician, who lived in the 16th century, for extracting bullets from gunshot wounds. It consists of three branches, closed by a ring. When inserted into a wound, the ring is drawn back, to allow the branches to separate and grasp the ball.

**Alphonsine Tables.** See ALFONSO X.

**Alphonso.** See ALFONSO.

**Alpine Plants**, the name given to those plants whose habitat is in the neighborhood of the snow, on mountains partly covered with it all the year round. As the height of the snow-line varies according to the latitude and local conditions, so also does the height at which these plants grow. The mean height for the alpine plants of Central Europe is about 6,000 feet; but it rises in parts of the Alps and in the Pyrenees to 9,000, or even more. The high grounds clear of snow among these mountains present a very well marked flora, the general characters of the plants being a low, dwarfish habit, a tendency to form thick turfs, stems partly or wholly woody, and large,



## Alps

brilliantly colored and often very sweet-smelling flowers. They are also often closely covered with woolly hairs. In the Alps of Middle Europe the eye is at once attracted by gentians, saxifrages, rhododendrons, primroses of different kinds, etc. Ferns and mosses of many kinds also characterize these regions. Some Alpine plants are found only in one locality.

\* **Alps**, the highest and most extensive system of mountains in Europe, included between lat.  $44^{\circ}$  and  $48^{\circ}$  N., and long.  $5^{\circ}$  and  $18^{\circ}$  E., covering the greater part of Northern Italy, several departments of France, nearly the whole of Switzerland, and a large part of Austria, while its extensive ramifications connect it with nearly all the mountain systems of Europe. The culminating peak is Mont Blanc, 15,781 feet high, though the true center is the St. Gothard, or the mountain mass where it belongs, from the slopes of which flow, either directly or by affluents, the great rivers of Central Europe, the Danube, Rhine, Rhone, and Po.

The Alps in their various great divisions receive different names. The Maritime Alps, so called from their proximity to the Mediterranean, extend westward from their junction with the Apennines for a distance of about 100 miles; culminating points, Aiguille de Chambeyron, 11,155 feet, and Grand Rioburent, 11,142 feet; principal pass, the Col di Tende, 6,158 feet, which was made practicable for carriages by Napoleon I. Proceeding northward the next group consists of the Cottian Alps, length about 60 miles; principal peaks: Monte Viso, 12,605 feet; Pic des Ecrins, 13,462; Pelvoux, 12,973. Next come the Graian Alps, 50 miles long, with extensive ramifications in Savoy and Piedmont; principal peaks: Aiguille de la Sassièrre, 12,326 feet; Grand Paradis, 13,300; Grande Casse, 12,780. To this group belongs Mont Cenis, 6,765 feet, over which a carriage road was constructed by Napoleon I.; a railway now passes through the mountain by a tunnel nearly 8 miles long. The Pennine Alps form the loftiest portion of the whole system, having Mont Blanc (in France) at one extremity, and Mont Rosa at the other (60 miles), and including the Alps of Savoy and the Valais. In the E. the valley of the Upper Rhone separates the Pennine Alps from the great chasm of the Bernese Alps, running nearly parallel, the great peaks of the two ranges being about 20 miles apart. The principal heights of the Pennine Alps are Mont Blanc, 15,781 feet; Monte Rosa, 15,217; Mischabelhörner (Dom.), 14,935; Weisshorn, 14,804; Matterhorn, 14,780. In the Bernese Alps, the Finsteraarhorn, 14,026; Aletschhorn, 13,803; Jungfrau, 13,671. The pass of Great St. Bernard is celebrated for its hospice. The easternmost pass is the Simplon, 6,595 feet, with

## Alps

a carriage road made by Napoleon I. Further E. are the Lepontine Alps, divided into several groups. The principal pass is the St. Gothard (6,936 feet), over which passes a carriage road to Italy, while through this mountain mass a railway tunnel more than 9 miles long has been opened. Highest peaks: Tödi, 11,887 feet; Monte Leone, 11,696. The Rhætian Alps, extending E. to about lat.  $12^{\circ} 30'$  N., are the most easterly of the central Alps; principal peaks: Piz Bernina, 13,294 feet; Ortler-spitze, 12,814; Monte Adamello, 11,832. The Brenner Pass, 4,588 feet, from Verona to Innsbruck, and between the central and the eastern Alps, is crossed by a railway. On the railway from Innsbruck to the Lake of Constance is the Arlberg tunnel, over 6 miles long. The Eastern Alps form the broadest and lowest portion of the system, and embrace the Noric Alps, the Carnic Alps, the Julian Alps, etc.; highest peak, the Gross Glockner, 12,405 feet.

The Alps are very rich in lakes and streams. Among the chief of the former are Geneva, Constance, Zürich, Thun, Brienz, on the N. side; on the S. Maggiore, Como, Lugano, Garda, etc. The drainage is carried to the North Sea by the Rhine, to the Mediterranean by the Rhone, to the Adriatic by the Po, to the Black Sea by the Danube. In the lower valleys the mean temperature ranges from  $50^{\circ}$  to  $60^{\circ}$ . Half way up the Alps it averages about  $32^{\circ}$ —a height which, in the snowy regions, it never reaches. In respect to vegetation the Alps have been divided into six zones: The first is the olive; the second, the vine; the third the mountainous; the fourth the sub-Alpine or coniferous; the fifth, the pasture; and the sixth, the region of perpetual snow.

The geological structure of the Alps is highly involved, and is far, as yet, from being thoroughly investigated or understood. In general three zones can be distinguished, a central, in which crystalline rocks prevail, and two exterior zones, in which sedimentary rocks predominate. The rocks of the central zone consist of granite gneiss, hornblende, mica slate, and other slates and schists. In the western Alps (in the central zone) there are also considerable elevations which belong to the Jurassic (Oolite) and Cretaceous formations. Among the minerals that are obtained are iron and lead, gold, silver, copper, zinc, alum, and coal.

Many of the Alpine summits are now ascended by railway. The Rigi is one of these. There is an inn at the top, 5,905 feet above the level of the sea, and 4,468 above the Lake of Lucerne. A favorite view from hence is to watch the sun rise over the Bernese Alps. The Becca di Nona (8,415 feet), S. of Aosta, gives, according to some authorities, the finest panoramic view to be obtained from any sum-

\*For Map, see SWITZERLAND.



mit of the Alps. Among the most impressive phenomena are the avalanche and the glacier. The most accessible glaciers are those of Aletsch, Chamonix, and Zermatt.

**Alsace=Lorraine** (äl-säs-lō-rān') (German, *Elsass-Lothringen*), since its cession by France, in 1871, a State or "imperial territory" (*Reichsland*) of the German empire. A naturally rich and historically interesting region, with fertile soil and active industries, it occupies the extreme S. W. corner of Germany, and is bounded W. by France, E. by Baden, and S. by Switzerland. Its utmost length from N. to S. is 123 miles; its breadth varies between 22 and 105 miles; and its area is 5,580 square miles, of which 1,353 belong to Upper Alsace (in the S.), 1,844 to Lower Alsace (N. E.), and 2,383 to Lorraine (N. W.). Pop. (1905) 1,814,564, of whom 76 per cent. were Catholics, and more than 80 per cent. spoke German—mainly the vernacular Alsatian, a dialect of Allemannian. The most populous districts in their order are Lower Alsace, Lorraine, and Upper Alsace. The French speaking population is mainly in the larger towns and in Lorraine. The Rhine flows 115 miles north-by-eastward along all the eastern boundry, and receives, below Strasburg, the Ill from Alsace, 127 miles long. Other rivers are the Moselle, flowing through Lorraine past Metz, and its affluent, the Saar. Along the Rhine is a strip of level country, 9 to 17 miles broad, and declining from 800 to 450 feet above sea level. Westward of this rise the Vosges Mountains, culminating at a height of 4,677 feet; while Lorraine, rather hilly than mountainous, rarely attains 1,300 feet. About 48.5 per cent. of the entire area is arable, 11.6 meadow and pasture, and 30.8 under wood. Alsace=Lorraine produces much wine, grain, and tobacco; it is rich in mines, iron and coal; and manufactures iron, cotton, wool, silks, chemicals, glass, and paper. It contains the important cities of Strasburg (pop. 1905, 167,678), Mühlhausen (pop. 94,498), Metz (pop. 60,419), and Colmar. As a French province, Alsace was divided into the departments of Haut-Rhin and Bas-Rhin. Lorraine fell into the Departments of Meuse, Moselle, Meurthe, and Vosges (parts of all which still remain French). The lieutenant-governor (*Statthalter*), representing the Imperial Government, resides at Strasburg, and is assisted by a Ministry of five departments, and a Council of State.

In Cæsar's time Alsace=Lorraine was occupied by Celtic tribes, and formed part of ancient Gaul; but during the decline of the empire the Alemanni and other tribes from beyond the Rhine occupied and largely Germanized it. From the 10th century it formed part of the German empire, under

various sovereign dukes and princes, latterly of the house of Hapsburg; till a part of it was ceded to France at the Peace of Westphalia (1648), and the rest fell a prey to the aggressions of Louis XIV., who seized Strasburg (1681) by surprise in time of peace. By the Peace of Ryswick (1697), the cession of the whole was ratified. Thus—as the Germans used to complain—was this fine land, with one of the noblest branches of the race, alienated from the German people, and the command of the German Rhine disgracefully surrendered to the enemy in the time of misfortune. German never ceased to be the chief language of the people, and all newspapers were, during the whole period of the French possession, printed in both languages. In 1814–1815 Russia would not hear of the restitution of Alsace=Lorraine to Germany; and not till 1871, after the Franco-Prussian war, were Alsace and German Lorraine, by the treaty of Frankfort, incorporated in the new German Empire. The great mass of the population were strongly against the change, and 160,000 elected to be French, though only 50,000 went into actual exile, refusing to become German subjects. For, at least since the era of the Revolution, Alsace in sentiment was wholly French. To France she gave the bravest of her sons—Kellerman, Kléber, and many another hero. Strasburg first heard the "Marseillaise;" and MM. Erekmann-Chatrian, Lorrainers both, have faithfully represented their countrymen's love of *La Patrie* in the days of the second as of the first Napoleon. France, too, is always thinking of her loss, eager some day to repair it; and the imperial territory, for ages the borderland and battlefield of two great powers, remains a perpetual cause of strained relations between France and Germany. Of late it is claimed by the Germans that, through the emigration of the irrecconcilables and the immigration of German settlers, the tendency of the older natives to accept the inevitable, and the rising up of a new generation, to whom the French connection is a tradition, the situation has slowly but steadily changed in favor of Germany and the existing firm but fair administration. The irritating passport system, a special grievance not in force elsewhere in Germany, was withdrawn in 1873. On May 9, 1902, Emperor William directed that a bill be laid before the Federal Council abolishing paragraph 10 in the imperial constitution, which imposed practically a dictatorship on the reichsland of Alsace=Lorraine. This imperial action was wholly unexpected.

**Altai Mountains** (al'tī), an important Asiatic system on the borders of Siberia and Mongolia, partly in Russian and partly in Chinese territory, lying between lat. 46° and 53° N., long. 83° and 91° E., but having



## Altamirano

great eastern extensions. The Russian portion is comprised in the governments of Tomsk and Semipalatinsk, the Chinese in Dsungaria. The rivers of this region are mostly head waters of the Obi and Irtysh. The mountain scenery is generally grand and interesting. The highest summit is Byeluka, height 11,000 feet. The area covered by perpetual snow is very considerable, and glaciers occupy a wide extent. In the high lands the winter is very severe; but on the whole the climate is comparatively mild and is also healthy. The vegetation is varied and abundant. The mountain forests are composed of birch, alder, aspen, fir, larch, stone pine, etc. The wild sheep has here its native home, and several kinds of deer occur. The Altai are exceedingly rich in minerals, including gold, silver, copper, and iron. The name Altai means "gold mountain." The inhabitants are chiefly Russians and Kalmuks. The chief town is Barnaul.

**Altamirano, Ignacio Manuel** (äl-tä-mē-rä'nō), a Mexican poet, orator, and journalist, born in Guerrero, about 1835; wrote "Clemencia;" "Julia," etc. He held political office, rose to the rank of Colonel in the army during the French invasion, and was of pure Indian blood, said to have been descended from the ancient Aztec monarchs. He died in Italy, February, 1893.

**Altar**, an erection made for the offering of sacrifices for memorial purposes, or for some other object. An altar designed for sacrifice is mentioned in Scripture as early as the time of Noah (Genesis viii: 20). Abraham, Isaac and Jacob built several altars in places where for a brief or more lengthened period they sojourned. Most of these appear to have been for sacrificial purposes, and one or two seem to have been for memorial ends; but the most unequivocal case of the memorial altar was subsequently. (Josh. xxii: 10-34; Gen. xii: 7, 8; xiii: 4, 18; xxii: 9; xxvi: 25; xxxiii: 20; xxxv: 1, 7.)

At Sinai directions were given that altars should be of earth or of stone unhewn, and that the ascent to them should not be by steps (Exod. xx: 24-26). When the tabernacle worship was established, there was an altar of wood covered with brass, designed for sacrifice, and one overlaid with gold, on which incense was burned (Exod. xxvii: 1-8; xxxi: 1-10). Both had projections at the four corners of the upper surface. To those of the brazen altar victims were bound, and a fugitive from death seizing hold of one of these could not legally be dragged away to meet his doom. Strictly speaking, all sacrifices were to be confined to the one sacrificial altar, but the injunction was observed only to a partial extent. (I Sam. vii: 17; II Sam. xxiv: 25; I Kings, xviii: 32.)

## Altar

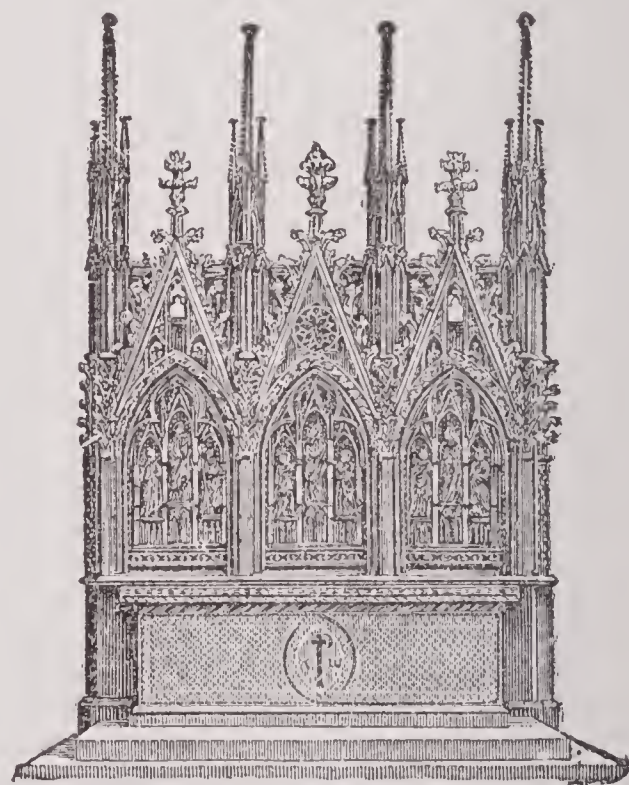
In the early Christian centuries altars were generally of wood. During the 6th century stone was employed in the construction, and this continued to the time of the Reformation.

In the Church of Rome an altar is essential, it being believed that in the mass an actual though bloodless sacrifice is offered for sin. Formerly, also, there was an upper altar (super-altare), which was a small portable one for the consecration of the communion elements, when the priest had not the opportunity of using the altar in a church or chapel.



ALTAR — OLD GREEK.

The stone altars, which were in the churches of the Church of England when the Reformation began, were removed about 1550, and tables substituted for them. Queen Mary restored the altars, which were, however, again removed on the accession of



ALTAR — GOTHIC STYLE.

(In the Elizabeth Church, Marbury.)

Queen Elizabeth. What is sometimes called "the altar" is everywhere in the prayer book called "the holy table."

Many of the old ethnic nations built altars for idolatrous worship on the tops of hills or in groves. The Greeks and Romans built high altars to the heavenly gods, and some of lower elevation to the demigods and



heroes, while they worshipped the infernal gods in trenches scooped out of the ground. Many nations have had, and yet possess, altars of turf, stone, wood, or, in rare cases, even of horn; but they are wholly absent among the Mohammedans.

**Alten, Karl August, Count von**, a Hanoverian soldier, born Oct. 20, 1764; entered the army in 1781; but in 1803 left Hanover for England, where he was appointed commander of the "German Legion" in the British service. In almost all the engagements of the Spanish War of Liberation he took a prominent part; and he fought with distinction at Quatre-Bras and Waterloo. He died April 20, 1840.

**Altenburg** (-bürg), the capital of the Duchy of Saxe-Altenburg, situated on the Pleisse, in a fertile country, 30 miles S. of Leipsic. Standing on an almost perpendicular rock of porphyry, the old castle of Altenburg forms a striking feature in the landscape. Its foundations are probably as old as the 11th century; and, since the two fires of 1865 and 1868, it has been finely restored. It is memorable as the place whence, in 1455, a neighboring knight, Kunz von Kaufungen, carried off the young Saxon princes, Ernest and Albert. Before he could reach the Bohemian frontier, he was apprehended by a charcoal burner, and handed over to the executioner. The episode is known in history as the "Prinzenraub." Brushes, woolen goods, gloves, and cigars are among the manufactures. Pop. (1905) 38,818.

**Alterative**, a kind of medicine which, when given, appears for a time to have little or no effect, but which ultimately changes, or tends to change, a morbid state into one of health. Garrod divides alteratives into seven groups: (1) Mercurial alteratives, (2) iodine alteratives, (3) chlorine alteratives, (4) arsenical alteratives, (5) antimonial alteratives, (6) sulphur alteratives, and (7) alteratives of undetermined action.

**Altgeld, John Peter**, author, lawyer, and judge, born in Germany, in December, 1847. When but a few months old he was taken to Mansfield, Ohio. He was Judge of the Supreme Court at Chicago, in 1886-1891, and Governor of Illinois in 1893. His pardon of the Anarchists caused much controversy. He wrote "Our Penal Machinery and Its Victims," "Live Questions," and other books. He died March 12, 1902.

**Altiscope**, an instrument consisting of an arrangement of mirrors in a vertical framework, by means of which a person is enabled to overlook an object (a parapet, for instance) intervening between himself and whatever he desires to see, the picture of the latter being reflected from a higher to a lower mirror, where it is seen by the observer.

**Altitude**, in mathematics the perpendicular height of the vertex or apex of a plane figure or solid above the base. In astronomy it is the vertical height of any point or body above the horizon. It is measured or estimated by the angle subtended between the object and the plane of the horizon, and may be either true or apparent. The apparent altitude is that which is obtained immediately from observation; the true altitude, that which results from correcting the apparent altitude, by making allowance for parallax, refraction.

**Alto**, in music, the highest singing voice of a male adult, the lowest of a boy or a woman, being in the latter almost the same as contralto. The alto, or counter-tenor, is not a natural voice, but a development of the falsetto. It is almost confined to English singers, and the only music written for it is by English composers. It is especially used in cathedral compositions and glees.

**Alton**, a city in Madison co., Ill., on the Mississippi river, 5 miles above the mouth of the Missouri, and on several trunk line railroads; 21 miles N. of St. Louis, Mo. It is built on a high limestone bluff, and has very picturesque surroundings. The Mississippi is here spanned by a costly railroad bridge, and the city is connected with upper Alton, 2 miles distant, by a trolley line. Alton has important manufactures, and a large river trade. Here are the Cathedral of Sts. Peter and Paul, St. Joseph's Hospital, Ursuline Convent (all Roman Catholic), Hayner Memorial Public Library, Monticello Seminary, Old Women's Home, 2 National banks, and several daily and weekly newspapers. UPPER ALTON is the seat of Shurtleff College (Baptist), and Wyman Institute. Elijah P. Lovejoy, the abolitionist, was murdered at Alton by a mob in 1837. A monument to his memory was erected in 1897. Pop. (1900) 14,210; (1910) 17,528.

**Altoona**, a city in Blair co., Pa.; on the Pennsylvania and the Altoona, Clearfield and Northern railroads; 117 miles E. of Pittsburg. It is at the E. base of the Alleghany Mountains, at an elevation of 1,180 feet above sea level, where the railroad begins to ascend the mountains at a grade of 90 feet to the mile. The city contains extensive machine shops of the Pennsylvania railroad, large individual car works, rolling and planing mills, a hospital, two convents, a public library, general offices of the Pennsylvania railroad, and 2 National banks. Altoona is a mining, manufacturing, lumbering, and farming trade center for Central Pennsylvania, and has had a rapid development. Pop. (1890) 30,337; (1900) 38,973; (1910) 52,127.

**Altorf**, or **Altdorf**, a town of Switzerland, in the canton of Uri, near Lake Lucerne. A tower marks the spot where Wil-



## Alto=Rilievo

liam Tell is said to have shot the apple from his son's head. The adjacent village of Burglen is Tell's traditional birthplace. Pop. about 2,500.

**Alto=Rilievo**, or **Alto=Relievo**, sculptured work of which the figures project more than half their true proportions. When they project just one-half, the term used is mezzo-relievo; and when less than half, basso-relievo, or in English, bas-relief.

**Altranstädt** (ält'rän-stedt), an important village in the Prussian Province of Saxony, near Lutzen. It is famous for its castle, where, on Sept. 24, 1706, Charles XII. of Sweden signed the peace with August II., King of Poland. By this treaty, August II. agreed to vacate the Polish throne, not to enter any alliances against Sweden, especially any with the Czar, and to give up the Livlander Patkul, to grant the Swedish winter quarters in Saxony, and pledge himself not to persecute the Evangelical Church. This treaty did not go into effect until Nov. 26, because August felt that, by reason of a previous peace, he was obliged to support the Russians in their attack upon the Swedish General Mardefeld. After the defeat of Charles XII. at Poltava, August II., on Aug. 8, 1709, declared the Peace of Altranstädt to be void under the pretext that his representatives had exceeded their authority. Through the Treaty of Altranstädt of Aug. 30, 1707, Charles XII. obtained from the Emperor Johann Joseph I. religious liberty and toleration for the Protestants of Silesia.

**Altruism**, a term used in psychology and ethics to denote disposition and conduct directed toward the well-being of others. It is contrasted with egoism, or self-seeking disposition and conduct. It is essential to altruism, as well as to egoism, that the good of others, or of self, should be consciously and intentionally pursued. Actions and dispositions which are instructive, such as maternal instinct, are not, properly speaking, altruistic, nor are the opposite egoistic. It is only when the consciousness of self is sufficiently developed in the child to give rise to a contrast between self and the "other" (alter), that the conscious pursuit of the interest of one of them is possible. This is covered by psychologists by saying that real altruism and egoism are always "reflective." Altruism is also applied to the type of ethical theory which bases morality upon generous or altruistic disposition or conduct (in the sense defined above).

**Alum**, the name given to double salts of sulphate of aluminum with sulphates of potassium, sodium, ammonium, or of other monatomic metals, as silver, thallium, caesium, rubidium. They crystallize in octohedra. Potash alum,  $\text{Al}_2\text{K}_2(\text{SO}_4)_4 + 24\text{H}_2\text{O}$ ,

## Aluminum

is prepared by the decomposition of a shale containing iron pyrites,  $\text{FeS}_2$ , which is gently burned and exposed to the air in a moist state; it oxidizes and forms sulphates, and, on the addition of a potash salt to the solution obtained by water, alum crystallizes out. Alum has a sweet astringent taste, reddens litmus paper, and dissolves in its own weight of boiling water. Sodium alum is very soluble. Ammonium alum is often prepared by adding the ammonia liquor of gas-works instead of potash. Alum is used in dyeing and in preparing skins, etc. Alums can be also formed in which ferric or chromic sulphates replace aluminium sulphate, as potassio-ferric sulphate,  $\text{Fe}_2\text{K}_2(\text{SO}_4)_4 + 24\text{H}_2\text{O}$ , and ammonio-chromic sulphate,  $\text{Cr}_2(\text{NH}_4)_2(\text{SO}_4)_4 + 24\text{H}_2\text{O}$ . These crystallize in the same form, and cannot be separated from each other by crystallization. Alum is used in medicine as an astringent in doses of 10 to 20 grains. Burned alum is alum deprived of its water of crystallization by heat; it is used externally as a slight escharotic.

In mineralogy, Dana makes alum the type of a group of minerals, classed under his "Oxygen Compounds—Hydrous Sulphates," and places under it tschermigite and kalinite. Ammonia alum, a mineral, called also tschermigite. Feather alum, a mineral, called also halotrichite. Iron alum, a mineral, called also halotrichite. Magnesia alum, a mineral, called also pickeringite. Manganese alum, a mineral, called also apjohnite. Native alum, a mineral, called also kalinite. Soda alum, a mineral, called also mendozite. Saccharine alum, a composition made of common alum, with rose-water and the white of eggs boiled together to the consistence of a paste, and thus capable of being molded at pleasure. As it cools it grows as hard as an ordinary stone.

**Alumbagh**, a palace and connected buildings in Hindustan, about 4 miles S. of Lucknow. On the outbreak of the Indian mutiny it was occupied by the revolted Sepoys, and converted into a fort. On Sept. 23, 1857, it was captured by the British, and during the following winter a British garrison, under Sir James Outram, held out here, though repeatedly attacked by overwhelming numbers of the rebels, till in March, 1858, it was finally relieved. Sir Henry Havelock was buried within the grounds.

**Aluminum**, a metal discovered by Wöhler in 1827, as a gray powder, but in 1847 in the form of small, glittering metallic globules. In 1854, H. St. Clair Deville isolated aluminum into a state of almost perfect purity and determined its properties. He found that aluminum could be prepared in a compact form at a comparatively small expense. It is a white metal,



somewhat resembling silver, but possessing a bluish hue, which reminds one of zinc. This bluish color can be whitened by hydrofluoric and phosphoric acids, and also by a heated solution of potash. It is very malleable and ductile, in tenacity it approaches iron, and it takes a high polish. It fuses at about 1292° F. (700° C.), and can then be cast in molds into ingots. Exposed to dry or moist air, it is unalterable, and does not oxidize or tarnish like most common metals. Salt water affects it less than it does silver, tin, or copper. Neither cold nor hot water has any action upon it. Sulphuretted hydrogen, the gas which so readily tarnishes the silver in households, does not act on aluminum, which is found to preserve its appearance under all ordinary circumstances as perfectly as gold does. When cast into molds, it is a soft metal like pure silver, and has a density of 2.56; but when hammered or rolled, it becomes as hard as iron, and its density increases to 2.67. It is, therefore, a very light metal, being lighter than glass, and only one-fourth as heavy as silver.

Aluminum is very sonorous, a bar of it, when struck, giving out a very sweet, clear, ringing sound. It is a good conductor of heat and electricity. Since about 1850, such articles as coins, medals, statuettes, personal ornaments, keys, helmets, sabre-sheaths, mounts for furniture, and culinary vessels of aluminum have been tried, and failed to take the market. Not being acted upon by organic secretions, it is used for optical, surgical, and chemical instruments and apparatus. Aluminum leaf and wire may be employed with great advantage in place of silver leaf for decoration, or silver wire for embroidery. Of late it has come to be used in shipbuilding, especially for torpedo-boats, and boats meant to be sent in pieces to African lakes, etc., its hardness and lightness and non-corrosiveness being in its favor. Bicycles have also been made of it. And as it is especially suitable for cooking-vessels, efforts to cast it for pots and pans have often been made, but unsuccessfully till 1895, when aluminum (at 1s. 6d. = 31 cents, per pound), was weight for weight, three times the price of copper, but bulk for bulk, the cheaper metal. In 1855 Napoleon III. paid the expense for making industrial use of aluminum at Javel. Many other manufactories of aluminum were also started about that same time in France. In 1856, Alfred Mounier produced aluminum at Camden. In 1857, the price of aluminum was from \$28 to \$32 a pound. Between 1862 and 1877 it ranged from \$12 upward. In 1886 such improvements were made in its manufacture that its price was very much lowered, and when in 1888 electrical methods of production were used, the price of aluminum was reduced to less than \$1

a pound. In 1884, William Frishmuth, of Philadelphia, produced the aluminum cap for the Washington monument. In 1885 aluminum was produced for the most part in scientific laboratories as a curiosity for which little use was apparent. It sold for \$12 a pound. To-day it sells for 31 cents. In 1885 three books had been written about it. Now nearly a score are in circulation and several trade newspapers represent it. In its manufacture, millions are employed and millions more are invested in its collateral interests. The dreams of Deville, the originator of the aluminum industry, and of the Russian Chernuishevsky, have been brought to pass, for it is truly a metal of everyday life. In 1888 a process for the production of the pure metal was established at Pittsburg, and since then the spread in the production of the metal has been extremely rapid.

The metals most used for the production of aluminum are bauxite, a metal first found near Baux, but since then found in Styria in Austria, in Ireland and in many places in the United States; and cryolite, found on the W. coast of Greenland. There is no other useful metal, iron not excepted, which is widely scattered over the earth and which occurs in such abundance. The Smithsonian Institution has calculated the percentage of aluminum in the earth's crust at 7.81, while that of iron is 5.46. Aluminum is not found in a metallic state. It is a combination which exists in almost any clay bank and which enters into scores of minerals and also numerous precious stones, notably the ruby, sapphire, garnet, cyanite, turquoise, topaz, and lazulite. Copper has a specific gravity of 8.93 and a tensile strength of 16,500 pounds per square inch when pure. Aluminum has a specific gravity of 2.68, a tensile strength of 26,000 pounds in pure soft wire, and 40,000 pounds per square inch in hard drawn wire. The conductivity of the two metals is 28.5 per cent. in favor of copper. Recently aluminum has been substituted for copper as an electric conductor on certain rapid transit lines, it being much cheaper than copper. For occurrence and production in the United States, see BAUXITE.

*Aluminum Alloys.*—The aluminum bronzes, now becoming so generally introduced, are the alloys of aluminum and copper, in which the amount of copper considerably exceeds that of aluminum. Aluminum containing small quantities of copper is not designated as aluminum bronze, while copper containing from 13 to 90 per cent. of aluminum is brittle, having no use in the arts. The useful bronzes are those containing from 1 to 12 parts of aluminum. The value of these aluminum bronzes consists in their non-corrosive properties and in their strength. In respect to the former, they nearly rival the nobler metals, and in respect to the latter



## Alva

they surpass iron and compare favorably with steel. The non-corrosive property is not confined to any particular mixture, but is characteristic of all the alloys, and is undoubtedly due to the minute film of oxide of aluminum which is formed on the surface of the metal when exposed to the air — this film, though imperceptible, doubtless protecting from corrosion.

**Alva, or Alba, Ferdinand Alvarez de Toledo, Duke of**, prime minister and general of the Spanish armies under Charles V. and Philip II., was born in 1508, of one of the most illustrious families of Spain. He entered the army a mere youth, and fought in the wars of Charles V. in France, Italy, Africa, Hungary, and Germany. He is more especially remembered for his bloody and tyrannical government of the Netherlands (1567–1573), which had revolted, and which he was commissioned by Philip II. to reduce to entire subjection to Spain. Among his first proceedings was to establish the "Council of Blood," a tribunal which condemned, without discrimination, all whose opinions were suspected, and whose riches were coveted. The present and absent, the living and the dead, were subjected to trial and their property confiscated. Many merchants and mechanics emi-



DUKE OF ALVA.

grated to England; people by hundreds of thousands abandoned their country. The most oppressive taxes were imposed, and trade was brought completely to a standstill. As a reward for his services to the faith, the Pope presented him with a consecrated hat and sword, a distinction previously conferred only on princes. Resistance was only quelled for a time, and soon the provinces of Holland and Zealand revolted against his tyranny. A fleet which was fitted out at his command, was annihilated, and he was everywhere met with insuperable courage. Hopeless of finally

## Alvary

subduing the country, he asked to be recalled, and, accordingly, in December, 1573, Alva left the country, in which, as he himself boasted, he had executed 18,000 men. He was received with distinction in Madrid, but did not long enjoy his former credit. He had the honor, however, before his death of reducing all Portugal to subjection to his sovereign. It is said of him that during 60 years of warfare, he never lost a battle and was never taken by surprise. He died Jan. 12, 1582.

**Alvarado, Pedro de** (äl-vä-rä'dō), a famous comrade of Cortes, was born at Badajoz, toward the close of the 15th century. In 1518 he sailed for the New World, and accompanied Grijalva in his exploring voyage along the shores of the American continent. It was now that the Spaniards heard for the first time of the riches of Montezuma, and of his vast empire. Alvarado was soon sent back to Cuba to inform the Governor, Velasquez, of the result of the expedition. In February, 1519, he sailed with Cortes and his little band of heroes from Havana, and took an active part in all the incidents of the conquest of Mexico. He died in 1541.

**Alvarez, Don Jose** (al-vä'räth), the greatest of modern Spanish sculptors, was born in 1768, in the Province of Cordova. During youth he labored with his father, a stonemason; and when 20 years old, began to study drawing and sculpture in the academy at Granada. He secured the patronage of the Bishop of Cordova, and in 1794 was received into the Academy of San Fernando, where, in 1799, he gained the first prize and a grant to enable him to study at Paris and Rome. In Rome, where he lived on terms of friendship with Canova and Thorvaldsen, he executed a famous group, now in the Royal Museum of Madrid, representing a scene in the defense of Saragossa. At Rome till 1826, he died at Madrid in 1827.

**Alvarez do Oriente, Fernan** (äl'vä-reth dō ô-rē-en-te), a Portuguese poet (1540–1599), of the school of Camoens. His life-work, "Lusitania Transformed," is a pastoral romance in the manner of Sannazaro's "Arcadia," composed of prose and poetry and containing elegies, sonnets, and idyls of such beauty as to have caused some of them to be ascribed to Camoens.

**Alvary, Max**, a German tenor, son of the painter, Andreas Achenbach, whose name, however, he never used, born at Düsseldorf, May 1, 1858. He was first a merchant; then an architect in Cologne; studied singing with Lamperti in Milan, and with Stockhausen in Frankfort-on-the-Main; and joined the court opera in Weimar. In 1884 he went to New York, where for five years he distinguished himself as "Tannhäuser," "Siegfried," "Tristan," "Loge," "Walter Stolzing," and other Wagnerian characters.



In 1890, he returned to Germany. He died near Grosstabarz, Nov. 7, 1898.

**Alverstone, Lord.** See WEBSTER, SIR RICHARD EVERARD.

**Alvey, Richard Henry**, an American jurist, born in 1826; admitted to the bar in 1849; member of the Maryland State Constitutional Convention; Chief Judge of the Fourth Judicial Circuit, and a judge of the Maryland Court of Appeals in 1867-1883; Chief Justice of the latter Court in 1883-1893; became Chief Justice of the Court of Appeals of the District of Columbia in 1893, and one of the Venezuela Boundary Commissioners in 1896. He died Sept. 14, 1906.

**Alzog, Johann Baptist** (alts'ög), a German Catholic Church historian, born in Silesia in 1808; in 1834, he became a priest, and in 1836 was appointed professor in the Clerical Seminary at Posen; in 1845, professor and regent of the Seminary at Hildesheim, and in 1853, professor in the University of Freiburg. His chief work is a "Manual of the Universal History of the Christian Church," which has been translated into many languages, even into Armenian, and the 10th edition of which was reprinted in 1882 in two volumes. He also wrote a sketch of "Patrology." He died March 1, 1878.

**Amaddedulat**, the founder of the Persian dynasty, was the son of a fisherman. He and his two brothers took Persia proper, Persian Irak and Caramania, which they divided among them. Amaddedulat settled at Shiraz in Persia proper, in 933; died in 947.

**Amadeus**, a common name in the house of Savoy. The first who bore it was Count Amadeus, who lived in the 11th century, but the first to make an important figure in history was Amadeus V. (1249-1323). Amadeus VIII., born in 1383, secured the elevation of Savoy into a duchy. He was elected Pope in 1439, as Felix V., but resigned later. Amadeus I., of Spain, born in 1845, brother of King Victor Emmanuel of Italy, was elected King of Spain in 1870, abdicated in 1873, and died in 1890.

**Amadis**, a much used name in the chivalric poetry of the Middle Ages. Of the numerous romances that may be grouped under it, that which narrates the adventures of Amadis of Gaul is at once the most ancient and the best. It is believed that the earliest forms of the story were a lost Castilian version, perhaps about 1250, and a Portuguese version, also lost, composed about 1370 by Vasco de Lobeira of Porto. Most likely these earlier versions were in verse. Instead of these, we have a Spanish version of almost 100 years later, written by Garci-Ordoñez de Montalvo about 1465, but first printed in 1508. This prose

romance is one of the three spared by the licentiate and the barber at the burning of Don Quixote's books, and the barber's reason is that "it is the best of all the books of this kind." Its hero is Amadis, the model of every knightly virtue, son of King Perion of Gaul and Elisena, Princess of Brittany; he is sent away to Scotland, where he falls in love with Oriana, the incomparable daughter of King Lisuarte of England, and the narration of the course of this love story, with its varied adventures, wide journeys into foreign lands, numberless struggles with knights, giants and robbers, forms the chief subject of the romance. The work is wearisome from its length, but it contains many pathetic and striking passages, and has great value as a mirror of the manners of the age of chivalry.

The Spanish Amadis romances consist of 12 books, of which the first four contain the history of Amadis of Gaul. The earliest existing version of this is, as has been said, that of Montalvo, and the earliest edition now in existence bears the date of 1508. He himself added a fifth book containing the adventures of Esplandian (1510), the eldest son of Amadis and Gloriana; later writers have multiplied the posterity of the old hero. Already, in 1510, appeared a sixth book with the history of Florisando, his nephew; in 1514, 1526, and 1535, respectively, a seventh, eighth and ninth book, with the wonderful histories of Lisuarte of Greece, a son of Esplandian, and Perion of Gaul, and the still more wonderful history of Amadis of Greece, a great-grandson of the Gallic hero. Then follow Don Florisel of Niquea and Anaxartes, son of Lisuarte, whose history, with that of the children of the latter, fills the tenth and eleventh books. Lastly, the twelfth book, printed in 1546, narrates the exploits of Don Silves de la Selva, son of Amadis of Greece and Finistea. A French translation appeared in 1540, an Italian in 1546, an English in 1588, while a version in German was published in 1583. The French translators increased this series of romances from 12 to 24 books; the German, to 30. Lastly, a Frenchman, Gilbert Saunier Duverdier, at the beginning of the 17th century, arranged all these romances into a harmonious and consecutive series, and with his compilation in seven volumes, the "Roman des Romans," brought the history of Amadis and the series of about 50 volumes to a close. A version of the old romance in French was published by Creuzé de Lesser, in 1813; in English, by William Stewart Rose, in 1803; while the literary skill of Southey produced, in 1803, an abridgement that is still readable. On the other hand, Wieland's "Neuer Amadis" has nothing in common with the more ancient Amadis, except the title.



## Amadou

**Amadou**, a kind of brown match, tinder or touchwood, brought chiefly from Germany. It is called also punk, German tinder and pyrotechnic sponge. It is made by steeping a large fungus — the *boletus ignarius* — in a strong lye prepared with saltpetre, and afterward drying it thoroughly. In addition to being employed as a match, it is used to stop hæmorrhage. The *hernandia guianensis*, a species of daphnad, readily taking fire with flint and steel, is used as amadou. In India, a fungus, the *polyporus fomentarius*, or an allied species, is employed for the same purpose.

**Amalfi** (am-al'fē), a city and seaport, in the Province of Salerno, Italy; on the Gulf of Salerno; 22 miles S. E. of Naples. It was founded in the 4th century; was the birthplace of Flairo Gioja, the inventor of the mariner's compass; became the capital of a republic; and attained very large commercial importance. It contained a cathedral with bronze doors cast in Constantinople in 1066, and a Capuchin monastery, which, in recent years, became a popular hotel. On Dec. 24, 1899, a portion of the rocks and land facing the Gulf suddenly slid into the water, carrying down the ancient monastery building and other structures. Pop. (1901) 7,308.

**Amalgam**, the union or alloy of any metal with quicksilver (mercury).

In mineralogy, a mineral classed by Dana under his "Native Elements." It occurs crystallized, massive, or semi-fluid. Its color and streak are silver-white. It is brittle, and when cut gives a grating noise. It consists of silver 34.8, and mercury 65.2. It occurs in Hungary, the Palatinate, Sweden, Spain, Chile, and elsewhere.

Gold amalgam is a mineral occurring in white, crumbling grains about the size of a pea, or in yellowish-white four-sided prisms. It consists of gold 39.02, and mercury 60.98. It is found in Colombia and in California.

**Amalia, Anna**, Duchess of Saxe-Weimar, was born in 1739, and, left a widow in the second year of her marriage (1758), by her judicious rule as guardian of her infant son, she enabled the country to recover from the effects of the Seven Years' War. She appointed Wieland tutor to her son, afterward Grand Duke, and attracted to Weimar such men as Herder, Goethe, Musæus, Schiller; forming a galaxy of genius such as few courts were ever graced with. The battle of Jena is said to have broken her heart; she died (1807) six months after that event.

**Amalie, Marie Friederike Auguste** (ä-mä'lē-e), a German dramatist (1794-1870), who wrote under the pseudonym AMALIE HEITER. She was Duchess of Saxony, sister

## Amanita

of King John of Saxony. Comedies and dramas of simple conception, but careful delineation of character, and well adapted for the stage, have given her eminence. Among them are "The Uncle," "The Prince's Fiancée," "Primogeniture," "The Young Lady from the Country," and "The Agriculturist."

**Amalphitan Code**, a collection of laws bearing on navigation, collected by the inhabitants of Amalfi about the 11th century, and received as authority for a long period subsequently.

**Amalric**, or **Arnauld**, a Spanish military Churchman, who distinguished himself by his cruelties against the Albigenses. In 1209, he laid siege to Beziers, and commanded 60,000 of its inhabitants to be slaughtered after the town had surrendered. "How are we to distinguish the Catholics from the heretics?" inquired one of the officers. "Kill them all — God knows his own," replied Amalric. Died in 1225.

**Amalthea**, one of the 10 sibyls. It was she who, according to the old Roman legend, offered Tarquinius Priscus the nine Sibylline books at a price so high that, instead of giving her what she asked, he laughed at her, believing her to be mad. On this she burned three of the nine volumes in his presence, and asked the original price for the remaining six. Meeting with a second refusal, she proceeded to burn three more, and asked the full price for the remaining three. Awed by her extraordinary conduct, the king at last purchased the three for the sum originally asked for the nine.

**Amana**, a communistic German colony in Iowa, 28 miles W. of Iowa City, founded by the Amanites, who branched out from the so-called "Inspiration Congregation," consisting of seven villages, with over 2,000 inhabitants, which, through agriculture, wool and cotton spinning, have attained great prosperity.

**Amana** and **Amanus**, a chain of lofty mountains separating Cilicia from Syria. This name was given by the Greek and Roman geographers, and is also sometimes applied by modern geographers to the branch of Mount Taurus, which, beginning at the mountain of Cape Hynzyr, on the Gulf of Scanderoon, runs in a N. E. direction into the interior.

**Amanita**, a genus of *hymenomycete fungi*, nearly allied to the mushrooms (*agaricus*). Several of the species are edible, notably the delicious orange (*A. caesarea*), but the majority are poisonous. *A. muscaria*, which is quite common in woods, especially of fir and beech, in Great Britain, is one of the most dangerous fungi. It is sometimes called fly agaric, being used in Sweden and other countries to kill flies and bugs, for which purpose it is steeped in



milk. The pileus or cap is of an orange-red color, with white warts, the gills white, and the stem bulbous. It grows to a considerable size. It contains a bitter and narcotic principle, resembling in its physiological action that of Indian hemp (hasheesh), and is used by the Kamehadales to produce intoxication.



AMANITA, YOUNG.



AMANITA, ADULT.

**Amarantaceæ**, or **Amaranthaceæ**, a natural order of plants, consisting of "che-nopodal exogens, with separate sepals opposite the stamens, usually one-celled anthers, a single ovary often containing several seeds, and scarious flowers buried in imbricated bracts." The order is divided into three sub-orders—*Gomphreneæ*, *Achyrantheæ*, and *Celoseæ*. The species are generally unattractive weeds, but sometimes they are of more showy appearance. In 1846 Lindley estimated the known species at 282; now, it is believed, about 500 are known. They occur chiefly in the tropics of America and Asia; a number also are Australian.

**Amaranthus**, or **Amarantus**, a genus of plants, the typical one of the order *Amarantaceæ*. It is placed under the sub-order *Achyrantheæ*. It has green, purplish, or crimson flowers in large spiked clusters, which are very ornamental. *A. melancholicus* and *tri-color* are tender annuals, and *A. sanguineus* and *caudatus* common border flowers. The leaves of *A. viridis* are employed externally as an emollient poultice. *A. obtusifolius* is said to be diuretic. *A. debilis* is used in Madagascar as a cure for syphilis.

**Amari, Michele** (am-är'ē), an Italian statesman and Orientalist, born at Palermo, 1806. In 1841 he published a history of the Sicilian Vespers, which made him famous. He was active in the Revolution of 1848, and in 1860 aided Garibaldi. He also filled the chair of Arabic at Pisa, later at Florence. He was an authority on Oriental studies as well as a distinguished publicist. He died in 1889.

**Amarillo**, a town of Texas, county-seat of Potter co., and the largest town in the "Pan-handle," 333 miles N. W. of Fort Worth; on the Fort Worth and Denver, Southern Kansas and Texas, Pecos Valley and North-eastern, and Colorado, Rock Island, and Gulf railroads. A United States weather bureau observatory and an agricultural experiment farm are located at Amarillo. There are water works and electric-light plants under private control, and in 1907 gas works and a street railway system were in process of construction. Five banks have \$3,000,000 on deposit. Amarillo is the shipping point for the cattle-raising section of Texas. The leading religious denominations are represented, and there are well-equipped public and private schools. Pop. (1910) 9,957.

**Amaryllidaceæ**, an order of plants placed by Lindley in the narcissal alliance of the class endogens. In their six-partite or six-cleft colored perianth, and their three-celled fruit, they resemble lily-worts, from which, however, they are at once distinguished by their inferior ovary. In 1846 Lindley estimated the known species at 400. The representatives of the order in the English flora are narcissus, galanthus, and leucojum. Beautiful as they are, most of them have poisonous bulbs. The Hottentots are said to dip the heads of their arrows in the viscid juice of the bulbs of *Hæmanthus toxicarius* and some allied species. Several are emetic, having a principle in their composition like that of the squill.

**Amaryllis**, the name of a certain beautiful girl beloved by the shepherd Tityrus, also the servant-girl of a soothsayer. A similar meaning in Theocritus. From Greek *amarusso* = (1) to sparkle, (2) to dazzle. The word is also applied to a genus of plants, the typical one of the order *Amaryllidaceæ*.

**Amasis** (am-ä'sis), a king of Egypt, of humble origin, who rose to be general, and, when sent to put down an insurrection, joined the rebels, and was proclaimed king (570 B. C.). He cultivated the friendship of the Greeks, opened up to them the commerce of Egypt (previously confined to Nau-cratis), married a Greek wife, and took a body guard of Greeks into pay. Pythagoras and Solon are said to have visited him. During his reign of 44 years he greatly promoted the prosperity and adornment of Egypt.

**Amati** (am-ä'tē), a family of Cremona, in the 16th and 17th centuries, famous for their violins, which are at the present time valued very highly on account of their tone, which is beautiful and pure, though not very strong. They are instruments of exquisite finish, but being arched below and above, lack breadth and fullness of tone. The founder



of the violin works at Cremona was ANDREA AMATI, who died 1577. He worked with his brother Niccolo. From them 24 violins were sent to the courts of Louis XIII. and Louis XIV. His sons, ANTONIO, born about 1555, and GERONIMO (1556-1630), brought the business to still greater fame. In 1595, the famous violin which was designed for Henry IV. and is still in existence, was made by them. Geronimo's son, NICCOLO, born in 1596, was the most distinguished member of the family, and brought the brilliancy of the Cremona violins to the highest perfection. He was the teacher of Stradivarius and Andrea Guarnerius. He died April 12, 1684.

**Amaurosis**, a disease of the eye, arising from impaired sensibility of the retina. It is held to exist when a patient without *opauca cornua*, closed pupil, or cataract, complains of lost or defective vision. It commences with confused vision; then there is the appearance of a black spot in the center of an object looked at; next, floating bodies called *muscæ volitantes* appear before the eye, or objects appear brighter than natural. In the commencement of the disease the pupil dilates and contracts sluggishly; after a time it becomes more dilated and fixed; and at last there is established a state of complete blindness, constituting the true *gutta serena*. Amaurosis arises from inflammation or turgescence of the retina, from derangement of the digestive organs, from exercise of the eye on minute objects, and from injury or disease of the fifth nerve or its branches, or from injury of the eye itself.

**Amazon**, a river of South America, the largest in the world, formed by a great number of sources which rise in the Andes; the two head branches being the Tunguragua or Marañon and the Ucayale, both rising in Peru, the former from Lake Lauricocha, in lat. 10° 29' S., the latter formed by the Apurimac and Urubamba, the head-waters of which are between lat. 14° and 16° S.; general course N. of E.; length, including windings, between 3,000 and 4,000 miles; area of drainage basin, 2,300,000 square miles. It enters the Atlantic under the equator by a mouth 200 miles wide, divided into two principal and several smaller arms by the large island Marajo, and a number of smaller islands. In its upper course, navigation is interrupted by rapids, but from its mouth upward for a distance of 3,300 miles (mostly in Brazil) there is no obstruction. It receives the waters of about 200 tributaries, 100 of which are navigable, and 17 of these 1,000 to 2,300 miles in length; Northern tributaries: Santiago, Morona, Pastaga, Tigre, Napo, Putumayo, Japura, Rio Negro (the Cassiquiare connects this stream with the Orinoco), etc. Southern: Huallaga, Ucayale, Javari, Ju-

tay, Jurua, Coary, Purus, Madeira, Tapajos, Xingu, etc.

At Tabatinga, where it enters Brazilian territory, the breadth is 1½ miles; below the mouth of the Madeira, it is 3 miles wide, and where there are islands often as much as 7; from the sea to the Rio Negro, 750 miles in a straight line, the depth is nowhere less than 30 fathoms; up to the junction of the Ucayale there is depth sufficient for the largest vessels. The Amazonian water system affords some 50,000 miles of river suitable for navigation. The rapidity of the river is considerable, especially during the rainy season (January to June), when it is subject to floods; but there is no great fall in its course. The tides reach up as far as 400 miles from its mouth. The singular phenomenon of the bore, or, as it is called on the Amazon, the *pororoca*, occurs at the mouth of the river at spring-tides on a grand scale. The river swarms with alligators, turtles, and a great variety of fish. The country through which it flows is fertile, and is mostly covered with immense forests; it must at some future time support a numerous population, and be the theater of a busy commerce. Steamers and other craft ply on the river, the chief center of trade being Para, at its mouth. The Amazon was discovered by Yañez Pinçon in 1500, but the stream was not navigated by any European till 1540, when Francis Orellana descended it. He stated that he found on its banks a nation of armed women, and this circumstance gave the name to the river.

**Amazon**, or **Amazone** (from *a* = without, and *mazos* = the breast, from the story that the Amazons cut off their right breast to prevent its interfering with the use of the bow), a nation on the river Thermodon, the modern Termeh in Pontus, in Asia Minor, said to consist entirely of women renowned for their love of manly sports, and as warriors. Men were excluded from their territory, and commerce was held only with strangers, while all male children born among them were killed. They are mentioned by Homer. Diodorus also speaks of a race of Amazons in Africa. They are said to have founded a kingdom within Asia Minor, with Themiscyra for its capital. The legends of this strange race of warriors are simply legends.

Also the females of an Indian tribe on the banks of the great river Marañon, in South America, who assisted their husbands when fighting against the Spaniards, and caused the Marañon to receive the new name of the Amazon, and any female soldiers, such as the band of female warriors kept by the King of Dahomey in Africa.

In entomology, Huber's name for the neuters of a red ant (*polyergus*), which are



accustomed to sally forth in large numbers from their nests, in military array, and, proceeding to some neighboring anthill belonging to another species, plunder it of the larvæ of its neuters. These, when hatched, become a kind of pariah caste in the habitation of the Amazons.



AMAZON — BERLIN  
MUSEUM.

**Ambassador**, a diplomatic officer of the highest rank, sent by a sovereign or nation to another power to treat on affairs of State, representing not only the affairs, but also the person, of his sovereign or executive and entitled to almost equal respect. From the most ancient times, ambassadors have had a sacred character, owing to the impossibility of mediating between armed men without some assurance of personal inviolability, and to this privilege they are still en-

titled. Anciently ambassadors were sent only on special missions, after the performance of which they returned, their functions corresponding to those of the modern ambassador extraordinary; only in modern times did there originate the employment of an ambassador residing permanently at the seat of a foreign government, who is expected to familiarize himself with its politics and to exert his influence for the advantage of his own nation. At the outbreak of war between his own government and that to which he has been sent, the ambassador is dismissed or summoned to return. If the ambassador appointed by one government be considered by the State to which he is assigned personally disagreeable or not calculated to produce friendly relations between the two countries, he may be objected to as a *persona non grata*, and his reception refused; but if he is actually received he is entitled to each and every privilege of his office. These privileges have never been closely defined, but include the inviolability of the person of the ambassador from public and private violence; immunity from all jurisdiction, both civil and criminal, of the

country in which he is a resident; and similar exemption from local jurisdiction for his family, household and retinue. His house is sacred, but he cannot harbor malefactors. Exemption of his personal effects from duties, free exercise of worship, and numerous minor privileges are also granted. He must, however, regard the laws and customs of the country in which he is resident, or complaint may be made to the government he represents, and his recall demanded, or if his offense be serious, he may be sent beyond its borders by the offended power and a trial in his own country exacted. In the United States, jurisdiction in all diplomatic cases is by the Constitution delegated to the Supreme Court. The term ambassador was not formerly applied to American diplomatic agents, the highest rank being envoy extraordinary and minister plenipotentiary, until 1893, when Congress provided that all ministers to nations sending ambassadors to the United States should rank as ambassadors. Great Britain was the first to respond to the suggestion of Congress, and raised her minister at Washington (Sir Julien Pauncefote) to the grade of ambassador, the United States reciprocating by the similar promotion of Thomas F. Bayard. Since then Italy, France, Russia, Germany, Mexico, and Austria-Hungary (May, 1902) have raised their missions in Washington to embassies, and the United States has promptly returned the diplomatic courtesy. Representatives of the rank of ambassadors have the privilege of audience with the head of the State to which they are accredited.

**Amber**, as a mineral, called also succinite, from Latin *succinum* = amber. Its color is generally yellow, but sometimes reddish, brownish, or whitish and clouded. It is resinous in luster, always translucent, and sometimes transparent. It is brittle, and yields easily to the knife. It fuses at 287° C. It is also combustible, burning readily with a yellow flame, and emitting an agreeable odor. It is also highly electrical, so much so that electricity is derived from the Greek word *elektron*, or *elektros* = amber. Composition: Carbon, 78.94; hydrogen, 10.53; oxygen, 10.53 = 100. Found occasionally in masses as large as a man's head; but at other times in smaller pieces, some no larger than a grain of coarse sand. It is found in Europe, Asia and America. It is valued as a gem.

*As a Geological Product.*—Pliny was correct when he considered it to be an exudation from trees of the pine family, like gum from the cherry, and resin from the ordinary pine. Prof. Göppert, of Breslau, in 1845, deemed it a resinous exudation from an extinct pine, *pinus succinifer*, most nearly



## Amberg

allied to *pinus abies* (*abies excelsa*, the Norway spruce), or *pinus picca* (*abies picea*, the silver fir). He believed that forests of this tree once grew in the southeastern part of what is now the bed of the Baltic, in about 55° N. lat. and from 37° to 38° E. long.; but that during the time of the drift they were swept away, and the amber carried S. and S. W. to Pomerania and the adjacent regions, where now it is found. Subsequently he discovered that amber had been formed, not by the *pinus succinifer* only, but by eight other allied species, if, indeed, all the *abietinæ* and *cupressinæ* of the time and place did not share in its production. In 1845 he thought it of the age of the Molasse (Miocene?); in 1854 he deemed it Pliocene, and perhaps of the drift formation (Upper Pleiocene = pleistocene); but its exact age is as yet undetermined. Of 163 species of plants found in it, 30 still exist. Eight hundred species of insects have also been met with in it, with remains of animals of other classes.

In Scripture, the word amber, Hebrew *chasmal* (Ezek. i: 4, 27; vii: 2), is not what is now called by the name, but a mixed metal. It may be polished brass, or brass and gold, or silver and gold; it is difficult to say which.

**Amberg**, a town of Germany, formerly the capital city of the Upper Palatinate, situated on both sides of the Vils, in Bavaria, in the midst of numerous ironworks. The town is well built, and has a considerable manufacture of glass, iron wares, stoneware, tobacco, beer, vinegar, and arms of good quality. The principal buildings are a Gothic church of the 15th century, the royal palace, the town house, the old Jesuits' college, etc. At Amberg the Archduke Charles defeated the French General Jourdan on Aug. 24, 1796. Pop. (1905) 24,303.

**Ambergris**, a substance derived from the intestines of the sperm whale, and found floating or on the shore; yellowish or blackish white; very light; melts at 140°, and is entirely dissipated on red hot coals; is soluble in ether, volatile oils, and partially in alcohol, and is chiefly composed of a peculiar fatty substance. Its odor is very agreeable, and hence it is used as a perfume.

**Amblyopsis**, a North American bony fish, found in the Mammoth Cave of Kentucky, and interesting as illustrating in the rudimentary condition of its eyes the effects of darkness and consequent disuse. It only measures a few inches in length, is colorless, and has its small eyes covered by the skin. It seems able, however, to hear acutely, and the wrinkles of skin on its head are regarded as special feeling organs. Typhlichthys is a closely allied genus found in the same surroundings, while another relative,

## Amboyna

chologaster, occurring in the ditches of the South Carolina rice fields, is, as one would expect, open eyed. The caves are tenanted by similar half-blind animals of various classes. Wholly blind fishes are found only in the unsunned ocean depths.

**Ambo** (Greek, *ambon*), a kind of reading desk or pulpit, which in early churches was placed in the choir. The epistle and gospel were read from the ambo, and sermons were sometimes preached from it. The ambo had two ascents—one from the E. and the other from the W. In the Roman churches there were two ambos, one on each side of the choir, from one of which the gospel was read, and from the other the epistle. The name ambo was also given to an eagle shaped reading desk.

**Amboise** (änb-wäz'), a French town in the Department of Indre-et-Loire, on the Loire, 15 miles by rail E. of Tours. It lies in a region so rich in vineyards that it has been called "the Garden of France." The town is memorable for the Huguenot conspiracy (1560), which cost the lives of 1,200 Protestants, and as the place whence was issued the Edict of Amboise (1563), conceding certain privileges to the Huguenots. The castle of Amboise, from 1431, was a frequent residence of the Valois kings; the birth and death place of Charles VIII.; and, since the days of Louis XI., 15,000 prisoners are said to have been confined in its subterranean "oubliettes." Pop. 5,000.

**Amboise, Aymerie d'**, a famous French admiral, and brother of GEORGE D'AMBOISE (q. v.). He became, in 1503, Grand Master of the Knights of St. John in Rhodes, and gained a splendid victory over the Sultan of Egypt, in 1510. Died in 1512.

**Amboise, Bussi d'**. See BUSSI.

**Amboise, George d'**, a French Cardinal, and Minister of State, born in 1460. He became successively Bishop of Montauban, Archbishop of Narbonne, and of Rouen. Louis XII. made him Prime Minister. He was one of the wisest statesmen France ever had. He reformed the Church, remitted the people's burdens, and conscientiously labored to promote the public happiness. Died in 1510.

**Amboy**, a city of Lee co., Ill.; 95 miles W. of Chicago, on the Chicago, Burlington and Quincy and the Illinois Central railroads; has public schools, churches, newspapers, and shops of the Illinois Central road. Pop. (1890) 2,257; (1900) 1,826.

**Amboyna**, the most important of the Moluccas or Spice Islands belonging to the Dutch, lies S. W. of Ceram, and N. W. of Banda. Area, 365 square miles. Population about 58,000, nearly a third Mohammedans. A bay runs into the island lengthways, forming two peninsulas, the northern called



Hitu, and the southern, Leitimor. Amboyna is mountainous, well watered, fertile and healthy. Clove, sago, mango and cocoanut trees are abundant, also fine timber for cabinet work. The Dutch have diligently fostered the growth of the clove, and forced its culture by tyrannical methods. The Dutch took Amboyna from the Portuguese in 1605. The British settlement was destroyed by the Dutch in the terrible Amboyna massacre of 1623, for which, in 1654, Cromwell exacted compensation. The British held the island, 1796-1802. It became finally Dutch in 1814. Amboyna, capital of the Dutch Moluccas, is situated on the N. W. shore of Leitimor, has a good roadstead, and was almost wholly destroyed by an earthquake in 1898. The government buildings are in Fort Victoria. Pop. 9,000.

**Ambriz** (äm-brëth'), a seaport and region in the Portuguese colony of Angola, on the coast of Old Guinea, at the mouth of the Loje. The official name is Oporto do Ambriz or Mbrish. It lies in a flat, treeless region with an unfavorable harbor. It was originally the capital of Quibanza and was taken by the Portuguese, and in 1855 they built a fort, a custom-house and a church, which gradually became the nucleus of a city. It has a number of factories, and a trade in India rubber, coffee and palm oil. The trade in ivory, which at one time was important, is now transferred to Nokki and other places on the Kongo.

**Ambros, August Wilhelm** (äm'brös), a notable Austrian writer on music, born at Mauth, Bohemia, Nov. 17, 1816; was trained for the civil service and served in it with distinction; but his aptitude for music, and particularly for the criticism and literature of music, led him in another direction, and he rose to eminence as the author of "The Limits of Music and Poetry," besides numerous essays and studies connected with art. His masterpiece, however, he left unfinished, "The History of Music," a work which cost him many years of labor and which he carried only to the fourth volume. He attempted musical composition, but in it won no popularity. He died in Vienna, June 28, 1876.

**Ambrose, St.**, a celebrated father of the Church; born in 333 or 334 A. D., probably at Treves, where his father was prefect; died in 397. He was educated at Rome, studied law, practiced as a pleader at Milan, and, in 369, was appointed governor of Liguria and Æmilia (North Italy). His kindness and wisdom gained him the esteem and love of the people, and, in 374, he was unanimously called to the bishopric of Milan, though not yet baptized. For a time he refused to accept this dignity, but he had to give way, and at once ranged himself against the Aryans. In his strug-

gles against the Aryan heresy he was opposed by Justina, mother of Valentinian II., and for a time by the young Emperor himself, together with the courtiers and the Gothic troops. Backed by the people of Milan, however, he felt strong enough to deny the Aryans the use of a single church in the city, although Justina, in her son's name, demanded that two should be given up. He had also to carry on a war with paganism, Symmachus, the prefect of the city, an eloquent orator, having endeavored to restore the worship of heathen deities. In 390, on account of the ruthless massacre at Thessalonica, ordered by the Emperor Theodosius, he refused him entrance into the church of Milan (for eight months). The later years of his life were devoted to the more immediate care of his see. He wrote Latin hymns, but the "*Te Deum Laudamus*" which has been ascribed to him was written a century later. He introduced the Ambrosian chant, a mode of singing more monotonous than the Gregorian which superseded it. He also compiled a form of ritual known by his name.

**Ambrosia**, in Greek mythology, the food of the gods, as nectar was their drink.

**Ambrosian Library**, a public library in Milan, founded by the Cardinal Archbishop Federigo Borromeo, a relation of St. Charles Borromeo, and opened in 1609; now containing 160,000 printed books and 8,000 MSS. It was named in honor of St. Ambrose, the patron saint of Milan.

**Ambrosius, Johanna** (äm-brö'zi-ös), a German poet and story writer, born at Lengwethen, East Prussia, Aug. 3, 1854. Daughter of an artisan, and married in 1874 to a peasant's son by the name of Voigt, she led the hard life of a peasant woman till, in middle age, she wrote verses, which were published in a weekly newspaper; their success led to the publication of other poems and stories of hers, which have had extremely wide circulation.

**Ambulance**, a hospital establishment which accompanies an army in its movements in the field for the purpose of providing assistance and surgical treatment to the soldiers wounded in battle. The name is also given to one of the carts or wagons used to transfer the wounded from the spot where they fell to the hospital. One form of ambulance wagon is a strong but light covered vehicle, the body of which contains two stretchers for the accommodation of those most severely wounded, while seats before and behind are provided for those suffering from less serious wounds. The hospital chests, containing surgical instruments, bandages, splints, etc., are placed in the box under the driver's seat. A thorough ambulance system in connection with armies in the field is of quite recent introduction.



## Amen

A training in ambulance work is now recognized as of importance beyond the field of military affairs, and as being of the utmost service wherever serious accidents are likely to happen — as in large cities.

During the war between the United States and Spain, in 1898, the former put into operation two unique agencies for the relief of the sick and wounded, both thoroughly equipped with the best hospital appliances. One was a railroad ambulance train to convey soldiers from Key West to camps in the N.; the other was the steamship "Solace", which accompanied the fleet to Cuba.

**Amen**, a Hebrew word of asseveration, equivalent to "Yea," "Truly," which has been commonly adopted in the forms of Christian worship. In Jewish synagogues, the "Amen" is pronounced by the congregation at the conclusion of the benediction given at parting. Among the early Christians, the prayer offered by the presbyter was concluded by the word "Amen," uttered by the whole congregation (cf. I Cor. xiv: 16). Justin Martyr is the earliest of the fathers who alludes to the use of the response. In speaking of the sacrament of the Supper, he says that, at the close of the benediction and prayer, all the assembly respond "Amen." According to Tertullian, none but the faithful were permitted to join in the response. Up to the 6th century, it was the custom of those present at the Lord's Supper to utter a loud "Amen" at the reception of the bread and wine, and to join in shouting "Amen" at the close of the consecration. The same custom was observed at baptism, where the sponsors and witnesses responded vehemently. In the Greek Church, this word was pronounced after the name of each person of the Trinity; and, at the close of the baptismal formula, the people responded. At the conclusion of prayer, it signifies (according to the English Church Catechism) "So be it;" after the repetition of the creed, "So is it." The Roman Catholic version of the New Testament (Rheims, 1582), substitutes "Amen" for the "Verily" of our authorized version, it being the word used in the original Greek. The Mohammedans also use this word in their service.

**Amendment**, in law, the correction of any mistake discovered in a writ or process.

In legislative proceedings, a clause, sentence, or paragraph proposed to be substituted for another, or to be inserted in a bill before Congress, and which, if carried, actually becomes part of the bill itself. As a rule amendments do not overthrow the principle of a bill.

In public meetings, a proposed alteration of the terms of a motion laid before a meeting for acceptance. This amendment may be so much at variance with the essential

## Amenhotep

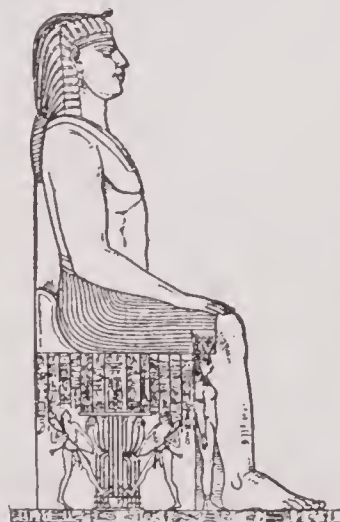
character of the motion that a counter motion would be its more appropriate name.

**Amenemhat** (am-en'em-hat), or **Amenemha**, the name of four Egyptian Kings of the 12th dynasty. The first, called SEHOTEP-AB RA, the founder of the dynasty, reigned about 2466 B. C.; was successful as a ruler and general, and built the temple of Amun, in Thebes. The second, called NUB-KAN RA, reigned in 2400 B. C. The third, called MAA-EN RA, reigned in 2300 B. C. He was best known by the name of Moiris among the Greeks. He reigned 43 years; after he had carefully marked the height of the Nile floods at different times, he built a great reservoir in the oasis of Fayum, connected with the Nile by a canal in order to regulate the flow of the water and improve its usefulness. He built also, beside the Lake Moiris, the great temple called the Labyrinth and pyramid of his tomb. Records of his time are found on the rocks in the peninsula of Sinai. The fourth, called MAAT-KHERN RA, reigned in 2266 B. C.

**Amenhotep** (am-en'hō-tep), or **Amenophis**, the name of four Egyptian kings of the 18th dynasty. The first, SER-KA RA, reigned about 1666 B. C., and carried on successful wars in Ethiopia and Libya. The second, called AA-KHEPERU RA, reigned in 1566 B. C., and made a successful campaign in Asia, commemorated in an inscription in a temple in Nubia. The third, the most famous, was the 9th of the 18th dynasty, known as MAAT-NEB RA; reigned about 1500 B. C. He was great in war and in peace. During his reign



AMENOPHIS I.

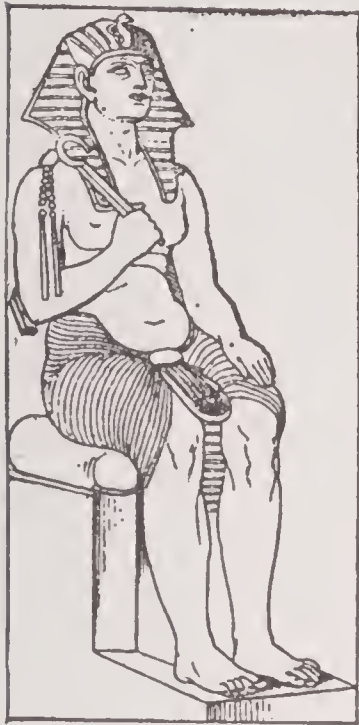


AMENOPHIS III.

Egypt stretched from Mesopotamia to the country of Karo in Abyssinia. He also built along the banks of the Nile a series of marvelous monuments. The temple at Gebel-Barkal in the Sudan was erected by this King. He added considerably to the temple of Karnak and that part of the temple of Luxor which bears his name; also erected on the left bank of the Nile, opposite Luxor, a sacred edifice which once must have been one of the most important in Egypt, of which now only the enormous colossi are left, which are portrait statues of himself. He was known to the Greeks as Ammon. The fourth was known as KHUN-ATEN and



reigned in 1466 B. C., and made an innovation in religion by substituting the new worship of Aten (the sun's disk) for that of Amun and other Egyptian deities. He also moved the capital from Thebes to a place in the middle of Egypt, the modern Tel-el Amarna.



AMENOPHIS IV.

**A Mensa et Thoro**, a legal term used when a wife is divorced from her husband (as far as bed and board are concerned), liability, however, remaining on him for her separate maintenance.

**Amenthes**, the unseen world of the ancient Egyptians, the Hades of the Greeks, who borrowed their ideas about the lower world from Egypt. The passage across the river, the islands of the blessed, Cerberus, and the judgment of the dead, all have their original in Amenthes, the localities of which, and the account of its divinities, are described in the famous "Book of the Dead," as well as in pictorial representations. The principal scene is the judgment seat of Osiris, the judge of the dead, before whom the dead are carried by the goddess Ma ("righteousness"), while Horus and Anubis weigh out their deeds.

**America**, or the **New World**, the largest of the great divisions of the globe except Asia, is washed on the W. by the Pacific, on the E. by the Atlantic, on the N. by the Arctic, and on the S. by the Antarctic Ocean. On the N. W. it approaches at Bering Straits within 48 miles of Asia, and on the N. E. Greenland approaches within 370 miles of the European island Iceland; but in the S. the distance between the American mainland and the E. continent is much greater, the shortest distance between its E. coast and the W. coast of Africa being 1,600 miles, and between its W. coast and the E. coasts of Asia and Australia from six to eight times more. The extreme points of America are—N., the point of Boothia Felix, in the Strait of Bellot, lat.  $71^{\circ} 56' N.$ , lon.  $94^{\circ} 34' W.$ ; S., Cape Froward, lat.  $53^{\circ} 53' 45'' S.$ , lon.  $71^{\circ} 18' 30'' W.$ , or, if the archipelago of Tierra del Fuego is included, Cape Horn, lat.  $55^{\circ} 59' S.$ , lon.  $67^{\circ} 16' W.$ ; W., Cape Prince of Wales, lat.  $65^{\circ} 33' N.$ , lon.  $167^{\circ} 59' W.$ ; and E., the Point de Guayaquil, lat.  $7^{\circ} 26' S.$ , lon.  $34^{\circ} 47' W.$ . The entire American continent has a length of about 9,500 miles; a maximum breadth, between

Cape Prince of Wales and Cape Charles in North America, of 3,500 miles; a coast-line of 43,200 miles; and a total area, including the islands, estimated at about 15,896,000 square miles.

**Coast-line.**—The E. coast of America strikingly resembles the opposite coasts on the other side of the Atlantic, the rounded shore of Africa being repeated in that of South America; while the ragged and indented outline of Europe is not unfitly represented by the shores of Melville Sound, Labrador, Nova Scotia, Maryland, Florida, and Yucatan. This difference between the E. coasts of North and South America is exhibited also in their W. coasts, and still more remarkably in their respective archipelagos. A similar contrast is presented by the inlets of the two continents—the Gulfs of Darien and Venezuela, the Bahía de Todos os Santos (All-Saints' Bay), and the Gulfs of San Matias and St. George on the E., and the Gulfs of Guayaquil and Panama on the W., though the largest which South America possesses, being very feeble representatives of the North American inlets, for example, Hudson Bay, the Gulf of St. Lawrence, the Bay of Fundy, the Bays of Campeachy and Honduras, the Gulf of California, etc.

**Surface.**—Three-fourths of the area of America is flat, and yet, throughout, the relative position of highland and lowland is very uniform. The Andes and the Rocky mountains stretch from N. to S., and the depression of the Isthmus of Panama, which rises only from 500 to 600 feet, forms a natural separation between the cordillera systems. The cordilleras of South America descend by steep short terraces to the seashore, or to a narrow belt of level land immediately adjoining it, form regular chains, display the loftiest masses of all America, and send out only short branches to the E. plains; whereas, on the contrary, the North American cordilleras lean, in the W., on elevated plateaus, so as to favor a large development of rivers, are less vertical in their structure, and less high, and send to the E. more extensive ramifications. The names of particular groups of the Andes are taken from the countries to which they more especially appertain; thus, proceeding from S. to N., we have the cordilleras of Chile, Bolivia, Peru, Ecuador, and Colombia, and along with these there occur elevated plateaus of considerable extent; while snow-capped summits, such as Aconcagua (the culminating point of America), the peak of Sorata, Illimani, Chimborazo, Cotopaxi, the peak of Tolima, etc., tower far above the general average height. N. from the depression of the Isthmus of Panama, the North American cordilleras rise, under the names of the cordilleras of Guatemala, Mexico, Sonora; the W., central, and E. cordilleras, enclosing the



plateaus of Anahuac, New Mexico, and Oregon, and surmounted by snow-covered summits, for example, Popocatepetl, Orizaba, James, Mount Brown, etc. The isolated mountain groups, which do not stand in immediate connection with the cordillera system, and, with some exceptions, lie in chains parallel to the nearest coasts, are, in North America, the system of the Appalachians or Alleghanies, and, in South America, the mountain land of Brazil, Guiana, Venezuela, and the Sierra Nevada of Santa Marta. As the cordilleras fill the W. with mountains, so the great American plain commences with few interruptions at their E. base, and stretches from the shores of the Arctic Ocean to the S. extremity of Patagonia. In South America the plains form three-fourths, in North America about the half of the area of their respective continents; and a general similarity in their horizontal grouping cannot fail to be perceived. The narrow plains of the Mexican coast correspond to the Patagonian steppes, and the savannahs of the Mississippi to the pampas of the Parana, Paraguay, and Rio de la Plata; in the same manner the Appalachians and the mountain chains of Brazil must be regarded as forming similar interruptions to the continuity of the plains. There is also another grand point of resemblance, namely, that in both continents the great plains are situated in the E. This resemblance, however, is merely in position, and cannot be extended to the nature of the plains, since those of the N. regions and of the Amazon, when compared, are seen at once to present, not resemblances, but striking contrasts. The immense grassy flats of America have no counterpart in any other quarter of the globe whatever, and present life itself under a new and characteristic form.

*Hydrography.*—Of the many advantages the New World has over the Old, none is so striking as the extent of its river systems. The rivers which flow into the Pacific, however, owing to the fact that the great backbone of the continent, the Rocky mountains and the Andes, lies so near the W. coast, have so short a distance to traverse before they reach the ocean, that their volume necessarily remains small. On the other hand, those rising from the opposite slopes have extraordinarily long courses, and ramify into every part of the continent. Sometimes rivers traversing the same plains, and nearly on the same levels, open communications with each other, especially when their waters are high, and form a kind of network. In this way it frequently becomes difficult to fix the exact limits of the basin of any river, and to say where the watershed separating it from other basins properly begins. Of this peculiarity there is a remarkable instance in the Cassiquiare, which, branching off from the Rio Negro

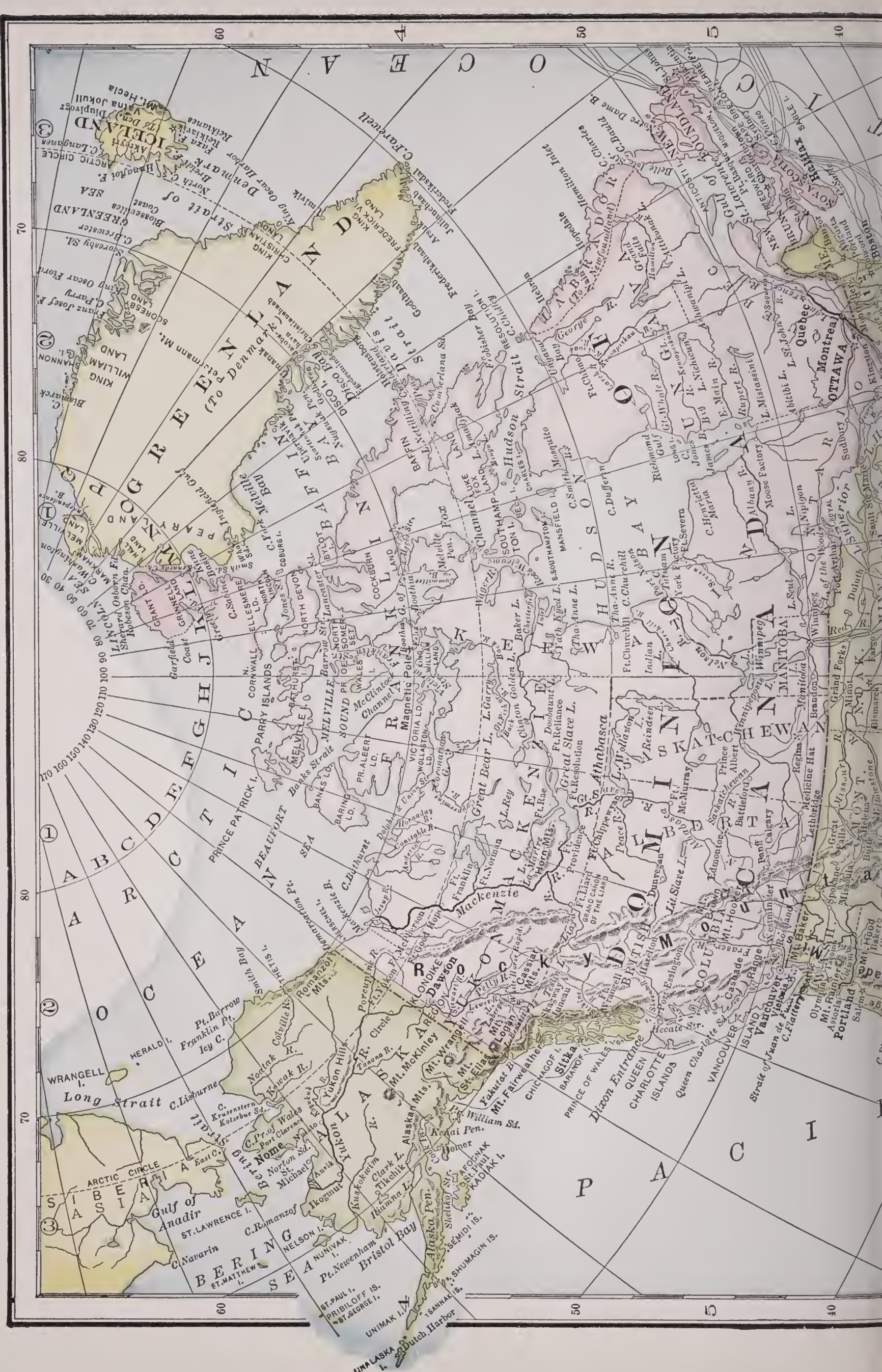
and joining the Orinoco, forms a kind of natural canal, uniting the basins of the Orinoco and the Amazon. The largest rivers of the world are in South America. The Amazon or Marañon has a course of about 4,000 miles, and a basin of 2,300,000 square miles; and the La Plata, estimating it from the source of the Parana, is 2,760 miles long, with a basin of 1,295,400 square miles. The Mississippi-Missouri, the largest river of North America, runs as long a course as the Amazon, but the area of its basin is only 1,221,000 square miles. On the other hand North America has the most extensive group of lakes in the world. The river system of the St. Lawrence, with its majestic lakes, drains an area of 600,000 square miles, and, like the Mississippi, opens up the heart of the continent, while other rivers in countless number intersect the N. plains. In the N., as in the S., in the pampas as in the savannahs, in the llanos and selvas as on the Arctic flats, the copious watercourses perform an equally important part as a means of communication over widely extended areas; without them whole regions, both within the icy polar circle and within the tropics, would be uninhabitable. To this presence of water it is owing that America has no sterile deserts so extensive as those of Africa, even when, from the nature of the soil, such a result might have been anticipated. The rivers, where the strata at their mouths is of solid texture, discharge themselves into bays or estuaries, but where the ground is alluvial and soft, form deltas and lagoons. The principal rivers of America are the Mackenzie, Coppermine, and Great Fish rivers, entering the Northern Ocean; the Churchill, Nelson, Severn, and Albany, entering Hudson bay; the St. Lawrence, Mississippi, Rio del Norte, Magdalena, Orinoco, Amazon, Paranaíba, San Francisco, Rio de la Plata, Colorado and Rio Negro entering the Atlantic; and the Yukon, Fraser, Colombia, San Joaquin, Sacramento, and Colorado, entering the Pacific.

*Climate and Vegetation.*—The climate of America, even in the equatorial regions, is characterized as comparatively cool and humid. This is justly ascribed to the vast extent of territory that may be classed as insular—to the copious waters of the interior, together with the magnificent vegetation produced by them—to the configuration of the surface and the nature of the soil—to the possession of a polar shore—and to the prevailing winds. The rainy zone is disproportionately extended in America; and as the continent stretches over all the zones, the vegetation is remarkably diversified, from the lowly moss of the N. to the lordly banana of the tropics. The giant coast chain of the Andes everywhere rises above the snow-line. From the sterile Peruvian coast,







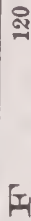




ENGLISH STATUTE MILES

0 100 200 300 400 500

KILOMETERS



Hammond's 8 x 11 Map of North America.  
C.S. Hammond & Co., New-York.







burned up by tropical heats, one can look up to summits covered with perpetual snow and ice; and one may climb from the gigantic equatorial vegetation of Quito to heights where only the condor testifies to the existence of organic life, and wings his flight over snow fields and glaciers. In Peru the culture of cereals is carried on at the height of 12,000, and near Quito at 9,000 feet. The N. and S. of America have the same length of day; but in the seasons, which depend not merely on astronomical but on a variety of local causes, the analogy does not hold, and very remarkable discrepancies appear. Thus, for example, the E. coast of Brazil has the rainy season from March to September, while Peru, lying under the very same latitude, has it from November to March. Within the tropics the transition from the rainy to the dry season takes place almost instantaneously; but in receding from the tropics on either side the change of seasons becomes more and more gradual, till at last in the polar zones, nature, bound in icy chains, affords for living existence only a short awakening out of a long winter sleep.

In passing from N. to S. through the different climates of America, the following characteristic appearances are observed: From the N. shores, almost destitute of vegetation, to an isothermal line which is in lat.  $50^{\circ}$  on the E. and lat.  $60^{\circ}$  on the W. coast, and shows a mean temperature of  $62^{\circ}$  F. in the warmest and  $14^{\circ}$  F. in the coldest month, are seen in succession plains covered first with low mosses and lichens, and then with shrubby plants, most of them yielding berries, next pines, firs, and birches, at first isolated and of stunted growth, but afterward grouped in small woods as forerunners of tree vegetation. This becomes developed in its more vigorous forms in the next zone, which reaches to about lat.  $40^{\circ}$ , and has in the warmest month a mean temperature of  $77^{\circ}$  F. and in the coldest of  $35^{\circ}$  F. Here grow the trees which periodically shed their leaves and form extensive forests, for example, oaks, beeches, maple, limes, elms, chestnuts, etc.; here, too, instead of the heaths of the Old World boundless plains become covered with various grasses, particularly to the W. of the Mississippi, while to the E. of it the European cereals and other plants yielding food take their place in the cultivated districts, European fruit trees thrive, and in the more S. portions of the zone the vine begins to attract attention. The next zone which may be considered as forming the transition to one of a genuine tropical character, extends to lat.  $25^{\circ}$ , where the mean temperature of the hottest months is  $80^{\circ}$  F., and of the coldest  $66^{\circ}$  F., a difference which, amounting to  $14^{\circ}$ , induces a luxuriant vegetation. Trees with evergreen foliage, as oranges, laurels, and olives, are

now seen, and vegetation presents new forms in the magnolias, tulip trees, plane trees, and dwarf palms. Along with wheat maize, and rice, sugar, cotton, and tobacco are cultivated, while the batatas and manihots offer their farinaceous roots for food. From lat.  $25^{\circ}$  N. to the S. tropic bananas and tropical productions occupy a zone which, under the equator, possesses a mean temperature of  $86^{\circ}$  F. in the warmest, and  $75^{\circ}$  F. in the coldest month, and in which the vegetable world revels in the most luxuriant and gigantic forms. Sugar cane, cotton, and coffee now ascend to the lower mountain regions, and in their place, at sea-level, appear yams, pineapples, bananas, melon, bread fruit and cow trees, cocoa palms, etc. The impenetrable forests contain numerous and occasionally most majestic trees, yielding timber of the finest quality as mahogany, guaiacum, campeachy, and Brazil woods, etc. Especially in South America tropical luxuriance is represented by the loveliest species of palms. Dense forests of the chinchona overshadow the mountain terraces of Quito; the cactus develops its most singular forms on the Mexican plateaus, and instead of the aloe of Africa, furnishes vegetable food for the animals which might otherwise starve on the arid steppes. The ferns assume the form of trees; the grasses become almost incredibly tall; and instead of a matting of turf, numbers of creeping and climbing plants form an impenetrable web, at once attesting the wild luxuriance of nature, and furnishing, particularly in vanilla and ginger, products of great economical value. The zone reaching S. as far as lat.  $40^{\circ}$  S. has a mean temperature of  $71^{\circ}$  F. in the warmest and  $53^{\circ}$  F. in the coldest month. There the palm still thrives on the lower basin of the La Plata, beside the mulberry and indigo, while thistles like trees cover the plains; the pampas and the W. coasts of Chile are characterized by beautiful araucarias, by beeches and oaks, the potato and the arum. There, too, we are reminded of Europe by the plants introduced to cultivation: the vine, olive, and orange; hemp, flax, and tobacco; maize, barley, and wheat. The S. limit of the periodical rains reaches as far as lat.  $48^{\circ}$  S., when the mean temperature of  $59^{\circ}$  F. in the warmest and  $39^{\circ}$  F. in the coldest month still favors the growth of European cereals, and on sheltered spots of the W. coast the growth even of the vine and the finer fruits. The zone reaching to the S. extremity of America shows comparatively little difference between the warmest and coldest month, the mean temperature of the one being  $41^{\circ}$  F., and of the other  $25^{\circ}$  F.; but the low degree of summer warmth produces a sudden change in the form of vegetation, which now presents only a few trees, as the beech and birch, and an extraordinary abundance



of mosses and ferns. As in passing from the equator to the pole the region of the vegetable world gradually declines, so in climbing from the tropical shores to the ice-covered mountain summits three different climates have been distinguished by the names of *tierra caliente*, *templada*, and *fria*. Of these the *templada* extends over those healthy and beautiful regions where a kind of perpetual spring prevails, and green pastures and noble forest trees are found united with the fantastical and gigantic forms of the tropics.

*Zoölogy*.—If America, in respect of the development of vegetable life, takes precedence of all other quarters of the globe, it cannot advance the same claim in respect of the animal world, though it must be admitted that here too it has its own peculiar features. The American jaguar and congar, or puma, have not the majesty of the Asiatic tiger or the African lion; the tapir is only a very humble representative of the elephant or hippopotamus, and the llama falls far short of the camel. Still, America has many animals which belong only to itself. It has its own species of bears (the grizzly being most formidable), wolf, and deer, the bison and musk ox, with special kinds of squirrels, etc. To it also belong the Virginian stag, the wild sheep of California, the opossum, and raccoon. Characteristic of Central and South America are sloths, ant-eaters, and armadillos, the condor among the heights of the Andes, the most beautiful parrots as well as peculiar monkeys in the woods, the humming bird with its rich metallic plumage, the rattlesnake, the alligator or cayman on the banks of the streams, the electrical eel in the tropical waters, swarms of mosquitos on the wide plains, and sea fowl in such numbers on the W. coast as to have furnished large deposits of guano, to which some of the richest countries of Europe are indebted for the means of extending and largely increasing the produce of their agriculture.

*Mineralogy*.—To no part of the world has nature been more lavish in dispensing mineral treasures. No other regions are so rich in silver, and few are so rich in gold, as some of the W. portions of the United States, while the States are also equally favored in possessing ample stores of coal, iron, copper, lead, etc. The precious metals also abound in Mexico and other American countries.

*Population*.—The origin of the indigenous population of America cannot now be traced. There can be no doubt, however, that man was in existence at a very early period in the Western Hemisphere. Human remains have been found in the coral reef of Florida, which is estimated to be 10,000 years old; and a skeleton dug up from beneath four buried forests in the Mississippi

delta, near New Orleans, is supposed to have lain there for 50,000 years; but such estimates are hazardous. Human skeletons and fossilized bones, together with articles made by man, have also been found in Missouri, Kansas, California, in the volcanic deposits on the coast of Ecuador, and elsewhere, all under conditions indicative of remote antiquity. When the Europeans first became well acquainted with the New World they found a population presenting man under many aspects and society in various stages, from the semi-civilization of Mexico and Peru to the brutal abasement of savage life; at the extreme N. of the continent they came into contact with the dwarfed Eskimos; at the extreme S. with the gigantic Patagonians; the variety of complexion embraced almost every hue met with elsewhere on the face of the globe, except the coal-black negro. Ever since the discovery of America at the close of the 15th century Europeans of all nations have crowded into it; and the comparatively feeble native races, partly in consequence of the barbarous treatment to which they have been submitted, and partly as the necessary result of a higher when brought into contact with a lower civilization, have rapidly diminished, or lost their distinctive features by intermixtures with whites, and also with negroes brought from Africa to work as slaves. These mixed races the Spaniards distinguished by a variety of names, as *mezizos*, *mulattoes*, *zambos*, etc., while the native descendants of European parents are called *creoles*. The total population of the New World may be estimated at about 133,000,000 souls, of which perhaps 85,000,000 are whites, 23,000,000 mixed races, 15,000,000 negroes, and 10,000,000 Indians.

*Civilization*.—The indigenous civilization spread simultaneously from three central points—the lofty plains of Peru, Cundinamarca, and Mexico. The Peruvians under their princes and high priests, the Incas or sons of the sun, were trained by the forms of the mild religion of Manco Capac into a peaceable but effeminate people. The Toltecs and Aztecs of the high land of Anahuac were ruled in a more politic and warlike spirit by the *caziques*; while in the center, betwixt Peru and Mexico, the Muisecas in Cundinamarca had a spiritual and a temporal head. All of them, from Lake Titicaca to Mexico, practised agriculture, mechanical trades, and arts, and have left behind them remains of a peculiar civilization. On the Isthmus of Panama savage and warlike tribes placed themselves between the theaters of civilization; while in the higher and more temperate regions of the Andes the more cultivated races gradually gained the ascendancy over the ruder hordes of the low-lying plains. S., in the alpine valleys of Chile, dwelt, and still dwell, the warlike and hospitable Araucan-

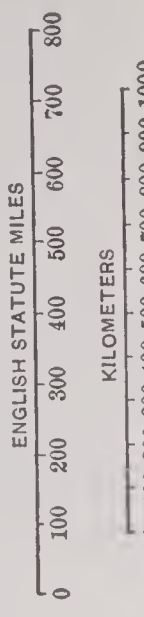








# SOUTH AMERICA



**GALAPAGOS IS.**  
(TO ECUADOR)  
Same scale as large map.











ians, engaged in agriculture and the rearing of cattle; N., on the high plateaus of Mexico, and extensive areas now included in the United States, were, and even now are, settled tribes, who live indeed mostly by hunting and fishing, but also engage in tillage, and show traces of having once been still more civilized. The cold, taciturn, and apathetic races of uncivilized Indians inhabit the low-lying plains and the lower highlands. These roam about as hunters and fishers, but are constantly becoming more and more restricted in their limits as civilization advances, though over great areas of South America in particular they have even yet come but little in contact with civilization. Since the beginning of the 16th century the ethnographic condition of America has essentially changed. While the Europeans were advancing as conquerors and colonists, the native races declined or sunk. At a later period negroes were introduced as slaves. The Spaniards and Portuguese made themselves masters of South America and Mexico; the French and British of North America, though the French were soon obliged to quit the field. The Antilles in time were occupied by six European nations and a race of negroes, and Guiana became a colonial land for France, Great Britain, and Holland. The Spanish peninsula and Great Britain have been the main instruments to make of America a new Europe, to introduce and spread in it civilization and Christianity.

*Political Divisions.* — The independent States of both North and South America are now all republican in their form of government, though it was only in 1889 that Brazil became a republic instead of an empire. The different independent States are as follows: In NORTH AMERICA — 1. The United States; 2. Mexico; 3. Nicaragua; 4. Honduras; 5. Guatemala; 6. Costa Rica; 7. (San) Salvador. In the WEST INDIES — 8. Cuba; 9. Haiti; 10. San Domingo. In SOUTH AMERICA — 11. Venezuela; 12. Colombia; 13. Peru; 14. Ecuador; 15. Bolivia; 16. Argentine Republic; 17. Uruguay; 18. Paraguay; 19. Chile; 20. Brazil. In NORTH AMERICA the European colonies are: the Dominion of Canada, including the provinces of Ontario, Quebec, Nova Scotia, New Brunswick, Manitoba, British Columbia, Prince Edward Island, and the Northwest Territories, etc; Newfoundland; and the Bermudas, all belonging to Great Britain; Greenland, belonging to Denmark; and St. Pierre and Miquelon to France. The WEST INDIAN ISLANDS comprise the republics of Haiti, San Domingo, and Cuba, and Porto Rico, formerly Spanish, now a territory of the United States; the British possessions of Jamaica, Trinidad, Barbados, Grenada, St. Vincent, Tobago, St. Lucia, Antigua, Montserrat, St. Christopher, Anguilla, Nevis, Virgin Islands, Dominica, the Baha-

mas, Turk's Island, etc.; the French possessions of Guadeloupe and dependencies (including St. Bartholomew's), Martinique, the N. part of the island of St. Martin's; the Dutch possessions, the S. side of St. Martin's Curacao and its dependencies; Santa Cruz, St. Thomas and St. John's, possessions of Denmark which agreed by treaty (Jan. 24, 1902) to sell them to the United States. In South America the British possess (besides the Falkland Islands) an important part of Guiana, the remaining portions being owned respectively by the French and Dutch.

*Discovery.* — The merit of first unlocking the American continent to modern Europe belongs to the Genoese Christopher Columbus, who, after a voyage of discovery as dangerous as it was fortunate, discovered, in October, 1492, Guanahani, one of the Bahamas, and named it San Salvador. It is certain, however, that Europeans had in the earlier part of the Middle Ages, and on different occasions, discovered the American coasts. Northmen proceeding from Iceland discovered the N. polar land of Greenland. The Iclander Bjorne Herjulfson, in 986, got a glimpse of the coasts of Massachusetts and Rhode Island, which in the year 1000 were visited by Leif the Lucky, and named by him Vinland. In 1388 and 1390 Niccolo and Antonio Zeni undertook voyages to the North Atlantic Ocean, and were wrecked on Frieslandia, probably the Faroe Islands; thereafter they saw a part of the N. E. coast of America, probably Nova Scotia, which they named Drogno. These discoveries, however, had no influence on the enterprise of Columbus, and cannot detract in the least from his merit; they were forgotten, and had never been made known to the inhabitants of the S. of Europe. Though Columbus was the first of his time who set foot on the New World, it has taken its name not from him, but from Amerigo Vespucci. The mainland was first seen in 1497 by Sebastian Cabot, who sailed under the patronage of Henry VII. of England. See UNITED STATES; CANADA; MEXICO; etc.

*American Antiquities.* The antiquities of America present a study of great interest from many points of view. In particular they afford evidence of the existence in long-past ages of a numerous population spread over a widely extended region of the N. and S. continents, and with a civilization varying in degree but distinguished throughout by common characteristics. The first inquiry which naturally suggests itself is in regard to the antiquity on the New Continent of man himself, but in regard to this no satisfactory evidence has been reached. Human remains have been found along with those of extinct mammals, and in geological formations indicating an antiquity extending far beyond any authentic historical records either of the Old or the New World,



but little direct evidence as to the antiquity of man in America has been obtained. That this continent received its early inhabitants from Asia is exceedingly probable, and it may have also received some from Europe by way of Greenland and Labrador. The aboriginal inhabitants appear to have been in the palæolithic or early stone age, and to this followed, in America as elsewhere, the neolithic or later stone age. The stone implements of these periods are not different in America from those found elsewhere, but subsequently American culture developed on lines of its own; and the antiquities which we are here to deal with are those that possess a special American character, such as earthworks, pyramids, and other remains of human industry which, from their local associations, afford some direct internal evidence of human history. These distinctly American antiquities might perhaps be divided into two or three sections or periods, in particular into a historical and a non-historical period, the first embracing those remains regarding which there is authentic external historical information; the second, those regarding which there is no authentic information of an external kind.

The central region of the American continent, embracing the table-lands formed by the mountain systems of both divisions (North America and South America), in which, owing to the elevation of the surface, a moderate temperature is preserved, was the principal seat of ancient American civilization, and within this region, extending from about lat.  $35^{\circ}$  N. to  $35^{\circ}$  S., the most important remains exist. In the N. part of this region the remains to which the highest antiquity is ascribed have been found, and from this region civilization appears to have first receded; there appears, therefore, to be no authentic tradition preserved, and no probability that any information will ever be acquired, apart from that furnished by the remains themselves. The Indians of the present day, who know nothing of the history of these monuments, ascribe them to supernatural beings. In the basins of the Mississippi, Ohio, and Missouri, the remains consist chiefly of earthworks, and though the extent, regularity, and variety of these seem to place them above the reach of any Indian tribes known to have inhabited these regions since the arrival of Europeans, there are not wanting some links of connection between these monuments and the known enterprises of the later inhabitants. The leading purposes served by these works, as would appear from their nature, were those of defense, of sepulture, and of worship. There is evidence both from French and English sources that the Indians, even in historic times, were in the habit of making earthwork fortifications, and the ancient works have been partially used by them for both of the other objects. The ancient for-

tifications are found in positions of natural vantage, on hills, on peninsulas, and on banks of rivers. They inclose considerable areas, and are surrounded by an exterior or interior ditch; the ramparts are composed of mingled earth and stones, are often of great extent in proportion to the area inclosed, and show a clear conception of the elementary principles of fortification. They are always supplied either naturally or artificially with water, and give other indications of having been provided for a siege. Fort Hill, on the Little Miami in Ohio, had an embankment of this kind, with a line of circumvallation 4 miles in length, and varying from 10 to 20 feet in height, inclosing an area of several hundred acres. A large class of forts consist of several lines of embankment drawn across the neck of a peninsula. Barrows and tumuli containing human bones, and which bear indications of having been used both as places of sepulture and as temples, are also numerous. They are in exact geometrical forms—circles, squares, parallelograms, or combined figures. They vary much in size, the smaller apparently having been used as tombs, the larger as temples. It is seldom that more than one skeleton has been found in each mound, unless where they have been used as burying-places by the later Indians. A mound on the plain of Cahokia in Illinois, opposite the city of St. Louis, is 700 feet long, 500 broad, and 90 feet high, and on the site of this city there were so many of these mounds that it was called Mound City. Another class of earth mounds represent gigantic animal forms in bas-relief on the ground. One is a man with two heads, the body 50 feet long and 25 feet broad across the breast; another represents a serpent 1,000 feet in length, with graceful curves, trebly coiled tail, and open jaws, in the act of swallowing an object of oval form, represented by an embankment 4 feet high, with transverse and conjugate diameters of 160 and 80 feet respectively. The embankment constituting the effigy of the serpent is upwards of 5 feet high and 30 feet broad at the base in the middle of the body. These animal forms are supposed to be symbolically connected with objects of worship. They have been mostly found in Wisconsin and Iowa.

Besides the vast dimensions of many of these structures, and their elaborate and skillful workmanship, another circumstance very difficult to account for is their immense number. Upwards of 10,000 have been counted in the State of Ohio alone. From geological changes, and from the state of the human skeletons found in them, it has been conjectured that these remains cannot be less than 2,000 years old, but it is practically certain that they are by no means all of the same antiquity. The nature of many of them indicates that wars were carried on among those who constructed them, while



their extent and elaborateness attest the existence of a large population, and consequently a settled agricultural condition of society, either divided into hostile states, or with powerful nomadic foes. Among the remains too are some which, together with the arts of civilization, indicate a certain amount of commerce, such as carvings of stone, elegant designs in pottery, ornaments in metal, mica, shells, and other materials brought from various parts of the continent, from Lake Superior to Mexico. What became of the people by whom these works were executed is left entirely to conjecture, for many refuse to believe that the American Indians of the present day are their descendants.

The monuments of Mexico, Central America, and Peru belong to a more advanced state of civilization, approach nearer to the historical period, and make the loss of authentic information more severely felt. Great numbers of these have, as already mentioned, been destroyed, and numerous facts illustrate how rapidly the memory of what has been lost has faded. Forty-four towns were discovered by Stephen in Central America, buried in almost impenetrable forests. All these towns are within the historic period, and of many the names and dates of the founders have been preserved. The fort-like erections called *casas grandes*, which have been assumed as monuments of indefinite antiquity, were seen in use by Coronado in 1540, and several of the towns where the most celebrated ruins are found, as Cholula, Uxmal, Chichen, Quiche, and Pachacamac, are known to have been inhabited at the time of the conquest. Yet there are here also undoubtedly the remains of successive stages of civilization, and perhaps of different races.

The Mexican annals which are contained in picture writing supply some valuable information on the movements of the American populations, but their authenticity and accuracy are not unquestioned. In Peru aqueducts, bridges, and roads of elaborate construction have been found; but the principal remains of Mexico, Peru, and Central America consist of the temples. The descriptions given by the Spanish conquerors of the Mexican and Peruvian temples are in the highest degree magnificent. The number of these edifices also appears to have been very great. In the city of Mexico nine great temples of the first magnitude and 2,000 smaller ones dedicated to as many idols are mentioned, and in the whole empire 40,000 is the number estimated by Torquemada, while Clavigero places it much higher. Peru was not less magnificent in its devotions, the Temple of the Sun at Cuzco being of peculiar splendor. The Peruvian temples were generally built on elevations, surrounded with four circular embankments of earth, rising one above the other.

In Central America and Mexico the form of the temples was generally pyramidal. They are known as *teocallis*. Besides being raised on elevated platforms formed of artificial mounds of earth, when they consist of more than one story the higher stories are usually less in area than the lower, preserving the form of a pyramid in stages. They are usually of imposing dimensions, the platform commonly containing a series of buildings, some of greater, others of less size. They are most frequently only one story in height, the chambers arranged in two parallel rows lighted by doors instead of windows, and the inner row only lighted from the outer, yet adorned with rich sculptures and gaily painted. The temple at Uxmal contains 11 chambers in each row, the roofs are supported on bearers of hard wood, while those at Palenque and Copan are formed of arched stone. The temple of Palenque is 200 feet by 180, and 25 high. That at Uxmal is 322 feet long, and is ascended from the second to the third terrace (19 feet) by well-made steps 130 feet wide. Buildings similar in character are found in Mexico, Honduras, Chiapas, and Yucatan, and numerous hieroglyphics are found in them, from which it appears that the inhabitants of these districts had formerly the same written language. At Copan in Honduras, where the principal temple and subordinate buildings are contained within a sacred enclosure, the skull of a quadrumanous animal is carved repeatedly in high relief on the walls. Numerous well-executed statues, as well as hieroglyphics and sculpture in relief, occur in other buildings, and at Copan there are also several sculptured obelisks. At Chichen a space of 274 feet long and 30 wide is inclosed by walls 30 feet thick. It is supposed to have been designed for some public games.

**American Federation of Labor.** See LABOR, AMERICAN FEDERATION OF.

**American Colonization Society** (more accurately, THE NATIONAL COLONIZATION SOCIETY OF AMERICA), an organization formed "to promote and execute a plan for colonizing, with their own consent, the free people of color residing in our country in Africa, or such other place as Congress shall deem expedient." The constitution was adopted on Dec. 28, 1816, and officers were elected on Jan. 1, 1817. The first colonists finally settled in 1822 at Cape Mesurado, where the Republic of Liberia (*q. v.*) was founded. With the development of the abolition movement, increasing dissatisfaction was expressed with the society, and many of its leading supporters withdrew.

**American Indians.** See INDIANS, AMERICAN.

**Americanisms**, a word defined as a term, phrase or idiom of the English language as spoken in America (or in the United



## Americanisms

States) which either (a) originated in America; or, (b) is peculiar to America; or, (c) is chiefly employed in America. The following is a list of a few of the more noteworthy Americanisms:

*Approbate, to.*—To license, as to approve to preach; to approbate a man to keep a hotel or public house.

*Around or round.*—About or near. To hang around is to loiter about a place.

*Backwoods.*—The partially cleared forest regions in the western states.

*Bayou.*—A small bay in Louisiana.

*Bee.*—An assemblage of persons to unite their labors for the benefit of an individual or family or to carry out a joint scheme.

*Bogus.*—False; counterfeit.

*Bone.*—One dollar.

*Boss.*—An employer or superintendent of laborers; a leader.

*Bulldoze, to.*—To intimidate voters.

*Bunco.*—A swindling game.

*Buncombe or Bunkum.*—A speech made solely to please a constituency; talking for talking's sake, and in an inflated style.

*Calculate.*—To suppose, to believe, to think.

*Camp-meeting.*—A meeting held in the fields or woods for religious purposes, and where the assemblage encamp and remain for several days.

*Car.*—A carriage or wagon of a railway train. The Englishman "travels by rail," the American takes, or goes by, the cars.

*Carpet-bagger.*—A needy political adventurer who carries all his earthly goods in a carpet-bag; originally applied to politicians from the Northern States who sought offices in the South after the Civil War.

*Caucus.*—A private meeting of the leading politicians of a party to agree upon the plans to be pursued in an approaching election.

*Chewing the rag.*—Frivolous conversation.

*Chunk.*—A short, thick piece of wood or any other material.

*Cop.*—A police officer.

*Corn.*—Maize. In England, wheat or grain in general.

*Corn-husking or Corn-shucking.*—An occasion on which a farmer invites his neighbors to assist him in stripping the husks from his corn.

*Crooking the elbow.*—Taking a drink.

*Dead-heads.*—People who have free admission to entertainments, or who have the use of public conveyances, or the like, free of charge.

*Dope.*—A narcotic; also a sleepy person.

*Down East.*—In or into the New England States. A down-easter is a New Englander.

*Drummer.*—A commercial traveler.

*Dry goods.*—A general term for such articles as are sold by linen-draper, haberdashers, hosiers, etc., in England.

## Americanisms

*Fix, to.*—To put in order, to prepare, to adjust. To fix the hair, the table, the fire, is to dress the hair, lay the table, make up the fire.

*Fixings.*—Arrangements, dress, embellishments, luggage, furniture, garnishments of any kind.

*Foul shop.*—A non-union factory.

*Freeze out.*—To get rid of objectionable persons.

*Gerrymander.*—To arrange political divisions so that in an election one party may obtain an advantage over its opponent, even though the latter may possess a majority of votes.

*Grab.*—To gain a privilege without proper payment.

*Greenback.*—A former kind of paper money.

*Guess, to.*—To believe, to suppose, to think.

*Gulch.*—A deep, abrupt ravine, caused by the action of water.

*Happen in, to.*—To happen to come in or call.

*Hatchet, to bury or take up the.*—To end or begin war.

*Hayseed.*—A farmer.

*Help.*—The labor of hired persons collectively: the body of servants belonging to a farm or household or factory.

*High-falutin.*—Inflated speech, bombast.

*Hobo.*—A tramp or vagabond.

*Hoe-cake.*—A cake of corn meal baked on or before the fire.

*Hoodlum.*—A rough.

*How!*—Indian abbreviation of "How do you do?"

*Interlock.*—When the sources of two or more streams are so close together that at certain seasons, as in times of freshet, they flow into one another, the rivers are said to "interlock."

*Jolly, to.*—To flatter, to tease, to poke fun at.

*Johnny cake.*—A cake made of corn meal mixed with milk or water and sometimes a little stewed pumpkin.

*Lobster.*—A turncoat.

*Log-rolling.*—The assembly of several parties of wood-cutters to help one of them in rolling their logs to the river after they are felled and trimmed; also employed in politics to signify a like system of mutual co-operation.

*Lynch law.*—An irregular species of justice executed by the people or a mob, without legal authority or trial.

*Mail letters, to.*—To post letters.

*Main guy.*—The one in authority.

*Make tracks, to.*—To run away.

*Mush.*—A kind of hasty-pudding.

*Nickel.*—A five cent coin.

*Notions.*—A term applied to every variety of small wares.

*One-horse.*—A one-horse thing is a thing of no value or importance; a mean or trifling thing.



## American Institute of Social Service

*Oxbow*.—The bend in a river or the land inclosed within such a bend.

*Peart* (in the South).—Equal to smart or well.

*Piazza*.—A veranda.

*Picayune*.—A trifle.

*Pickaninny*.—A negro child.

*Pile*.—A quantity of money.

*Planks*.—In politics, the several principles which appertain to a party; "platform" is the collection of such principles.

*Plunk*.—Same as bone, one dollar.

*Pull*.—A special individual favor.

*Pull a leg, to*.—To work for a favor, to coax, to get money from a person.

*Reckon, to*.—To suppose, to think.

*Right smart*.—Very well.

*Roast, to*.—To criticise severely.

*Scab*.—A non-union workman.

*Scalawag*.—A scamp, a scapegrace.

*Shake*.—To leave a person.

*Skedaddle, to*.—To run away, a word introduced during the Civil war.

*Smart*.—Used in the sense of considerable, a good deal, as a smart chance; also equal to well, as "right smart," very well.

*Stakes, to pluck or pull up*.—To remove.

*Stampede*.—The sudden flight of a crowd.

*Stiff*.—In medical schools, a corpse.

*Store*.—Same as shop in Great Britain; as a book store, a grocery store.

*Strike oil, to*.—To come upon petroleum; hence, to make a lucky hit, especially financially.

*Stump speech*.—A bombastic speech calculated to please the popular ear, such speeches in newly settled districts being often delivered from the stumps of trees.

*Tanglefoot*.—A Westernism for liquor.

*Tenderfoot*.—A name applied in Western mining and cattle-raising regions to a self-conscious city man, as a new arrival.

*Tieker*.—A watch; also a telegraph receiver.

*Ticket, to vote the straight*.—To vote for all the men or measures on the ticket.

*Truck*.—The small produce of gardens; *truck patch*, a plot in which the smaller fruits and vegetables are raised.

*Turn down, to*.—Same as freeze out.

*Vamose, to*.—To run off.

*Vendue*.—An auction; to vendue, to sell at auction.

*Whoop it up*.—To create an excitement.

*Wilt*.—To become soft or languid, to lose energy, pith, or strength.

**American Institute of Social Service**, an organization effected in 1898 for social and industrial improvement; gathers and disseminates information concerning social problems to churches, organizations, and individuals; has over 500 classes, with 6,000 members.

**American Party, The**, the name of three separate organizations which at different times held a prominent place in the po-

## American Party

litical affairs of the United States. The first, organized about 1852, at a time when the Whig Party was near its dissolution was, in fact, a secret society, and was better known in later years as the "Know Nothings," from the assumed ignorance of its members when questioned in regard to the objects and name of the order. Its principal doctrine was opposition to all foreigners and Roman Catholics, and its motto was "Americans must rule America." The first National Convention of the Party was held in February, 1856, at which resolutions were adopted, demanding a lengthening of the residence necessary to naturalization, and condemning President Pierce's administration for the repeal of the Missouri Compromise. A number of the members withdrew because of the refusal to consider a resolution regarding the restriction of slavery. Millard Fillmore, of New York, was nominated for President, and Andrew Jackson Donelson for Vice-President, which nominations were subsequently indorsed by a Whig Convention. Fillmore carried but one State, Maryland; his popular vote being about 850,000. The party was successful in carrying the State elections in Rhode Island and Maryland in 1857, but never gained any popularity in the Western States. A second party, bearing the same name, but directly adverse to the first in that it was founded in opposition to secret societies, was organized for political purposes by the National Christian Association, at the adjournment of a convention held by the latter body at Oberlin, O., in 1872. The organization was completed and the name adopted at a convention in Syracuse, N. Y., in 1874. At Pittsburg, June 9, 1875, a platform was adopted in which were demanded recognition of the Sabbath, the introduction of the Bible into public schools, prohibition of the sale of liquors, the withdrawal of the charters of secret societies, and legislative prohibition of their oaths, arbitration of international disputes, the restriction of land monopolies, resumption of specie payment, justice to the Indians, and a direct popular vote for President and Vice-President. James B. Walker of Illinois was nominated for President. In 1880, the party again made nominations, and in 1884, S. C. Pomerooy was nominated, but withdrew in favor of John P. St. John, the Prohibition candidate. The third party to be called by the name of American Party was organized at a convention held at Philadelphia, Sept. 16-17, 1887. Its principal aims, as set forth in its platform, were, to oppose the existing system of immigration and naturalization of foreigners; to demand its restriction and regulation so as to make a 14-years' residence a prerequisite of naturalization; to exclude from the benefits of citizenship all anarchists, socialists,



## American Protective Association

and other dangerous characters; to demand free schools; to demand the establishment of a navy and the construction of fortifications and internal improvements; to condemn alien proprietorship; to declare for the permanent separation of Church and State, and in favor of the enforcement of the Monroe Doctrine. But little has been heard of the American Party in the past few years.

**American Protective Association**, popularly known as the "A. P. A.," a secret order organized throughout the United States, with branches in Canada, which has attracted much attention by its aggressive platform and active agitation. Its chief doctrine, as announced in its declaration of principle, is that "subjection to and support of any ecclesiastical power not created and controlled by American citizens, and which claims equal, if not greater, sovereignty than the Government of the United States of America, is irreconcilable with American citizenship;" and it accordingly opposes "the holding of offices in National, State, or Municipal Government by any subject or supporter of such ecclesiastical power." Another of its cardinal purposes is to prevent all public encouragement and support of sectarian schools. It does not constitute a separate political party, but seeks to control existing parties, and to elect friendly and defeat objectionable candidates, by the concerted action of citizens affiliated with all parties. The order was founded March 13, 1887, and in 1899 claimed a membership of about 2,000,000.

**American Psychological Association**, an organization founded in 1892 for the advancement of psychology as a science; annual dues, \$1; Secretary and Treasurer, Prof. Arthur H. Pierce, Smith College, Northampton, Mass.

**American Social Science Association**, a society organized in 1865; annual dues, \$5; General Secretary, Isaac F. Russell, 120 Broadway, New York City.

**American Society of Civil Engineers**, an association instituted in 1852; holds two meetings each month (excepting in July and August) at headquarters, 220 W. 57th st., New York city; membership, 5,800; Secretary, Charles W. Hunt, at headquarters.

**American Society of Mechanical Engineers**, an organization chartered in 1881; annual dues, members and associates, \$15; juniors, \$10; entrance fee, members and associates, \$25; juniors, \$15; membership unlimited; holds two meetings annually; headquarters, 29 W. 39th St., New York city; Secretary, Calvin W. Rice, at headquarters.

**American System**, a term used by Henry Clay and applied to his plan of protective

## America's Cup

duties and internal improvements, as proposed in the debates in Congress which resulted in the tariff law of 1824. At present it is used to denote the policy of protection to home industries by means of duties on imports.

**American University**, a co-educational and non-sectarian institution in Harriman, Tenn.; organized in 1891; has grounds and buildings valued at over \$50,000; volumes in the library, 5,000; professors and instructors, 12; students, 320; income, from board, tuition, etc., over \$6,000.

**American University, The**, a post-graduate institution in Washington, D. C., founded under the auspices of the Methodist Episcopal Church, in 1891, with Bishop John F. Hurst as chancellor.

**America's Cup**, a yachting trophy, originally known as the Queen's Cup, offered as a prize to the yachts of all nations by the Royal Yacht Squadron of Great Britain, in 1851. The first contest for it was held Aug. 22 of that year, when it was won by the American yacht "America," whose owners deeded it in trust to the New York Yacht Club. The subsequent success of American



THE AMERICA'S CUP.

yachts in keeping the cup caused it to become known as the "America's" Cup. The first challenger was the schooner "Cambria," built at Cowes in 1868. Since the defeat of the "Cambria" on Aug. 8, 1870, British owners and designers have made numerous attempts to recover the trophy. The following is a complete record of contests:



RECORD OF CONTESTS FOR THE AMERICA'S CUP.

| Date.          | Yachts.               | Corrected Time.                     | Won by                                     | Course.                                       |
|----------------|-----------------------|-------------------------------------|--|---|
| Aug. 22, 1851  | America.....          | 10 37                               | 21   | } Around Isle of Wight.                       |
|                | Aurora.....           | 10 58                               |  |   |
| Aug. 8, 1870   | Magic.....            | 3 58 21                             | 39 17                                      | } N. Y. Y. C. inside course.                  |
|                | Cambria.....          | 4 37 38                             |  |   |
| Oct. 16, 1871  | Columbia.....         | 6 19 41                             | 27 04                                      | } N. Y. Y. C. inside course.                  |
|                | Livonia.....          | 6 46 45                             |  |   |
| Oct. 18, 1871  | Columbia.....         | 3 07 41 <sup>3</sup> / <sub>4</sub> | 10 33 <sup>3</sup> / <sub>4</sub>          | } 15 miles to windward and return.            |
|                | Livonia.....          | 3 18 15 <sup>1</sup> / <sub>2</sub> |  |   |
| Oct. 19, 1871  | Columbia.....         | 4 02 25                             | 15 10                                      | } N. Y. Y. C. inside course.                  |
|                | Livonia.....          | 4 17 35                             |  |   |
| Oct. 21, 1871  | Sappho.....           | 5 36 02                             | 30 21                                      | } 20 miles to windward and return.            |
|                | Livonia.....          | 6 09 23                             |  |   |
| Oct. 23, 1871  | Sappho.....           | 4 46 17                             | 25 27                                      | } N. Y. Y. C. inside course.                  |
|                | Livonia.....          | 5 11 44                             |  |   |
| Aug. 11, 1876  | Madeleine.....        | 5 23 54                             | 10 59                                      | } N. Y. Y. C. inside course.                  |
|                | Countess of Dufferin. | 5 34 53                             |  |   |
| Aug. 12, 1876  | Madeleine.....        | 7 18 46                             | 27 14                                      | } 20 miles to windward and return.            |
|                | Countess of Dufferin. | 7 46                                |  |   |
| Nov. 9, 1881   | Mischief.....         | 4 17 09                             | 28 20 <sup>1</sup> / <sub>4</sub>          | } N. Y. Y. C. inside course.                  |
|                | Atalanta.....         | 4 45 29 <sup>1</sup> / <sub>4</sub> |  |   |
| Nov. 10, 1881  | Mischief.....         | 4 54 53                             | 38 54                                      | } 16 miles to leeward from Buoy 5 and return. |
|                | Atalanta.....         | 5 33 47                             |  |   |
| Sept. 14, 1885 | Puritan.....          | 6 06 05                             | 16 19                                      | } N. Y. Y. C. inside course.                  |
|                | Genesta.....          | 6 22 24                             |  |   |
| Sept. 16, 1885 | Puritan.....          | 5 03 14                             | 1 38                                       | } 20 miles to leeward and return.             |
|                | Genesta.....          | 5 04 52                             |  |   |
| Sept. 9, 1886  | Mayflower.....        | 5 26 41                             | 12 02                                      | } N. Y. Y. C. inside course.                  |
|                | Galatea.....          | 5 38 43                             |  |   |
| Sept. 11, 1886 | Mayflower.....        | 6 49                                | 29 09                                      | } 20 miles to leeward and return.             |
|                | Galatea.....          | 7 18 09                             |  |   |
| Sept. 27, 1887 | Volunteer.....        | 4 53 18                             | 19 23 <sup>3</sup> / <sub>4</sub>          | } N. Y. Y. C. inside course.                  |
|                | Thistle.....          | 5 12 41 <sup>3</sup> / <sub>4</sub> |  |   |
| Sept. 30, 1887 | Volunteer.....        | 5 42 56 <sup>1</sup> / <sub>4</sub> | 11 48 <sup>3</sup> / <sub>4</sub>          | } 20 miles to windward and return.            |
|                | Thistle.....          | 5 54 45                             |  |   |
| Oct. 7, 1893   | Vigilant.....         | 4 05 47                             | 5 48                                       | } 15 miles to windward and return.            |
|                | Valkyrie II.....      | 4 11 85                             |  |   |
| Oct. 9, 1893   | Vigilant.....         | 3 25 01                             | 10 35                                      | } 30 mile triangle.                           |
|                | Valkyrie II.....      | 3 35 36                             |  |   |
| Oct. 13, 1893  | Vigilant.....         | 3 24 39                             | 40   | } 15 miles to windward and return.            |
|                | Valkyrie II.....      | 3 25 19                             |  |   |
| Sept. 7, 1895  | Defender.....         | 4 59 55                             | 8 49                                       | } 15 miles to windward and return.            |
|                | Valkyrie III.....     | 5 08 44                             |  |   |
| Sept. 10, 1895 | Defender.....         | 3 55 56                             | 47   | } 30 mile triangle.                           |
|                | Valkyrie III.....     | 3 55 09                             | (Valkyrie III. disqualified for fouling.)  |   |
| Sept. 12, 1895 | Defender.....         | 4 43 43                             | (Valkyrie III. withdrew on crossing line.) | } 15 miles to leeward and return.             |
|                | Valkyrie III.....     |                                     | 10 08                                      |   |
| Oct. 16, 1899  | Columbia.....         | 4 53 53                             |  | } 15 miles to windward and return.            |
|                | Shamrock I.....       | 5 04 01                             |  |   |
| Oct. 17, 1899  | Columbia.....         | 3 37                                | (Sail-over; Shamrock I. disabled.)         | } 30 mile triangle.                           |
|                | Shamrock I.....       |                                     | 6 34                                       |   |
| Oct. 20, 1899  | Columbia.....         | 3 38 09                             |  | } 15 miles to leeward and return.             |
|                | Shamrock I.....       | 3 44 43                             |  |   |
| Sept. 28, 1901 | Columbia.....         | 4 30 24                             | 1 20                                       | } 15 miles to windward and return.            |
|                | Shamrock II.....      | 4 31 44                             |  |   |
| Oct. 3, 1901   | Columbia.....         | 3 12 35                             | 3 35                                       | } 30-mile triangle.                           |
|                | Shamrock II.....      | 3 16 10                             |  |   |
| Oct. 4, 1901   | Columbia.....         | 4 32 57                             | 41   | } 15 miles to leeward and return.             |
|                | Shamrock II.....      | 4 33 38                             |  |   |
| Aug. 22, 1903  | Reliance.....         | 3 32 17                             | 7 03                                       | } 15 miles to windward and return.            |
|                | Shamrock III.....     | 3 29 20                             |  |   |
| Aug. 25, 1903  | Reliance.....         | 3 14 54                             | 1 19                                       | } 30 mile triangle.                           |
|                | Shamrock III.....     | 3 16 13                             |  |   |
| Sept. 3, 1903  | Reliance.....         | 4 28 04                             | (Sail-over; Shamrock III. withdrew.)       | } 15 miles to windward and return.            |
|                | Shamrock III.....     |                                     |  |   |

**Amerigo Vespucci.** See VESPUCCI.

**Ames, Adelbert,** an American military officer, born in 1835; graduated at West Point, 1861; became Brigadier-General and brevet Major-General United States Volunteers, in the Civil War; Provisional Governor of Mississippi, 1868; resigned army commission, 1870; United States Senator from Mississippi, 1870-1873, Governor 1874-1876; and Brigadier-General United States Volunteers in the war with Spain, 1898.

**Ames, Charles Gordon,** an American clergyman, editor, and lecturer, born in Dorchester, Mass., Oct. 3, 1828. He graduated at the Geauga Seminary, Ohio; was ordained in 1849 as a Free Baptist, but later became a Unitarian, and pastor of the Church of the Disciples, Boston. He was

editor of the Minnesota "Republican" and the "Christian Register," of Boston. He wrote "George Eliot's Two Marriages," "As Natural as Life," some poems, etc.

**Ames, Eleanor Kirk,** an American author, born at Warren, R. I., Oct. 7, 1831. Among her many books are "Information for Authors," "Beecher as a Humorist," "The Influence of the Zodiac on Human Life," "Libra, or What the Stars told Elizabeth," etc. She died June 24, 1908.

**Ames, Fisher,** an American orator and statesman, born in Dedham, Mass., April 9, 1758. Admitted to the bar in 1781, he became a member of Congress in 1789, where he gained a national reputation by his oratory. Two of his finest efforts were in support of John Jay's treaty with Great



Britain, and a eulogy on Washington before the Massachusetts Legislature. He was elected president of Harvard College in 1804,



FISHER AMES.

but declined. A brilliant talker, he was distinguished in conversation for wit and imagination, while his character was spotless. His works consist of orations, essays, and letters (2 vols., 1854). He died in Dedham, July 4, 1808.

**Ames, Mary Clemmer**, an American author, born in Utica, N. Y., in 1839; was

a frequent contributor to the Springfield "Republican," and afterward to the New York "Independent." Married to and divorced from the Rev. Daniel Ames, she became, in 1883, the wife of Edward Hudson at Washington. Among her works are the novels "Victoria" (1864); "Eirene" (1870), and "His Two Wives" (1874); a volume of "Poems" (1882); and biographies of Alice and Phoebe Cary. She died in Washington, D. C., Aug. 18, 1884.

**Amesbury**, a town in Essex co., Mass.; on the Merrimac river and the Boston and Maine railroad; 27 miles N. of Salem. It has manufactories of cotton and woolen goods, boots and shoes, machinery, and carriages, and was long the residence of the poet Whittier. Pop. (1890) 9,798; (1900) 9,473.

**Ametabola**, or **Ametabolians**, a subclass of insects, consisting of those which do not undergo metamorphosis. It includes three orders: the *anoplura*, or lice; the *mallophaga*, or bird-lice; and the *thysanura*, or spring-tails. All are wingless insects.

**Amethyst**, so named either (1) from the foolish notion that it was a remedy for drunkenness; or (2), as Pliny thinks, because it did not reach, though it approximated to, the color of wine. A mineral, a variety of quartz, named by Dana amethystine quartz. Its color, which is either diffused through the entire crystals or affects only their summits, is clear purple or bluish violet; hence it is sometimes called violet-quartz. The coloring matter is generally believed to be manganese, but Heintz considers it to arise from a mixture of iron and soda. The beauty and hardness of the amethyst cause it to be regarded as a precious stone. It occurs in veins or geodes in trap-

pean and other rocks. The best specimens are brought from India, Armenia, and Arabia.

The Oriental amethyst is a rare purple variety of sapphire.

The word amethyst in the English Bible [Septuagint and New Testament, Greek *amethystos* — Exod. xxviii: 19; Rev. xxi: 20] is the rendering of the Hebrew word *achhelamah*. It is from the root *chhalam* = to sleep; apparently from the delusion that the fortunate possessor of an amethyst is likely to sleep soundly. The last stone in the third row of the Jewish high-priest's breastplate was an amethyst (Exod. xxviii: 19); and the 12th foundation of the new Jerusalem, mentioned in Rev. xxi: 20, was to be an amethyst.

**Amharic**, or **Amarinna**, a Semitic language with an intermixture of African words; since the 14th century the court and official language of Abyssinia; originally a dialect of the Province of Amhara and of Shoa. Within the last three centuries Ethiopian characters have been adapted to it for purposes of writing.

**Amherst**, a town in Hampshire co., Mass.; on the Boston and Maine and the Central Vermont railroads; 23 miles N. N. E. of Springfield. It has manufactories of paper, straw and palm leaf hats, leather, and children's wagons, and is best known as the seat of AMHERST COLLEGE (q. v.), the State Agricultural College, and the State Experiment Station. Pop. (1890) 4,512; (1900) 5,028; (1910) 5,112.

**Amherst College**, a college at Amherst, Mass.; founded by Congregationalists in 1821, but now non-sectarian. In its curriculum it has adhered strictly to classical and general culture. It has scientific and art collections of note. Of its graduates a high percentage has entered the ministry or the teaching profession. The faculty numbers about 50; the average enrollment is about 500; the library has over 80,000 volumes; and the annual income, exclusive of benefactions, is about \$170,000.

**Amherst, Jeffery, Lord**, a distinguished British officer, born in 1717. He entered the army at an early age, and ultimately became Major-General. Sent over to America, he captured Louisburg, and followed it up by the reduction of Forts Duquesne, Niagara, and Ticonderoga, which paved the way for the entire conquest of Canada. In 1763, Amherst was made Governor of Virginia, and created Baron Amherst of Holmesdale in 1776. He was appointed Commander-in-Chief of the British army in 1778, in which capacity he took a most active, but humane, part in suppressing the London riots of 1780. Upon resigning his chief command in 1795 he was made a Field-Marshal. Died in 1798.



**Amicis, Edmondo de**, an Italian writer; born in Oneglia, Liguria, Oct. 21, 1846; served several years in the Italian army; afterward applied himself to literature; and produced sketches of army life, novels, and a volume of verse. His writings have been widely translated, and those relating to travel are especially popular. Died in 1908.

**Amiel, Henri Frederic**, a distinguished Swiss essayist, philosophical critic, and poet, born at Geneva, Sept. 27, 1821; was for five years a student in German universities, and on his return home became Professor of Philosophy in the Geneva Academy. He is author of several works on the history of literature, as "The Literary Movement in Romanish Switzerland" (1849); "Study on Mme. de Staël" (1878); and of several poems, among them "Millet Grains" (1854). But his fame rests principally on the "Journal," which appeared after the author's death. He died in Geneva, March 11, 1881.

**Amiens** (äm-yan'), an old French city, the capital once of Picardy, and now of the Department of Somme, on the many-channelled navigable Somme, 81 miles N. of Paris by rail. Its fortifications have been turned into charming boulevards, but it still retains its old citadel. The Cathedral of Notre Dame is a masterpiece of Gothic architecture. Begun in 1220, or a little later than Salisbury Cathedral, it is 452 feet long, and has a spire (1529) 426 feet high; but its special feature is the loftiness of the nave, 141 feet. In his little work called "The Bible of Amiens," Ruskin says this church well deserves the name given it by Viollet-le-Duc, "the Parthenon of Gothic architecture," and affirms that its style is "Gothic, pure, authoritative, and unexcusable." Other noteworthy buildings are the Hôtel de Ville (1600-1760), in which the Peace of Amiens was signed, the large museum (1864), in Renaissance style; and the public library, which was founded in 1791, and contains 70,000 volumes. Amiens has considerable manufactures of velvet, silk, woolen, and cotton goods, ribbons, and carpets. Peter the Hermit and Du Guesclin were natives, and there are statues to both of them. The "Mise of Amiens," was the award pronounced by Louis IX. of France, in 1264, on the controversy between Henry III. of England and his people as to the "Provisions of Oxford." The Peace of Amiens (March 27, 1802) was a treaty intended to settle the disputed points between England, France, Spain, and Holland. By it, England retained possession of Ceylon and Trinidad, and an open port at the Cape of Good Hope; the republic of the Ionian islands was recognized; Malta was restored to the Knights of St. John; Spain and Holland regained their colonies, with the exception of Trinidad and Ceylon; the French were to quit Rome and Naples; and Turkey

was restored to its integrity. In the Franco-Prussian War, on Nov. 27, 1870, near Amiens, General Manteuffel defeated a French army 30,000 strong, and three days later the citadel fell. Pop. (1901) 90,758.

**Amish, The.** See MENNONITES.

**Amity College**, a coeducational institution in College Springs, Ia., organized in 1872; reported in 1899: Professors, 11; students, 250; volumes in the library, 2,500; grounds and buildings valued at \$40,000; productive funds, \$30,000; income, \$6,000; president, J. C. Calhoun, A. M.

**Ammen, Daniel**, an American naval officer, born in Brown county, O., May 15, 1820; entered the United States navy, July 7, 1836. He was executive officer of the North Atlantic Blockading Squadron at the outbreak of the Civil War. From 1861 to 1865 he rendered signal service in the attacks on Port Royal, Fort Mifflin, Fort Fisher, and both the ironclad attacks on Fort Sumter. On June 4, 1878, he was retired with the rank of Rear-admiral. He was the designer of the Ammen life raft and harbor defense ram. Among his works are "The Atlantic Coast" (1883); "The Old Navy and the New," and "Navy in the Civil War" (1883). He died in Washington, D. C., July 11, 1898.

**Ammergau** (am'er-gou), **Ober-** and **Unter**, two adjoining villages in Upper Bavaria, in the higher part of the valley of the Ammer, 42 miles S. W. by S. of Munich. Ober-Ammergau is noted for the performance of the "Passion Play," a series of dramatic representations of the sufferings of Christ, which has been produced every tenth year on every Sunday of the summer by about 500 performers, in accordance with a vow made at the time of the pestilence of 1634. During the intervening years, the actors give a series of representations of Old Testament legends. The performance generally lasts seven or eight hours, often without intermission, and is partly a religious service and partly a popular festival. In 1889, a theater was built just outside the place, with a stage and auditorium capable of seating 6,000 persons. On the height near by is a colossal memorial of "Christ on the Cross, with Mary and John," modeled by Halbig, the gift of King Ludwig II.

**Ammianus Marcellinus**, a Roman historian, born of Greek parents at Antioch, in Syria, about 330. After serving in several campaigns in Gaul, Germany, and the East, he settled at Rome, devoting himself to literature, and was alive as late as 390. He wrote in Latin a history of the Roman Empire from 96 to 378 A. D., in 31 books, of which only 18 books are extant, comprising the years 353 to 378. This part of the work, however, is the most valuable, as it treats



of affairs with which the author was contemporary, and is one of the most important sources for the history of the Emperor Julian. The work may be regarded as a continuation of Tacitus, and though the portions remaining have many faults of style, they are valuable on account of the author's careful descriptions of countries and events from personal observation.

**Ammon**, the eponymic ancestor of a people, known in Hebrew and Biblical history as the "children of Ammon" or Ammonites; frequently mentioned in the Old Testament. According to the account in Genesis (xix:38), and in the form of Ben-Ami, Ammon was the son of Lot by his youngest daughter.

**Ammon**, a god of the ancient Egyptians, worshipped especially in Thebes (No-Ammon), and early represented as a ram with downward branching horns, the symbols of power; as a man with a ram's head; and as a complete man with two high feathers on his head, bearded, sitting on a throne, and holding in his right hand the scepter of the gods, in his left the handled cross, the symbol of divine life. Ammon, his wife Mut (the mother), and his son Chensu, form

the divine triad of Thebes: their worship was at its greatest height under the 18th to the 20th dynasty. The name signifies the hidden, unrevealed deity; and in Egyptian mythology he held his highest place. His undefined character may serve to explain how other deities were identified with Ammon. After the 18th dynasty we find in hieroglyphics the name Amur-Ra frequently inscribed, indicating a blending of Ammon with the sun-god Ra. Similarly, the representation of Ammon with a ram's head shows the



AMMON.

blending of him with Kneph. From about the time of the 21st dynasty, he came to be considered the god of oracles, and as such was worshipped in Ethiopia and in the Libyan desert. Twelve days' journey W. of Memphis, in the desert, was a green oasis fringed with a belt of palm trees, on

which rose the temple of Ammon. Hither came pilgrims laden with costly presents; among them Alexander the Great and Cato of Utica. Alexander was hailed as the actual son of the god by the priests, quick to anticipate the wishes of the hero. The Persian conqueror, Cambyses, sent against the temple an expedition, which perished miserably in the sands. The worship of Ammon spread at an early period to Greece, and afterward to Rome, where he was identified with Zeus and Jupiter.

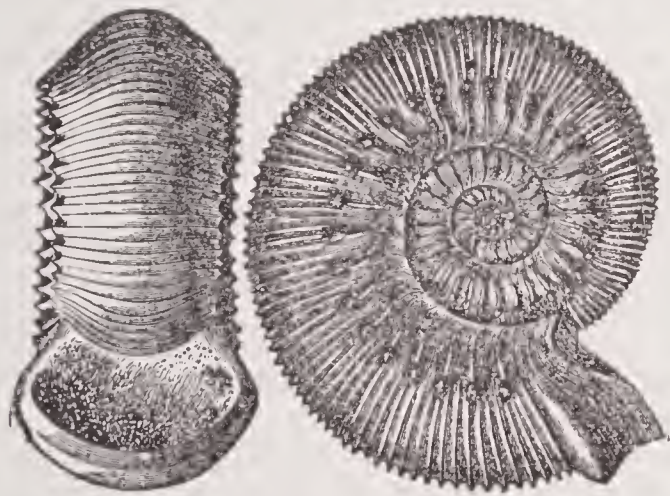
**Ammonia**, a substance consisting of  $\text{NH}_3$ . Molecular weight, 17. Sp. gr. 8.5, compared with H; compared with air (1), its sp. gr. is 0.59. It is a colorless, pungent gas, with a strong alkaline reaction. It can be liquefied at the pressure of seven atmospheres at  $15^\circ$ . Water at  $0^\circ$  dissolves 1,150 times its volume of  $\text{NH}_3$ , at ordinary temperatures about 700 times its volume. A fluid drachm of *ammonia liquor fortior* contains 15.83 grains of  $\text{NH}_3$ , and has a specific gravity of 0.891. The *liquor ammonia* of the pharmacopœia has a specific gravity of 0.959, and a fluid drachm contains 5.2 grains of  $\text{NH}_3$ . (Water being unity, the specific gravity of ammonia is .0007594.) Ammonia is obtained by the dry distillation of animal or vegetable matter containing nitrogen; horns, hoofs, etc., produce large quantities; hence its name of spirits of hartshorn. Guano consists chiefly of urate of ammonia. But ammonia is now obtained from the liquor of gasworks, coal containing about 2 per cent. of nitrogen. Ammonia is formed by the action of nascent hydrogen on dilute nitric acid. Ammonia gas is prepared in the laboratory by heating together one part of  $\text{NH}_4\text{Cl}$  with two parts by weight of quicklime, and is collected over mercury.  $\text{NH}_3$  is decomposed into N and  $\text{H}_2$  by passing it through a red-hot tube, or by sending electric sparks through it; the resulting gases occupy twice the volume of the ammonia gas. It is used in medicine as an antacid and stimulant; it also increases the secretions. Externally, it is employed as a rubefacient and vesicant. Ammonia liniment consists of one part of solution of ammonia to three parts of olive oil. Ammonia is used as an antidote in cases of poisoning by prussic acid, tobacco, and other sedative drugs. Substitution ammonias are formed by the replacement of H by an alcohol radical forming amines and by acid radicals forming amides. There are also ammonia substitution compounds of cobalt, copper, mercury, and platinum.

**Ammoniacum**, a gum resin, called also gum ammoniac, which is imported into this country from Turkey and the East Indies in little lumps, or tears, of a strong and not very pleasing smell and a nauseous taste,



followed by bitterness in the mouth. It is a stimulant, a deobstruent, an expectorant, an antispasmodic, a discutient, and a resolvent. Hence, it is internally employed in asthma and chronic catarrh, visceral obstructions, and obstinate colic, while it is used externally in scirrhus tumors and white swellings of the joints. The plant from which it comes has not yet been thoroughly settled. That of Persia has been said to come from the *dorema ammoniacum*, but is more probably derived from the *ferula orientalis*. (Lindley's "Vegetable Kingdom.") Garrod believes it to be from the first-named of these two plants, which grows in Persia and the Punjaub. Both are *umbelliferæ*.

**Ammonite**, a large genus of fossil chambered shells, belonging to the class *cephalopoda*, the order *tetrabranchiata*, and the family *ammonitidæ*. The shell is discoidal, the inner whorls more or less concealed, the septa undulated, the sutures lobed and foliated, and the siphuncle dorsal. Before geology became a science, even scientific men, and much more the unscientific, were puzzled what to call these fossils. They were looked on as real ram's horns, or as the curled tails of some animals, or as petrified snakes, or as convoluted marine worms or insects, or as vertebræ. The petrified snake hypothesis being a popular one, some dealers fraudulently appended heads to make the



AMMONITES.

resemblance more complete. It is to ammonites that Sir Walter Scott refers when he says that —

" . . . of thousand snakes, each one  
Was changed into a coil of stone  
When holy Hilda prayed."  
"Marmion," ii: 13.

The ancients venerated them, as the Hindus still do. About 700 so-called species have been described, ranging from the trias to the chalk. Several attempts have been made to divide the genus into sub-genera or sections; or, if ammonites be looked upon as a sub-family, then they will be elevated into genera.

**Ammonites**, a Semitic race of people, living on the edge of the Syrian Desert; according to Gen. xix: 38, the descendants of Lot, and closely akin to the Moabites. They inhabited the country lying to the N. of Moab, between the rivers Arnon and Jabbok. Their chief city was Rabbath-Ammon. The Israelites were often at war with them. Jephthah defeated them with great slaughter, and they were also overcome by Saul, David, Uzziah and Jotham; but after the fall of the kingdom of Israel (721 B. C.), they spread themselves in the districts E. of the Jordan. They sometimes secured the alliance of Syria, of Nebuchadnezzar, and of Arabian tribes, in their wars with the Jews. After the captivity, they endeavored to hinder the restoration of the Jewish State, but were finally conquered by Judas Maccabæus. Justin Martyr affirms that in his time the Ammonites were still numerous. From the name of their princes, it is evident that their language was closely akin to Hebrew. Their chief deity was Moloch.

**Ammonium**, the name given by Berzelius to a supposed monatomic radical ( $\text{NH}_4$ ). It is doubtful whether the ammonia salts — as chloride of ammonium,  $\text{NH}_4\text{Cl}$  — contain this radical, that is, whether N is sometimes a pentatomic element, or the molecule of  $\text{NH}_3$  is united with the acid, as  $\text{HCl}$ , by molecular attraction — thus,  $\text{NH}_3.\text{HCl}$  — in the same manner as water of crystallization is united in certain crystalline salts. At high temperatures this salt is decomposed into  $\text{NH}_3$  and  $\text{HCl}$ . The so-called amalgam of mercury and ammonium decomposes rapidly into hydrogen ammonia and mercury. It is formed by placing sodium amalgam in a saturated solution of  $\text{NH}_3\text{HCl}$ . It forms a light, bulky, metallic mass. A dark-blue liquid, said to be  $(\text{NH}_4)_2$  (ammonium), has been formed at low temperature and high pressure. But many of the salts of ammonium are isomorphous with those of potassium and sodium. The salts of ammonium give off  $\text{NH}_3$  when heated with caustic lime or caustic alkali. With platinic chloride they give a yellow precipitate of double platinic ammonium chloride; also with tartaric acid a nearly insoluble white crystalline precipitate of acid tartrate of ammonia. The salts of ammonium leave no residue when heated to redness.

**Ammonius**, surnamed SACCAS, or "The Porter," a philosopher of the 3d century, was born at Alexandria, probably of Christian parents, and became the founder of a new school of philosophy, which sought to effect a reconciliation of the Platonic and Aristotelian systems. The great critic Longinus, the mystic Plotinus, and the great Church teacher Origen, were his disciples. He died about 243.



## Amnesty

**Amnesty**, an act of oblivion passed after an exciting political period. Its object is to encourage those who have compromised themselves by rebellion or otherwise to resume their ordinary occupations, and this it does by giving them a guarantee that they shall never be called upon to answer for their past offenses.

**Amœba**, a term applied to a protozöon which perpetually changes its form. It is classed under the rhizopoda. It is among the simplest living beings known, and might be described almost as an animated mass of perfectly transparent moving matter. Amœbæ may be obtained for examination by placing a small fragment of animal or vegetable matter in a little water in a wine-glass, and leaving it in the light part of a warm room for a few days. (Prof. Lionel S.

**Amomum**, a genus of plants belonging to the order *zingiberaceæ*, or ginger-worts. They are natives of hot countries. The seeds of *A. granum paradisi*, *A. maximum*, and on the frontiers of Bengal of *A. aromaticum*, are the chief of the aromatic seeds called cardamoms. A pungent flavor is imparted to spirituous liquor by the hot acrid seeds of *A. angustifolium*, *macrosperrum*, *maximum*, and *clusii*. It is also the specific name of the *sison amomum*, the hedge-bastard stone-parsley.

**Amor**, the god of love among the Romans, equivalent to the Greek Eros. He had no place in the national religion of the Romans, who derived all their knowledge of him from the Greeks. According to the later mythology Amor is the son of Venus and Mars, the most beautiful of all the gods; a winged boy, with bow and arrows, sometimes represented blindfolded. His arrows inflict the wounds of love, and his power is formidable to gods and men. He is not always a playful child in the arms of his mother, but appears sometimes in the bloom of youth, for example, as the lover of Psyche. He is brother of Hymen, the god of marriage, whom he troubles much by his thoughtlessness. According to the earlier mythology he is the oldest of all the gods, and existed before any created being. In English the god of love is less frequently called Amor than Cupid; yet with the ancients *cupido* denoted, properly, only the animal desire.

**Amorites**, a powerful tribe of Canaanites, who inhabited the country N. E. of the Jordan, as far as Mount Hermon. In the 13th century B. C. they defeated the Moabites, crossed the Jordan, overpowered the Hittites, and overran Canaan to the sea; but their power was broken by the great victory of the Hebrews under Joshua, at Gibeon. Their two most famous kings were Sihon, King of Heshbon, and Og, King of Bashan, the last said to have been of gigantic size. The victory of Joshua did not wholly ex-

## Ampere

terminate the Amorites in Canaan. The residue of this people became tributary under Solomon. Recent investigations seem to prove that they were a race akin to the Hittites.

**Amos**, one of the so-called minor prophets of the Hebrews, was a herdsman of Tekoa, in the neighborhood of Bethlehem, and also a dresser of sycamore trees. During the reigns of Uzziah in Judah, and Jeroboam II. in Israel (about 800 B. C.), he came forward to denounce the idolatry then prevalent. His prophetic writings contain, in the first six chapters, denunciations of the Divine displeasure against several States, particularly that of Israel, on account of the worship of idols. The three remaining chapters contain his symbolical visions of the approaching overthrow of the kingdom of Israel, and lastly, a promise of restoration. His style, remarkable for its clearness and picturesque vigor, abounds with images taken from rural and pastoral life.

**Amour**, or **Amoor**. See AMUR.

**Amoy**, a seaport town and one of the treaty ports of China; on a small island of the same name in the Province of Fukien; 325 miles E. by N. E. of Canton, and directly opposite the island of Formosa. It has been celebrated as a trading town for some centuries. It was one of the earliest seats of European commerce in China, the Portuguese having had establishments here in the 16th and the Dutch in the 17th centuries. In 1841 it was taken by the British, and, by the treaty of Nankin, a British consul and British subjects were permitted to reside here. The imports are opium, rice, cotton twist, British long-cloths, beans, peas, umbrellas, clocks, etc.; the exports are tea, sugar, paper, opium, grass cloths, gold leaf, etc. This port is especially important in its relations to the prospective trade of the United States with China, and already its trade with the United States leads that of all other Chinese ports. During 1896 the United States took from this port alone tea amounting in value to nearly \$4,000,000. While the United States is the principal export customer of the port its imports thereto make a very small showing, owing to the fact that, under the local system of handling goods, the great bulk of the receipts from the United States is classified as English goods. During the international military operations in China, in 1900, the city was occupied by the Japanese.

**Ampere**, the practical unit of electric current strength. It is the measure of the current produced by an electro-motive force of one volt through a resistance of one ohm. In electric quantity it is the rate of one coulomb per second.



**Ampère, Andre Marie** (äm-pär'), a French mathematician and physicist, was born at Lyons in 1775. The guillotining of his father in 1793 made a deep and melancholy impression on young Ampère, who sought for solace in the study of nature and antiquity. In 1805, after he had been engaged for four years as a lecturer at Bourg and Lyons, he was called to Paris, where he distinguished himself as an able teacher in the Polytechnic School, having already begun his career as an author by his "Consideration of the Mathematical Theory of Gaming" (1802). In 1814 he became a member of the Academy of Sciences; in 1824, Professor of Experimental Physics in the Collège de France. He died at Marseilles, June 10, 1836. Scientific progress is largely indebted to Ampère, especially for his electro-dynamic theory, and his original views of the identity of electricity and magnetism, as given in his "Collection of Electro-Dynamic Observations" (1822), and his "Theory of Electro-Dynamic Phenomena" (1830). These researches prepared the way for Faraday's experiments. See his "Journal and Correspondence," 1793-1805 (7th ed., 1877); "André Marie Ampère and Jean Jacques Ampère;" "Correspondence and Recollections" (2 vols., 1875); and St. Hilaire's "Philosophy of the Two Ampères" (1866).

**Ampère, Jean Jacques Antoine**, son of the preceding, was born at Lyons, Aug. 12, 1800. After laying the groundwork of his comprehensive studies in Paris he proceeded to Italy, Germany and Scandinavia. After his return he lectured on the history of literature at Marseilles; but, after the July revolution (1830), succeeded Andrieux as professor in the Collège de France. He was elected to the Academy in 1847; and died March 27, 1864. Ampère was deeply read in German literature; his learning was marvellously wide, and his valuable writings upon China, Persia, India, Egypt, Nubia and his Levantine voyages, proved that the far East itself was embraced within the circle of his studies. Many of his magazine articles have been collected under the title "Literature and Travel" (1833). His chief works are "Literary History of France Before the Twelfth Century" (1840); "History of French Literature in the Middle Ages" (1841); "History of the Formation of the French Language" (1841); "Greece, Rome and Dante" (1848), and "Science and Literature in the Orient" (1865). Deep research and judicious criticism, expressed in a clear and classical style, distinguish his various compositions.

**Amphiarus** (am-fē-ar'ā-us) son of Oileus (according to some, of Apollo) and Hypermnestra; endowed by the gods with prophetic powers. Foreseeing that he should perish before Thebes, he hid himself; but

being betrayed by his wife, Eríphyle, he joined Polynices in his expedition against this city, and was one of his most valiant warriors. The besiegers having been repulsed in one of their attacks, the earth opened under him in his flight, and swallowed him, with his horses. On the spot where this event is said to have taken place, at Oropus, a feast was celebrated in honor of him (*Amphiarca*), and, not far from this city, a temple was dedicated to him, where oracles were delivered. His death was revenged by his son, Alemæon.

**Amphibia**, in zoology, animals which can live indiscriminately on land or water, or which at one part of their existence live in water and at another on land. It is used —

1. By Linnæus for the third of his six classes of animals. He includes under it reptiles in the wide sense of the word, with such fishes as are most closely akin to them. He divides the classes into three orders, reptiles, serpents and nantes.

2. By Cuvier, in his "Règne Animal," for his third tribe of carnivorous mammalia, the first and second being the plantigrades and digitigrades. He included under it the seals and their allies. In his "Tableau Élémentaire," the arrangement is different, the amphibia being an order ranked with the *cetacea* (whales), under his third grand division, *mammalia*, which have extremities adapted for swimming, the first being "Mammalia which have claws or nails," and the second "those which have hoofs."

3. By Macleay, Swainson, Huxley, and other modern zoologists, the fourth great class of animals corresponding to Cuvier's reptilian order *batrachia*. It is intermediate between *reptilia* and *pisces*. They have no amnion. Their visceral arches during a longer or shorter period develop filaments exercising a respiratory function, or branchiæ. The skull articulates with the spinal column by two condyles, and the base occipital remains unossified. But Huxley divides them into four orders, the *urodela*, the *batrachia*, the *gymnophiona*, and the *labyrinthodonta*. The frog, the toad, and the newt are familiar examples of the *amphibia*.

**Amphictyonic Council**, a celebrated council of the States of ancient Greece. An amphictyony meant originally an association of several tribes for the purpose of protecting some temple common to them all, and for maintaining worship within it, and it was only later that it acquired also a political importance. Its members were called amphictyons ("the dwellers around") Such associations existed at Argos, Delos, and elsewhere; but the most important was that at Anthela, near Thermopylæ, the seat of which was transferred later to Delphi through Dorian influence. The members of this league were 12 in number, and



## Amphion

were, according to Æschines, the Thes-salians, Bœotians, Dorians, Ionians, Per-rhæbians, Magnetes, Locrians, Cæteans, Phthiots, Malians, and Phocians and the Dolopians who are mentioned in other ac-counts. The members of this confederation bound themselves by an oath not to destroy any city of the Amphictyons, nor cut off their streams in war or peace, and to em-ploy all their power in punishing those who did so, or those who pillaged the property of the god, or injured his temple at Delphi. So excellent an oath was very indifferently kept. In the primitive period of Greek history, it had a beneficial and civilizing influence; but its more important interfer-ences in the affairs of Greece were directly contrary to the spirit of its institution. The first of these was the so-called sacred war, waged from 595 to 585 B. c., against the Phocian city of Crissa. The second sacred war, from 355 to 346 B. c., gave occasion to the fatal interference of Philip of Macedon in the affairs of Greece; and a third sacred war, instigated by Philip, was but the prelude to the victory of Chæronea, so fatal to Greek liberty.

**Amphion** (am-fī'on), in mythology, the son of Jupiter and Antiope; the eldest of the Grecian musicians. In Lydia, where he married Niobe, the daughter of King Tan-talus, he learned music, and brought it thence into Greece. He reigned in Thebes, which was before called Cadmea. Amphion



AMPHION AND ZETHUS.

joined the lower and upper city by walls, built the seven gates, and gave it the name of Thebes. To express the power of his music, and, perhaps, of his eloquence, the poets said, that, at the sound of his lyre, the stones voluntarily formed themselves into walls; that wild beasts, and even trees,

## Amphitheater

rocks, and streams, followed the musician. With the aid of his brother, Zethus, he is said to have revenged Antiope, who was driven into banishment by his father, and to have bound Dirce to the tail of a wild bull; which incident is supposed to be rep-resented by the famous piece of sculpture, the Farnese bull.

**Amphioxus**, a genus of fishes of an or-ganization so humble, that the first speci-men discovered was believed by Pallas to be a slug, and was described by him as the *limax lanceolatus*. It is now called *am-phioxus lanceolatus*.

**Amphipod**, in the singular, in zoology, an animal belonging to the crustaceous or-der amphipoda. In the plural, an order of crustaceans, consisting of species provided with feet both for walking and swimming. They live in the water, or burrow in the sand, or are parasitic upon fish. When they swim they lie on their side. Some, when on shore, leap with agility. The or-der consists of two families, the *hyperidæ* and the *gammaridæ*.

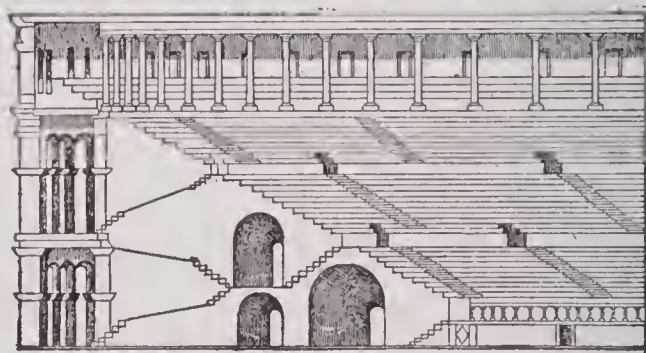
**Amphipolis**, an important city of Thrace or Macedonia; at the mouth of the Strymon river; 33 miles from the Ægean. It was founded by an Athenian colony about 436



COIN OF AMPHIPOLIS.

B. c.; was captured by Sparta in 424 B. c.; and near it the Spartans defeated the Athenians in 422 B. c. Subsequently it be-came a Macedonian possession; was called Popolia in the Middle Ages; and its site is now occupied by the Turkish town of Yenikeui.

**Amphitheater**, a double theater. The ancient theaters were nearly semi-circular in shape; or, more accurately, they were



AMPHITHEATER, SECTIONAL VIEW.

half ovals, so that an amphitheater, theo-retically consisting of two theaters, placed with their concavities meeting each other,



## Amphitrite

was, loosely speaking, a nearly circular, or, more precisely, an oval building. Amphitheaters were first constructed of wood, but in the time of Augustus stone began to be employed. The place where the exhibitions took place was called the arena (Lat.=sand), because it was covered with sand or sawdust. The part next the arena was called podium, and was assigned to the emperor, the senators, and the ambassadors of foreign nations. It was separated from the arena by an iron railing and by a canal. Behind it rose tiers of seats, the first 14, which were cushioned, being occupied by the equities, and the rest, which were of bare stone, being given over to the common people. Except when it rained, or was exceedingly hot, the amphitheater was uncovered. Among the sights were combats of wild beasts and gladiator fights. The Romans built amphitheaters wherever they went. Remains of them are still to be found in various parts of Europe; but the most splendid ruins existing are those of the Coliseum at Rome, which was said to have held 87,000 people.

**Amphitrite** (am-fē-trī'tē), a daughter of Oceanus and Tethys, or of Nereus and Doris. Neptune wished to make her his wife, and, as she hid herself from him, he sent a dolphin to find her, which brought her to him, and received as a reward a place among the stars. As a goddess and queen of the sea, she is represented as drawn in a chariot of shells by Tritons, or riding on a dolphin, with the trident of Neptune in her hand.

**Amphitrite, The**, a twin-screw, iron, double-turreted monitor of the United States navy; 3,000 tons displacement; length, 259 feet 6 inches; breadth, 55 feet 10 inches; mean draft, 14 feet 6 inches; horse power, 1,600; armor, 9 inches on sides, 7.5 inches on turrets, and 11.5 inches on barbettes; main battery, four 10-inch breech-loading rifles and two 4-inch rapid-fire guns; secondary battery, two 6-pounder and two 3-pounder rapid-fire guns, two 37- and two 1-pounder rapid-fire cannons; speed, 12 knots; crew, 26 officers and 145 men; cost, \$3,178,046.

**Amphitryon** (am-fit'rē-on), King of Thebes, son of Alcæus, and husband of Alcmena. Plautus, after him Molière, and, still later, Falk and Kleist, have made the trick played upon him by Jupiter the subject of amusing comedies, in which the return of the true Amphitryon, and his meeting with the false one, occasion several humorous scenes at the palace and in the city. The French give this name to a courteous host.

**Amphora**, a two-handled vessel, generally made of clay, and used for holding wine, oil, honey, or even the skeletons or ashes of the dead.

## Amputation

It is also a liquid measure, containing 48 sectari, or nearly six gallons. The Greek *amphoreus* held nearly nine. The capacity of the Saxon *ambra* is unknown.



AMPHORÆ.

**Ampulla**, a vessel bellying out like a jug, used by the ancient Romans, either for containing unctions for the bath, or for drinking at table. It is also one of the sacred vessels used at the altar. Such vials were employed for holding the oil for chrismation, as also that for consecration, coronation, inclosing the relics of saints, and similar purposes.

In biology, any membranous bag shaped like a leathern bottle; in anatomy, a dilatation occurring in each of the semi-circular canals of the ear; and in botany, one of the little flasks composed of metamorphosed leaves found on certain water plants, such as *utricularia*; called also *ascidium*; also a spongiole of a root.

**Amputation**, the cutting off of a part which, by its injured or diseased condition, endangers, or may endanger, the safety of the whole body. The amputation of a limb was in ancient times attended with great danger of the patient's dying during its performance, as surgeons had no efficient means of restraining the bleeding. They rarely ventured to remove a large portion of a limb, and when they did so, they cut in the gangrened parts, where they knew the vessels would not bleed; the smaller limbs they chopped off with a mallet and chisel; and in both cases had hot irons at hand with which to sear the raw surfaces, boiling oil in which to dip the stump, and various resins, mosses, and fungi, supposed to possess the power of arresting hemorrhage. Some tightly bandaged the limbs they wished to remove, so that they mortified and dropped off; and others amputated with red-hot knives, or knives made of wood or horn dipped in vitriol. The desired power of controlling the hemorrhage was obtained by the invention of the tourniquet in 1674, by a French surgeon, Morel, and its improvement early in the next century by his countryman Petit. The ancient surgeons endeavored to save a covering of skin for the stump, by having the skin



## Amritsar

drawn upward by an assistant, previously using the knife. In 1679 Lowdham of Exeter suggested cutting semicircular flaps on one or both sides of a limb, so as to preserve a fleshy cushion to cover the end of the bone. Both these methods are now in use, and are known as the "circular" and the "flap" operations; the latter is most frequently used in this country.

A "flap" amputation is performed thus: The patient being placed in the most convenient position, an assistant compresses the main artery of the limb with his thumb, or a tourniquet is adjusted over it. Another assistant supports the limb. The surgeon with one hand lifts the tissues from the bone, and transfixing them with a long, narrow knife, cuts rapidly downward and toward the surface of the skin, forming a flap; he then repeats this on the other side of the limb. An assistant now draws up these flaps, and the knife is carried round the bone, dividing any flesh still adhering to it. The surgeon now saws the bone. An expert surgeon can remove a limb thus in from 30 to 60 seconds. He then, with a small forceps, seizes the end of the main artery, and while he draws it slightly from the tissues, an assistant ties it with a thread. All the vessels being secured, the flaps are stitched together with a needle and thread, and the wound is dressed.

The question when amputation of a limb is necessary, is often, especially after an accident, one of the most difficult in surgery. The chief indications for it in these cases are—very extensive destruction or laceration of the skin; injury to the large vessels or nerves; severe splintering of the bones. The diseases most commonly requiring it are—disease of bones or joints, especially when the discharge from it threatens to exhaust the patient; tumors, especially cancer and sarcoma, which cannot otherwise be removed; and gangrene.

**Amritsar** or **Umritsir**, a well built city of the Punjab, 32 miles E. of Lahore by rail. It is the religious metropolis of the Sikhs, a distinction which, along with its name (literally, "pool of immortality"), it owes to its sacred tank, in the midst of which stands the marble temple of the Sikh faith. Founded in 1574, but all of it more recent than 1762, it is, next to Delhi, the richest and most prosperous city in Northern India, with manufactures of cashmere shawls, cotton, silks, etc. Pop. (1891) 136,766.

**Amruebnalas** (am'rö-ibn-al'as), or **Um-rubenelas**, a famous Saracen general, at first a great enemy of Mohammed, but afterward his zealous disciple. He conquered Syria and Egypt. He died A. D. 663.

**Amsterdam** ("dam" or "dike of the Amstel"), the capital of the Netherlands,

## Amsterdam

is situated at the influx of the Amstel to the Ij or Y (pronounced eye), an arm (now mostly drained) of the Zuyder Zee, 44¾ miles N. N. E. of Rotterdam by rail. It is divided by the Amstel and numerous canals into a hundred small islands, connected by more than 300 bridges. Almost the whole city, which extends in the shape of a crescent, is founded on piles driven 40 or 50 feet through soft peat and sand to a firm substratum of clay. At the beginning of the 13th century it was merely a fishing village, with a small castle, the residence of the Lords of Amstel. In 1296, on account of its share in the murder of Count Floris of Holland, the rising town was demolished; but in 1311, with Amstelland (the district on the banks of the Amstel), it was taken under the protection of the Counts of Holland, and from them received several privileges which contributed to its subsequent prosperity. In 1482 it was walled and fortified. After the revolt of the seven provinces (1566), it speedily rose to be their first commercial city, a great asylum for the Flemish Protestants; and in 1585 it was considerably enlarged by the building of the new town on the W. The establishment of the Dutch East India Company (1602) did much to forward the well-being of Amsterdam, which, twenty years later, had 100,000 inhabitants. In the middle of that century, the war with England so far reduced the commerce of the port that, in 1653, 4,000 houses stood uninhabited. Amsterdam had to surrender to the Prussians in 1787, to the French in 1795; and the union of Holland with France in 1810 entirely destroyed its foreign trade, while the excise and other new regulations impoverished its inland resources. The old firms, however, lived through the time of difficulty, and in 1815 commerce again began to expand—an expansion greatly promoted by the opening in 1876 of a new and more direct waterway between the North Sea and the city.

The city has a fine appearance when seen from the harbor, or from the high bridge over the Amstel. Church towers and spires, and a perfect forest of masts, relieve the flatness of the prospect. The old ramparts have been leveled, planted with trees, and formed into promenades. Between 1866 and 1876 many spacious streets and an extensive public park were added to the city. Tramways have been successfully introduced, and the harbor greatly improved. There is railway communication with all parts of the country and of Europe. Rich grassy meadows surround the city. On the W. side are a great number of windmills for grinding corn and sawing wood. The three chief canals—the Heerengracht, Keizersgracht, and Prinsengracht—run in semi-circles within each other, and are from



two to three miles long. On each side of them, with a row of trees and a carriage-way intervening, are handsome residences. The building material is brick; and the houses have their gables toward the streets, which gives them a picturesque appearance. The defenses of Amsterdam now consist in a row of detached forts, and in the sluices, several miles distant from the city, which can flood, in a few hours, the surrounding land. A hard frost, however, like that of 1794-1795, when Pichegru invaded the country, would render this means of defense useless.

The population, which from 217,024 in 1794, sank to 180,179 in 1815, rose steadily to 557,614 in 1906, of whom the majority belong to the Dutch Reformed Church. Of the remainder, about 80,000 were Catholics, 30,000 German Jews, and 3,200 Portuguese Jews. The chief industrial establishments are sugar refineries, engineering works, mills for polishing diamonds and other precious stones, dockyards, manufactories of sails, ropes, tobacco, silks, gold and silver plate and jewelry, colors, and chemicals, breweries, distilleries, with export houses for corn and colonial produce; cotton-spinning, book-printing, and type-founding are also carried on. The present Bank of the Netherlands dates from 1824, Amsterdam's famous bank of 1609 having been dissolved in 1796.

The former *Stadhuis* ("townhouse"), converted in 1808 into a palace for King Louis Bonaparte, and still retained by the reigning family, is a noble structure. Built by Van Kampen in 1648-1655, and raised upon 13,659 piles, it extends 282 feet in length, by 235 feet in breadth, and is surmounted by a round tower rising 182 feet from the base. It has a hall, 120 feet long, 57 wide, and 90 high, lined with white Italian marble—an apartment of great splendor. The cruciform *Nieuwe Kerk* (New Church), a Gothic edifice of 1408-1414, is the finest ecclesiastical structure in the city, with a splendidly carved pulpit, and the tombs of Admiral de Ruyter, the great Dutch poet Vondel, and various other worthies. The Old Church (*Oude Kerk*), built in the 14th century, is rich in painted glass, has a grand organ, and contains several monuments of naval heroes. Literature and science are represented by a university supported by the municipality (till 1876 known as the *Athenæum illustre*), by academies of arts and sciences, by museums and picture galleries, a palace of national industry, a botanical garden, several theaters, etc. The new Ryksmuseum contains a truly national collection of paintings, its choicest treasure being Rembrandt's "Night-guard." REMBRANDT (q. v.), made Amsterdam his home; and his statue (1852) now fronts the house he occupied. Spinoza was a native.

The hospital for aged people, the poorhouse, house of correction, the orphan asylums, a navigation school, and many benevolent societies, are well supported, and managed on good principles. A water supply was introduced in 1853. The North Holland canal, to which Amsterdam is so largely indebted for the rapid increase of its commerce, is noticed under Zuyder Zee.

**Amsterdam**, a city in Montgomery co., N. Y.; on the Mohawk river and the New York Central and Hudson River and the West Shore railroads; 33 miles N. W. of Albany. It is in an agricultural region, but is noted for its manufactures, especially of knit goods, carpets, steel springs, and paper. Pop. (1910) 31,267.

**Amulet**, anything hung around the neck, placed like a bracelet on the wrist, or otherwise attached to the person, as an imagined preservative against sickness, witchcraft, or other evils. Amulets were common in the ancient world, and they are so yet in nations where ignorance prevails. Thus an observant visitor to a school in India may see many a pupil with a piece of ordinary string tied bracelet-fashion round one or both of his wrists. This is an amulet, or talisman, which having been blessed by a Brahman, has then been sold for half a rupee (about 24 cents), or even for a rupee itself, as a sure preservative against fever.

**Amur** (am-ör'), a river formed by the junction (about 53° N. lat., and 121° E. long.) of the Shilka and the Argun, which both come from the S. W.—the former rising in the foothills of the Yablonoi Mountains. From the junction, the river flows first S. E. and then N. E., and, after a total course of 3,060 miles, falls into the Sea of Okhotsk, opposite the island of Sakhalin. Its main tributaries are the Sungari and the Ussuri, both from the S. Above the Ussuri, the Amur is the boundary between Siberia and Manchuria; below it, the river runs through Russian territory. It is very valuable for navigation, and carries a considerable fleet of steamers, but on account of the bar at its mouth, goods are generally disembarked, and carried overland to Alexandrovsk. The river is frozen for six months of the year; in summer there are extensive inundations.

From as early as 1636, Russian adventurers made excursions into the Chinese territories of the lower Amur. In 1666 they built a fort at Albazin, and succeeded in navigating from that fort to the mouth of the river. In 1685, the fort was taken and destroyed by the Chinese, but was retaken promptly by the Russians, who again, in 1689, abandoned it and the whole of the Amur to the Chinese. But soon fur hunters of Siberia, Russian traders, and adventurers, encouraged by government, continued to pursue their vocations on Chinese ground.



## Amurath

In 1854–1856 two military expeditions were conducted by Count Muravieff, who twice descended the river, unopposed by the Chinese, and established the stations of Alexandrovsk and Nikolaevsk. In 1858 China agreed to the Treaty of Tientsin, by which the boundaries of Russia and China were defined. The left bank of the Amur, and all the territory N. of it, became Russian; and below the confluence of the Ussuri, both banks. In 1860, after the occupation of Peking by the British and French, General Ignatieff secured the signature of Prince Kung to a treaty, by which Russia acquired the broad and wide territory comprised between the river Amur and the mouth of the Tumên, extending 10° of latitude nearer the temperate regions, and running from the shore of the North Pacific eastward to the banks of the river Ussuri, a principal affluent of the Amur. In September, 1900, Russia took formal possession of the right bank of the river. An enormous advantage to Russia of this acquisition of territory was the fact, that it conferred on that country the advantage of harbors on the Pacific in a comparatively temperate latitude, where navigation is impeded by ice for not more than three or four months a year.

This vast territory falls into two Russian provinces — the Maritime Province between the Ussuri and the sea, and the government of Amur, N. of the river. The latter has an area of 175,000 square miles. The country is richly timbered, and is admirably adapted for pasturage and agriculture, though the climate is severe. On the middle course of the river the summer heat is excessive, and the cold in the long winter very keen. Fur bearing animals are still plentiful, and the river abounds in fish. The capital is, since 1882, Khabarovka, and not, as formerly, Blagovestschensk. Nikolaevsk, once the only important place in these regions, is on the Amur, 26 miles from its mouth, where the river is 1¼ miles wide, and in places 15 feet deep; but the political center tends southward to the more temperate maritime province (area, 730,000 square miles), near the southern end of which is situated the important harbor of Vladivostok ("Rule of the East"), or Port May, which, in 1872, was placed in telegraphic communication with Europe by the China submarine cable, and is now the capital of the Amur provinces. The island of Sakhalin (Saghalien), N. of the Japan group, along a portion of the coast of Asiatic Russia, and formerly possessed partly by Russia and partly by Japan, is also a part of the Amur region in the wider sense.

**Amurath I.** (am-ö-rät'), a sultan of the Turks; succeeded his father Orchan in 1360. He founded the corps of Janissaries, conquered Phrygia, and, on the plains of Cassova, defeated the Christians. In this battle

## Amygdalin

he was wounded, and died the next day, 1389.

**Amurath II.**, one of the more illustrious of the Ottoman emperors, succeeded his father, Mohammed I., in 1421, at the age of 17. In 1423 he took Thessalonica from the Venetians; in 1435, subdued the despot of Servia, besieged Belgrade, which was successfully defended by John Hunniades; defeated the Hungarians at Varna, in 1444, and slew their king, Ladislaus. He died in 1451.

**Amurath III.**, succeeded his father, Selim II., in 1574. His first act was the murder of his five brothers. He added several of the best provinces of Persia to the Turkish empire. He was noted for his avarice, and his sensual excesses made him prematurely old. He died in 1595.

**Amurath IV.**, succeeded his uncle, Mustapha X., 1623. After two unsuccessful attempts he took Bagdad from the Persians in 1638, and ordered the massacre of 30,000 prisoners who had surrendered at discretion. The excessive cruelty and debauchery of Amurath IV. have earned for him the character of being one of the worst sovereigns that ever reigned over the Ottomans. He died in 1640.

**Amyclæ** (am-ik'lē). (1) An ancient town of Laconia, on the eastern bank of the Eurotas, 2½ miles S. E. of Sparta. It was the home of Castor and Pollux, the "Amyclæan brothers." It was conquered by the Spartans only before the first Messenian War. (2) An ancient town of Latium, which claimed to have been built by a colony from the Greek Amyclæ.

**Amygdalus** (am-ig'dal-us), a genus of plants belonging to the order *drupaceæ*, or almond-worts. It contains, among other species, the common peach, *amygdalus persica*, with the nectarine (variety *nectarina*), the almond, *amygdalus communis*, with the variety *amara*, or bitter almond. They are valued both for their flowers and their fruit. The flowers of the common peach are gently laxative. They are, therefore, suitable to be employed in the ailments of children.

**Amygdalin** (C<sub>20</sub>H<sub>27</sub>NO<sub>11</sub>3H<sub>2</sub>O), a crystalline principle existing in the kernel of bitter almonds, the leaves of the *prunus laurocerasus*, and various other plants, which, by distillation, yield hydrocyanic acid. It is obtained, by extraction with boiling alcohol, from the paste or cake of bitter almonds, which remains after the fixed oil has been separated by pressure. When obtained pure, it has a sweetish, somewhat bitter taste, and is not poisonous, and, when treated with alkaline solvents, ammonia is expelled, and amygdalic acid, C<sub>20</sub>H<sub>27</sub>O<sub>12</sub>, is produced. Its most remarkable change is, however, that which may be thus briefly stated: When the bruised almond kernel, or almond paste,



is brought in contact with water, the peculiar odor of bitter almonds is almost immediately evolved; and in 24 hours all traces of amygdalin will have disappeared, its place being taken by essential oil of almonds, hydrocyanic acid, sugar, and formic acid. This transformation is due to the presence of a peculiar nitrogenous matter called emulsin, or synaptase, which sets up a kind of fermentation.

**Amygdaloid**, an igneous crystalline, or, as the case may be, vitreous rock (lava), containing numerous cells, which owe their origin to the segregation and expansion of steam, with which all lavas are more or less charged at the time of their eruption. The cells vary in size from mere pores up to cavities several inches, or even feet, in diameter—these last, however, being exceptional, and, when they do occur, quite sporadic. The cells are generally flattened or drawn out in the direction of flow of the lava, and are frequently filled with mineral matter (amygdules), subsequently introduced by infiltrating water. This is the origin of many of the agates and so-called "Scotch pebbles" of jewelers. As cells and cellular structure occur in many different kinds of igneous rock, the term amygdaloid no longer denotes a rock species, and has, therefore, fallen into disuse. It is now only employed in the adjectival form, amygdaloidal, as indicating a cellular or slaggy-like structure, in which the pores and cells are more or less filled up with mineral matter.

**Amyl** ( $C_5H_{11}$ ), the fifth in the series of alcohol radicals whose general formula is  $C_nH_{2n+1}$ , and of which methyl and ethyl are the first two members. It is obtained by heating amyl-iodide with an amalgam of zinc in a closed tube at a temperature of about  $350^\circ$  F. ( $177^\circ$  C.), and is one of the natural products of the distillation of coal. As thus obtained, it represents two molecules of the radical united together, and usually goes by the name diamyl ( $C_5H_{11}$ )<sub>2</sub>. The single molecule,  $C_5H_{11}$ , has not been produced. Diamyl is a colorless liquid, with a specific gravity of .770 at  $52^\circ$  F. ( $11^\circ$  C.), and a boiling point of about  $316^\circ$  F. ( $158^\circ$  C.). It has an agreeable smell and burning taste. It enters into a large number of chemical compounds, most of which—as, for instance, bromide, chloride, iodide, etc.—are derived from amylic alcohol, which bears precisely the same relation to amyl that ordinary alcohol bears to ethyl,  $C_2H_5$ . Amylic alcohol is sufficiently described in the article fusel oil, which is the name given to the crude alcohol. It seems invariably to accompany ordinary alcohol when the latter is prepared by fermentation, and apparently occurs in largest

quantity in those liquids which remain most alkaline during fermentation.

**Amyl, Nitrite of** ( $C_5H_{11}NO_2$ ), a valuable drug which must not be confounded with nitrate of amyl, may be prepared by the action of nitric acid on fusel oil (amylic alcohol). It is a pale yellowish liquid, with an ethereal fruity odor, the vapor of which, when inhaled, even in very small quantity, causes violent flushing of the face and a feeling as if the head would burst. It is a very powerful remedy in all convulsive diseases, and is of special value in angina pectoris, as well as in asthma. Owing to its volatile nature it is usually kept in small glass globes containing from two to five drops, one of which, when crushed in the handkerchief, and the vapor breathed, will often give immediate relief.

**Amyloid**, a term used both in chemistry and botany, and generally equivalent to "starchy." Amyloids are substances like starch, dextrine, sugar, gum, etc., which consist of carbon, hydrogen, and oxygen, the latter two being always in the proportion in which they occur in water,  $H_2O$ . The animal body, chemically considered, is a mixture of proteids, amyloids or carbohydrates, and fats, plus water and mineral constituents, and the normal food always contains these constituents. Of the three items, proteids are, however, absolutely essential, amyloids and fats only desirable, accessories. In the human body the most important carbohydrates are glycogen,  $C_6H_{10}O_5$ ; grape-sugar or dextrose,  $C_6H_{12}O_6$ ; maltose,  $C_{12}H_{22}O_{11}$ ; and milk-sugar,  $C_{12}H_{22}O_{11}$ . A compound radical called amyl is formed by the decomposition of starch in a peculiar fermentation—the amylic fermentation—but to it the term amylaceous has no reference.

**Amyntas** (am-in'tas), the name of various characters in ancient Greek or Macedonian history, especially kings of Macedonia. (1) A son of Alcetas, reigned about 540 to 500 B. C., and he was succeeded by his son, Alexander I. (2) King of Macedonia, son of Philip, and brother of Perdiccas II.; reigned 393 to 369 B. C., having gained the crown by the murder of Pausanias. He was engaged in war with the Olynthians and assisted by the Spartans. He was father of Alexander, Perdiccas, and the famous Philip. (3) Philip excluded the grandson of Amyntas II. from his succession and he was put to death in the first year of the reign of Alexander the Great, because of a plot against the life of Alexander. The 4th was a Macedonian officer in Alexander's army.

**Amyntor, Gerhard von** (ä-min'tör), pseudonym of DAGOBERT VON GERHARDT, a German novelist and poet, born at Liegnitz, Silesia, July 12, 1831. He entered the army



in 1849, took part in the campaigns of 1864 and 1870-1871 as a major, was severely wounded in the former and resigned in 1872; settled in Potsdam in 1874. His principal works are "Peter Quidam's Rhine-Journey" (1877), an epic; "Songs of a German Night Watchman" (1878); "The New Romancero" (1880), poems; "The Priest" (1881), an epic; novels, "It Is You" (1882); "A Problem" (1884); "Praise of Woman" (1885); and "Gerke Sutehinne" (1887), a historical romance.

**Amyot, Jacques** (ä-mē-ō'), a French author (1513-1593), famous for his translations from the Greek, which, owing to their elegant style, are considered classical literature. They are the "Theagenes and Chariclea" of Heliodorus; "Seven Books of Diodorus Siculus," the "Daphnis and Chloe" of Longus; and "Plutarch's Lives," which was used by Corneille as a source for his antique tragedies, and by Shakespeare (in its English version by Sir Thomas North) for some of his plays.

**Amyridaceæ** (am-er-ē-das'ē-ī), an order of exogenous plants placed by Lindley under his rutales, or rutal alliance. The *amyridaceæ* have a panicled inflorescence, hypogynous stamina, double the petals in number, a one-celled ovary, with two to six pendulous ovules; the fruit sub-drupaceous, samaroid, or leguminous, with from one to two seeds, the leaves compound with pellucid dots, and abounding in resin. They occur in the tropics of India and America, in the latter region extending as far N. as Florida. In 1846, Lindley estimated the known species at 45.

**Ana**, a termination added to proper names to designate collections of sayings, table talk, anecdotes, items of gossip, as Johnsoniana, Boswelliana; as well as notes about some person, or publications bearing upon him, as Shakespeariana, Burnsiana. Such titles were first used in France, where they became common after the publication of Scaligerana by the brothers Dupuy (1666). In English literature there are many works of this kind, from Baconiana (1679) to Dickensiana (1886). America, also, has its Washingtoniana (1800). A tolerably complete catalogue of such works up to its own date may be found in Namur's "Bibliographie des Ouvrages publiés sous le Nom d'Ana" (Brussels, 1839).

**Anabaptists**, members of a well-known sect, which largely figured in the ecclesiastical and civil history of the 16th century. It began to attract notice within four years of the ever-memorable 31st of October, 1517, on which Luther affixed his "theses" to the gate of the castle church of Wittenberg. The most eminent of its early leaders were Thomas Munzer, Mark Stubner, and Nicholas Storck. They had been disciples of

Luther; but, becoming dissatisfied with the moderate character of his reformation, they cast off his authority, and attempted more sweeping changes than he was prepared to sanction. During his absence, they, in 1521, began to preach their doctrines at Wittenberg. Laying claim to supernatural powers, they saw visions, uttered prophecies, and made an immense number of proselytes. The ferment which the exciting religious events taking place in Central Europe had produced in men's minds, had made them impatient of social or political as well as of spiritual despotism; and, in 1525, the peasants of Suabia, Thuringia, and Franconia, who had been much oppressed by their feudal superiors, rose in arms, and commenced a sanguinary struggle, partly, no doubt, for religious reformation, but chiefly for political emancipation. The Anabaptists cast in their lot with the insurgent peasantry, and became their leaders in battle. After a time the allied princes of the empire, led by Philip, Landgrave of Hesse, put down the rebellion, and Munzer was defeated, captured, put to the torture, and ultimately beheaded. In 1532, some extreme Anabaptists from Holland, led by a baker called John Matthias, and a tailor, John Boccoldt, called also, from the place whence he came, John of Leyden, seized on the city of Münster, in Westphalia, with the view of setting up in it a spiritual kingdom, in which, at least nominally, Christ might reign. The name of Münster was changed to that of Mount Zion, and Matthias became its actual king. Having soon after lost his life in a mad, warlike exploit, the sovereignty devolved on Boccoldt, who, among other fanatical freaks, once promenaded the streets of his capital in a state of absolute nudity. On June 24, 1535, the Bishop of Münster retook the city by force of arms, and Boccoldt was put to death in the most cruel manner that could be devised. The excesses of the Anabaptists were eagerly laid hold of by the Popish party to discredit the Reformation. It was in 1534, when Boccoldt was in the height of his glory in Münster, that Ignatius Loyola took the first step toward founding the Order of the Jesuits, and the extension and rapid success of that celebrated fraternity are to be attributed in a very large measure to the reaction against Protestantism produced by the share which the Anabaptists took in the peasants' war, and the character of the spiritual sovereignty which they set up while Münster was in their hands.

**Anabasis** (an-ab'a-sis), the name given by Xenophon to his celebrated work describing the expedition of Cyrus the younger against his brother Artaxerxes Mnemon, King of Persia. Arrian also calls the expedition of Alexander the Great to Asia an *anabasis*. It is also applied to any similar



expedition, as that of Napoleon I. to Moscow.

**Anableps**, a genus of abdominal fishes, of the order *malacopterygii abdominales*, belonging to the family *cyprinidae* (carps). Their eyes greatly project, and, moreover, seem, but only seem, as if divided into two; hence, the species is called *anableps tetrophthalmus*. It is found in the rivers of Guiana.

**Anaconda**, a large serpent of the boa family, common in inter-tropical America. The head is comparatively small, conical, very flat below, and truncated in front. The color is grayish-brown or olive above, with two rows of large black spots running down the back and tail; the sides are adorned with black rings on a yellow ground; the under surface is ochre-yellow with black spots. The anaconda is the largest of living snakes, sometimes reaching a length of over 30 feet. Brazil and Guiana form its chief habitat. It always lives in or in the neighborhood of water; lies in wait for its prey in the water, or stretched on the sand; seldom attacks man; and during the dry season buries itself and becomes torpid.

**Anacreon** (a-nak'rē-on), a renowned lyric poet of Greece, born at Teos in Ionia, 562



ANACREON.

(?) B. C. He enjoyed the patronage of Polycrates, autocrat of Samos; and, while at his court, composed most of the odes in praise of wine and women which won for him pre-eminence among singers. A few of his authentic compositions have come down to us; under his name as many as 68 extant poems circulate, but the authorship of many of

these is extremely doubtful. He died 477 B. C.

**Anadyomene** (an-a-dī-om'en-ē), a name given to Aphrodītē (Venus) when she was represented as rising from the sea, as in the celebrated painting by Apelles, painted for the temple of Æsculapius at Cos, and afterward in the temple of Julius Cæsar at Rome.

**Anadyr** (an-ä'der), the most easterly of the larger rivers of Siberia and of all Asia; rises in the Stanovoi Mountains, and falls into the Gulf of Anadyr; length, 600 miles.

**Anæmia**, bloodlessness; a morbid state of the system produced by loss of blood, by deprivation of light and air in coal mines, or causes more obscure. The patient is characterized by great paleness, and blood-

vessels, easily traceable at other times, become unseen after great hemorrhage, or in cases of anæmia.

**Anæsthesia** (Greek, "lack of sensation"), a term used to express a loss of sensibility to external impressions, which may involve a part or the whole surface of the body. It may occur naturally as the result of disease, or may be produced artificially by the administration of anæsthetics. In some diseased conditions of the nervous centers, a part of the body may become totally insensible to pain, while in another part sensation may be unnaturally acute, constituting a state of hyperæsthesia. When a nerve is divided, there is no feeling of touch or pain referred to the parts which it supplies, because these are cut off from communication with the brain; and, in some diseases, as the elephantiasis græcorum, a loss of sensation in patches of the skin is an early and characteristic symptom. Insensibility to external impressions may be either general, *i. e.*, affecting the whole body, or local, where only that part is affected to which the anæsthetic agent is applied.

In ancient writers, we read of insensibility or indifference to pain being obtained by means of Indian hemp (*cannabis indica*), either smoked or taken into the stomach. The Chinese, more than 1,500 years ago, used a preparation of hemp, or ma-ya, to annul pain. The Greeks and Romans used mandragora for a similar purpose (*poiein anaesthesia*); and, as late as the 13th century, the vapor from a sponge filled with mandragora, opium, and other sedatives was used. The mandragora, however, occasionally induced convulsions, with other alarming symptoms; and, though Bullein, an English physician (died 1579), mentions the possibility of putting patients who were to be operated upon into "a trance, or a deepe terrible dreame" by its use, it gradually became obsolete, and was banished from the pharmacopœia. John Baptista Porta, of Naples, in his work on "Natural Magic" (1597), speaks of a quintessence extracted from medicines by somniferous menstrua. This was kept in leaden vessels hermetically closed, lest the aura should escape. "When it is used, the cover being removed, it is applied to the nostrils of the sleeper, who draws in the most subtle power of the vapor by smelling, and so blocks up the fortress of the senses, that he is plunged into the most profound sleep, and cannot be roused without the greatest effort. \* \* \* \* These things are plain to the skilful physician, but unintelligible to the wicked." In 1784, Dr. Moore, of London, used compression on the nerves of a limb requiring amputation, but this method was in itself productive of much pain. In 1800, Sir Humphry Davy, experimenting with the nit-



rous oxide or laughing-gas, suggested its usefulness as an anæsthetic; and in 1828 Dr. Hickman suggested carbonic acid gas. As early as 1795, Dr. Pearson had used the vapor of sulphuric ether for the relief of spasmodic affections of the respiration. The fact that sulphuric ether could produce insensibility was shown by the American physicians, Godwin (1822), Mitchell (1832), Jackson (1833), Wood and Baché (1834); but it was first used to prevent the pain of an operation in 1846, by Dr. Morton, a dentist of Boston. The news of his success reached England on Dec. 17, 1846; on the 22d, Mr. Robinson, a dentist, and Dr. Liston, the eminent surgeon, operated on patients rendered insensible by the inhalation of sulphuric ether. This material was extensively used for a year, when Sir J. Y. Simpson, of Edinburgh, discovered the anæsthetic powers of chloroform and introduced the use of it into his special department, midwifery. Since that time, chloroform has been the anæsthetic in general use in Europe, but ether is preferred in the United States. It is now the opinion of most medical men that chloroform should not be given where there is weak action of the heart from disease. Other substances have been used by inhalation, such as nitrous oxide gas, which is the best and safest anæsthetic for operations that last only one or two minutes, as in the extraction of teeth; bichloride of methylene and tetrachloride of carbon have also been employed, but are not so reliable as those above mentioned.

The employment of general anæsthetics in surgery has greatly increased the scope of the surgeon's usefulness, and has been a great boon to suffering humanity. It is, however, fraught with a certain amount of danger. However much care may be taken in its administration, an occasional fatal accident occurs from the action of the anæsthetics employed. In these cases, there is generally disease of the heart, or a hypersensitive nervous system, predisposing to sudden sinking, or to shock.

Local anæsthesia, artificially produced, is of great value in minor operations, and, in painful affections of limited areas of the body. It depends upon a paralysis of the sensory nerves of the part, and may be induced by the application of cold, or of medical agents. An ether or ethyl chloride spray, thrown on the part, produces such intense cold by its evaporation that the part is completely numbed, and a layer of ice forms on its surface. The after effects, however, when reaction sets in, are very painful, and there is danger that in weak constitutions sloughing and ulceration may follow. Of medical agents the best is cocaine, prepared from the coca shrub of Peru

(erythroxyton coca). In the form of a .1 to 5 per cent. watery solution, this drug is introduced into the tissues by a hypodermic needle, and produces complete anæsthesia of the part thus treated, immediately, or in a few seconds. A stronger solution, 4 to 20 per cent., applied to mucus surfaces, is also of great value. Rarely it produces giddiness, but has few unpleasant local after effects. Eucaïne, thymol, menthol, aconite, belladonna, chloroform (the last three as the well-known A. B. C. liniment), phenol, chloral, and Indian hemp, have also a local anæsthetic action if rubbed on the skin, or applied to abraded surfaces, but most are too irritating to be of any great value.

**Anagni** (an-än'yē), a town of Italy, on a hill, 40 miles E. S. E. of Rome. The seat of a bishop since 487, it has an old, but much modernized cathedral, and was the birthplace of four popes—Innocent III., Gregory IX., Alexander IV., and Boniface VIII. The chief city of the Hernici, it was a place of importance during the whole period of Roman history, and Vergil mentions it as "wealthy Anagnia."

**Anagram**, the letters of any word read backward. Thus in a satire on the English Government under Lord Melbourne, which appeared in a provincial Tory paper, the political leader was described as Enruoblem, which was simply Melbourne spelled backward. It is also applied to the letters of any word or words transposed in their order so as to make another word, or more generally, a short sentence. Thus the letters in the name of *William Noy*, Attorney-General to Charles I., who toiled hard in his vocation, became, when transposed, *I moyl in law*. Similarly *Galen* becomes by transposition *angel*, and *Mary*, *army*. The practice was not much in vogue among the Greeks and Romans, but it was common among the Jewish cabalists. Among European nations it first began to be extensively employed in the 16th century. Sometimes writers put not their own name, but its anagram, on their works; thus, Calvin put not Calvinus, but its anagram, Alcuinus, on the edition of his "Institutes," published at Strasburg in 1539. In certain cases mathematicians, who had made discoveries for which they wished to claim priority without communicating their secret, gave forth its anagram instead of itself. This was done by Galileo, Huyghens, and Sir Isaac Newton. Sometimes these anagrams were intentionally so obscurely worded, and of such a length, as to render their solution almost impossible. Thus Galileo announced his observations on Saturn: *Smaismrmilme poeta leumi bone nugttaviras = altissimum planetam tergeminum observavi* (I have observed that the most distant planet is triple-formed). Huyghens also announced his dis-



covery of Saturn's ring in the following anagram: aaaaaaa ccccc d eeeee iiiiii llll mmmmmnnnn oooo pp q rr s ttttt uuuuu = *annulo cingitur, tenui, plano nusquam cohærente, ad eclipticam inclinato* (it is surrounded by a slender ring, nowhere coherent, inclined to the ecliptic).

**Anahuac** (an-a-whak'), a term signifying, in the old Mexican language, "near the water," the original name of the ancient kingdom of Mexico. It is now used to designate either the whole of the tableland of Mexico or certain portions thereof, more or less extensive, with the capital as a common center. This plateau has a height of from 6,000 to 8,000 feet above the sea, and is generally level, though the great volcanoes of Jorullo and Popocatepetl rise out of it. The plateau, which comprises three-fifths of the republic of Mexico, is bounded E. and W. by the two great chains of the Cordilleras. The Anahualtecas, perhaps so called as living near the numerous lakes of the great plateau, are the Aztecs, and figure prominently in the ancient history of Mexico.

**Analogue**, that which resembles something else in one or more respects, as a word in one language corresponding to a word in another; or a part of an animal or plant which has the same function as another part in a second animal or plant differently organized; or any body which corresponds with, or bears great resemblance to, another body. (Especially used by geologists in comparing fossil remains with living specimens.)

**Analogy**, similitude of relations between one thing and other. The thing to which the other is compared is preceded by *to* or *with*. When both are mentioned together they are connected by the word *between*.

In logic, the resemblance of relations, a meaning given to the word first by the mathematicians, and adopted by Ferguson, Whately, and, as one of various senses, by John Stuart Mill. To call a country which has sent out various colonies the mother country implies that there is an analogy between the relation in which it stands to its colonies and that which a mother holds to her children.

As more commonly used it is a resemblance of any kind on which an argument falling short of induction may be founded. Under this meaning the element of relation is not especially distinguished from others. "Analogical reasoning, in this second sense, may be reduced to the following formula: Two things resemble each other in one or more respects; a certain proposition is true of the one, therefore, it is true of the other." If an invariable conjunction is made out between a property in the one case and a property in

the other, the argument rises above analogy, and becomes an induction on a limited basis; but if no such conjunction has been made out, then the argument is one of analogy merely. According to the number of qualities in one body which agree with those in another, may it be reasoned with confidence that the as yet unexamined qualities of the two bodies will also be found to correspond. Metaphor and allegory address the imagination, while analogy appeals to the reason. The former are founded on similarity of appearances, of effects, or of incidental circumstances; the latter is built up on more essential resemblances, which afford a proper basis for reasoning.

In biology, an analogy is the relation between parts which agree in function, as the wing of a bird and that of a butterfly, the tail of a whale and that of a fish. Relations of analogy were made very prominent in the system of the now extinct Quinary school of zoologists. They are to be carefully distinguished from those of affinity.

**Analysis**, in ordinary language, the act of analyzing; the state of being analyzed; the result of such investigation. The separation of anything physical, mental, or a mere conception into its constituent elements. It is a scientific word which has partially established itself in ordinary speech. It is also applied to a syllabus, conspectus, or exhibition of the heads of a discourse; a synopsis, a brief abstract of a subject to enable a reader more readily to comprehend it when it is treated at length.

In mathematics, the term analysis, signifying an unloosing, as contradistinguished from synthesis—a putting together, was first employed by the old Greek geometers to characterize one of the two processes of investigation which they pursued. The analytical method of inquiry has been defined as the art or method of finding out the truth of a proposition by first supposing the thing done, and then reasoning back step by step till one arrives at some admitted truth. It is called also the method of invention or resolution. Analysis in mathematics may be exercised on finite or infinite magnitudes or numbers. The analysis of finite quantities is the same as specious arithmetic or algebra. That of infinites, called also the new analysis, is particularly used in fluxions or the differential calculus. But analysis could be employed also in geometry, though Euclid preferred to make his immortal work synthetic; it is, therefore, a departure from correct language to use the word analysis, as many do, as the antithesis of geometry; it is opposed, as already mentioned, to synthesis, and to that alone.

In chemistry, the examination of bodies with the view of ascertaining of what sub-



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stances they are composed, and in what proportion these substances are contained in them. The former is called qualitative and the latter quantitative analysis. Chemical analysis is classified into blowpipe, qualitative, gravimetical, and volumetric analysis; and the proximate and the ultimate analysis of organic bodies.

1. Blow-pipe analysis. See BLOW-PIPE.

2. Qualitative analysis is employed to find out the composition and properties of any unknown substance, and to separate different substances from each other. It is performed in the following manner: The substance is dissolved in distilled water; if not soluble in water, then in hydrochloric acid or in aquaregia; if insoluble in these, it is fused with sodium carbonate. The commoner bases and acids contained in the solution are tested for as follows:

Add hydrochloric acid. A white precipitate is either  $\text{AgCl}$  (argentic chloride),  $\text{Hg}_2\text{Cl}_2$  (mercurous chloride), or  $\text{PbCl}_2$  (plumbic chloride).

Filter; pass  $\text{H}_2\text{S}$  (sulphuretted hydrogen gas) through the filtrate. A black precipitate is either  $\text{PbS}$  (plumbic sulphide),  $\text{CuS}$  (cupric sulphide),  $\text{HgS}$  (mercuric sulphide), or  $\text{Bi}_2\text{S}_3$  (sulphide of bismuth). A yellow precipitate is either  $\text{CdS}$  (cadmium sulphide),  $\text{As}_2\text{S}_3$  or  $\text{As}_2\text{S}_5$  (sulphides of arsenic), or  $\text{SnS}_2$  (stannic sulphide). A brown precipitate is  $\text{SnS}$  (stannous sulphide). An orange precipitate is  $\text{Sb}_2\text{S}_3$  (antimonic sulphide).

Filter; boil the filtrate to expel  $\text{H}_2\text{S}$ , add a few drops of nitric acid, and boil to oxidize the iron; then add chloride of ammonium and ammonia. A red precipitate is  $\text{Fe}_2\text{O}_3$  (ferric oxide). A bluish-green precipitate is  $\text{Cr}_2\text{O}_3$  (chromic oxide). A white precipitate is  $\text{Al}_2\text{O}_3$  (aluminic oxide), or phosphates, borates, and oxalates.

Filter; to the filtrate add sulphide of ammonium. A black precipitate is either  $\text{CoS}$  (sulphide of cobalt), or  $\text{NiS}$  (sulphide of nickel). A pink precipitate turning brown is  $\text{MnS}$  (sulphide of manganese). A white precipitate is  $\text{ZnS}$  (sulphide of zinc).

Filter; to the filtrate add ammonium carbonate. A white precipitate is either  $\text{BaCO}_3$ ,  $\text{SrCO}_3$ , or  $\text{CaCO}_3$  (carbonates of barium, strontium, or calcium).

Filter; divide the filtrate into two parts. To one part add  $\text{Na}_2\text{H}_2\text{PO}_4$  (sodium phosphate). A white precipitate is  $\text{Mg}(\text{NH}_4)\text{PO}_4 \cdot 6\text{H}_2\text{O}$ , indicating the presence of magnesia. The other part is evaporated to dryness, heated strongly to drive off the ammoniacal salts, and if there is a residue it is tested for potash and soda.

Ammoniacal salts are tested for in the original solution by adding caustic potash, which liberates ammonia,  $\text{NH}_3$ , which is recognized by its smell, and by its turning

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red litmus paper blue. The sulphides of arsenic, antimony and tin are soluble in sulphide of ammonium, and are reprecipitated by  $\text{HCl}$ .

Acids may be tested for as follows: Carbonic, hydrosulphuric, hydrocyanic acids are liberated by stronger acids with effervescence. Carbonic, arsenious, arsenic, chromic, boracic, phosphoric, oxalic, hydrofluoric, and silicic acids give from a neutral solution a white precipitate, with  $\text{BaCl}_2$  (barium chloride), which dissolves in hydrochloric acid; but sulphuric acid gives a white precipitate insoluble in acids. Tartaric and citric acids are recognized by the precipitate charring when heated, and emitting fumes of peculiar odor.

Chloride of calcium, with phosphoric and boracic acids, gives a white precipitate, which is soluble in acetic acid; also with oxalic and hydrofluoric acids, a white precipitate, insoluble in acetic acid.

Nitrate of silver ( $\text{AgNO}_3$ ) gives a black precipitate with hydrosulphuric acid; a yellow precipitate with arsenious, phosphoric, and silicic acid; a red precipitate with chromic and arsenic acid, and a white precipitate with boracic and oxalic acids. All these precipitates are soluble in nitric acid.

Nitrate of silver ( $\text{AgNO}_3$ ) gives a precipitate insoluble in nitric acid with hydrochloric, hydrocyanic, hydrobromic, and hydriodic acids.

Ferric chloride ( $\text{Fe}_2\text{Cl}_6$ ) gives a red color with acetic acid and sulphocyanic acid; a black precipitate with gallic and tannic acids; a blue precipitate with ferrocyanides.

Nitric acid ( $\text{HNO}_3$ ) and chloric acid ( $\text{HClO}_3$ ) are not precipitated by any reagent. Their salts deflagrate on ignited charcoal.

3. Gravimetical analysis, or quantitative analysis by weight, is the method of separating out of a weighed quantity of a compound its constituents, either in a pure state or in the form of some new substance of known composition, and accurately weighing the products; from the results of these operations the percentage of the constituents contained in the substance can be determined.

4. Volumetrical analysis, or quantitative analysis by measure, determines the amount of the constituents contained in a given solution by: (a) Neutralization of a measured quantity of the liquid by a certain volume of a standard solution of acid or alkali. (b) By the quantity of a standard solution of an oxidizing or reducing agent required to oxidize or reduce a measured quantity of the liquid to be tested. (c) By observing when no further precipitation takes place on adding the standard solution of the reagent to a known volume of the liquid to be tested.



5. By proximate analysis we determine the amount of sugar, fat, resin, alkaloid, etc., contained in an organic compound, each of these being removed and separated by different solvents, etc.

6. By ultimate analysis of an organic substance we determine the percentage of carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus contained in it. Thus the amount of carbon and hydrogen is determined by burning a weighed quantity of the substance in a combustion tube along with oxide of copper, and collecting the water produced in a weighed U tube filled with chloride of calcium, and the carbonic acid gas in weighed bulbs filled with caustic potash.

In other sciences, etc., the separation of anything which becomes the object of scientific inquiry into its constituent elements; also the result thus obtained.

"Analysis consists in making experiments and observations, and in drawing general conclusions from them by induction, and admitting of no objections but such as are taken from experiments, or other certain truths." (Newton's "Optics.")

"By anatomico-physiological analysis we separate the solids and fluids of the body into their various kinds, and classify and arrange them according to their characters and properties." (Todd and Bowman's "Anatomical Physiology," vol. i, introduction, p. 34.)

"By prismatic analysis Sir William Herschel separated the luminous from the non-luminous rays of the sun, and he also sought to render the obscure rays visible by concentration." (Tyndall's "Fragments of Science," 3d ed., viii, 5, p. 185.)

**Anam**, or **Annam**, a name given by the Chinese in the 3d century A. D. to a country of Asia occupying the E. side of the Southeastern or Indo-Chinese peninsula, along the China Sea, having a length of about 850 miles, with a breadth varying from over 400 miles in the N. to 100 in the middle. It is composed of three parts: Tonquin (or Tongking) in the N.; Cochin-China in the S.; and the territory of the Laos tribes, S. W. of Tonquin (together, area, 170,000 square miles, pop, 15,000,000, 9,000,000 being in Tonquin).

**Topography.**—The coast is considerably indented, especially at the mouths of the rivers, where it affords many commodious harbors. Tonquin is mountainous on the N. but in the E. is nearly level, terminating toward the sea in an alluvial plain yielding good crops of rice, cotton, fruits, ginger, and spices, and a great variety of varnish trees, palms, etc. The principal river is the Song-ka, which has numerous tributaries, many of them being joined together by canals, both for irrigation and commerce. Tonquin is rich in

gold, silver, copper, and iron. Cochin-China is, generally speaking, unproductive, but contains many fertile spots, in which grain, leguminous plants, sugar-cane, cinnamon, etc., are produced in great abundance. Agriculture is the chief occupation, but many of the inhabitants are engaged in the spinning and weaving of cotton and silk into coarse fabrics, the preparation of varnish, iron smelting, and the construction of ships or junks.

**People.**—The inhabitants are said to be the ugliest of the Mongoloid races of the peninsula, being under the middle size and less robust than the surrounding peoples. Their language is monosyllabic, and is connected with the Chinese. The religion of the majority is Buddhism, but the educated classes hold the doctrines of Confucius; beside which there are 420,000 Roman Catholics. The principal towns are Hanoi, the capital of Tonquin, and Hué, the capital of Cochin-China and formerly of the whole empire.

**History.**—Anam was conquered by the Chinese in 214 B. C., but in 1428 A. D. it completely won its independence. The French began to interfere actively in its affairs in 1847 on the plea of protecting the native Christians. By the treaties of 1862 and 1867 they obtained the southern and most productive part of Cochin-China, subsequently known as French Cochin-China; and in 1874 they obtained large powers over Tonquin, notwithstanding the protests of the Chinese. Finally, in 1883, Tonquin was ceded to France, and next year Anam was declared a French protectorate. After a short period of hostilities with China the latter recognized the French claims, and Tonquin is now directly administered by France, while Anam is entirely under French direction.

**Anamorphosis**, a term denoting a drawing executed in such a manner as to present a distorted image of the object represented, but which, when viewed from a certain point, or reflected by a curved mirror or through a polyhedron, shows the object in its true proportions.

**Anapa**, an important seaport and fortified town in Russian Circassia, on the Black Sea, a station of the Russian navy.

**Anarajapura**, or **Anuradhapoor**, a ruined city, the ancient capital of Ceylon, built about 540 B. C., and said to have covered an area of 200 square miles. The spacious main streets seemed to have been lined by elegant structures. There are still several dagobas in tolerable preservation, but the great object of interest is the remains of the sacred Bo-tree planted over 2,000 years ago, and probably the oldest historical tree in the world. It was shattered by a storm in 1887.



**Anarchism**, a tendency founded upon anarchy in human society. By anarchy is not to be understood the word in its exaggerated sense of chaos and disorder, but literally a state of society in which authority does not exist; that is, a society with the greatest imaginable independence of the individual, without law and without any relations whatever of superior and inferior. There were tendencies to anarchy in the thought of antiquity and of the Middle Ages as well as in modern times. Ever since there has been a philosophy of law there have been thinkers who have denied any necessity whatever for law, finding the most rational ordering of society in giving the utmost freedom to the will of the individual. A thoroughly anarchistic teaching is to be found in the work of William Godwin, called "An Enquiry Concerning Political Justice and Its Influence on General Virtue and Happiness," published in London in 1793. But anarchistic tendencies first became notably influential as a phase of thought toward the middle of the 19th century, when they were developed under an increasing sense of the misery of the oppressed masses of humanity. The founder of modern anarchism was Peter Joseph Proudhon (1809-1865). Impressed by the unequal distribution of property and the recurrence of disastrous financial crises he was led to write his essay, "What Is Property?" (1840). For these evils he made existing conditions of law responsible. He held that under the compulsion of the laws of property there existed between employers and workingmen a condition of exchange in commodities most unfavorable to the latter, in consequence of which the capitalist, without working himself, appropriated to himself, most unjustly, a portion of the earnings of the worker. Hence Proudhon's famous conclusion: "Property is robbery." As a remedy for these unjust conditions, Proudhon held that there should be a free activity of industrial forces under which there would be a just exchange of commodities corresponding to the actual relations of value. In order to achieve such conditions Proudhon rejected law and authority of every kind and demanded a social condition in which there should be absolutely no authority. As a characterization of this condition he was the first to employ the word "anarchy." In his essay, "A General Idea of the Revolution" (1851), he set forth his theory. According to this there should be an unfettered activity of industrial forces, under which there would be a true adjustment of production and distribution. Every division of industrial functions and of work would take place among individuals and groups of individuals exclusively according to the indwelling sense

of justice and mutual right conduct among men. In order to make the producer independent of the capitalist, Proudhon advocated the establishment of a bank of exchange, or bank of the people. By this means the individual worker would receive from the collectivity an advance, without interest, of the capital necessary to the production of his commodities. For the producer or the group of producers prices would be established on the basis of cost, as measured by the advance from the bank and the time required for the labor of production.

Proudhon looked for the peaceful realization of his ideals under the influence of argument and philosophical development. This theory found much approval in Germany at first. The doctrine was elaborated by Max Stirner in a book called "The Individual and His Property," published in 1845. Stirner acknowledges nothing but the will of the individual. He rejects every combination among men toward a higher unity, every compulsion of civilized principles—all of these signifying for him nothing but the enthrallment of the individual will. In place of Proudhon's sense of justice Stirner puts a naked egoism; in place of Proudhon's industrial groups Stirner has a "Society of Egoists." For the accomplishment of this egoistic anarchy, Stirner advocated the path of revolution. The triumph of the reaction in 1848 crowded anarchistic teachings into the background. In 1852 Proudhon himself, in his essay on "The Federative Principle," declared anarchy to be impracticable, and held the correct form of government to be a federation of autonomist communities. The labor agitations that began in the '60's were accompanied by a development of the anarchistic party, chiefly under the influence of Russian agitators. The founder of this party was Michael Bakunin (1814-1876). Since 1864 Bakunin was active in Switzerland as an anarchistic agitator. He followed Proudhon in advocating the free development of the powers of the individual in groups and societies of workers, resting upon a sense of solidarity. Unlike Proudhon, however, he advocated revolution as the means to the end, but he drew the line at murder. Bakunin sent his disciple, Sergei Netshaye, to Russia and there, in 1869, the latter developed the so-called "propaganda of action;" that is, an agitation by means of deeds of violence, murder and disorder, not for the purpose of overcoming the existing order of society, but simply to arouse sentiment by the effect of horrible deeds. This frightful error, which had nothing to do with the theoretical system of anarchism, was incorporated in the programme of the anarchistic party.

One of the most eminent representatives



of anarchistic doctrines is the Russian Prince Krapotkin (born in 1842). Krapotkin advocates a system of communistic anarchy based upon the idea of free production and consumption, with a free development of industrial powers in groups and societies. According to his theory, everybody should share as he pleased in production and also in the enjoyment of the fruits of collective effort. False relations would not exist, since everyone, following a higher morality, would give his best efforts to a participation in collective production. This is the programme of the greater number of the anarchists of to-day, especially of those who are called the Latin anarchists, being those believers in the doctrine who live in Western Switzerland, the S. of France, in Italy and in Spain. With the growing development of the Social Democratic organization, anarchy fell more and more into disfavor. These two tendencies, anarchy and socialism, have a common source in a sense of the misery of the oppressed masses, but their ends are directly opposed, the aim of anarchy being to achieve the extreme of individualism, while that of socialism aims to realize the extreme of collectivism. Therefore, very naturally, a bitter hostility arose between the representatives of the two tendencies. At the Congress of International Societies of Workingmen, held at The Hague, in 1872, at the instance of Carl Marx, the International Alliance of the Social Democracy, which followed the doctrines of Bakunin, was excluded, and ever since the hostility between the tendencies has been increasing. The German law against socialism, passed in 1878, caused, for the time, a tendency toward anarchism in consequence of the formation of revolutionary groups under the leadership of Most (1846), a former member of the German Reichstag. In consequence of this Most was expelled from the Social Democratic Party and went to London, but, in 1882, he came to New York and advocated the "propaganda of action." Most sought to improve upon the teaching of Proudhon by advocating the regulation of production and price through common action among groups of workers. In this doctrine, however, Most has given to the collectivity such influence as to leave anarchy hardly to be understood thereunder, and about the only thing which he has in common with the anarchists is the "propaganda of action." On the other hand, the peaceful tendency of Proudhon is represented by those who call themselves philosophical anarchists, as opposed to the revolutionary anarchists. Among these are numbered Benjamin R. Tucker, of New York, editor of "Liberty," and the German-Scotchman, John Henry Mackay, the biographer of Stirner.

In Germany, unlike the Latin countries,

the anarchistic agitation has never had much significance. The "propaganda of action," however, has resulted in various deeds of violence—for instance, the attempted assassination of Emperor Wilhelm I., by Hoedel (1878), and the attempt of Reinsdorf against the German princes at the dedication of the Niederwald monument, in 1883. The latter caused the enactment of the law against the criminal use of explosives on June 9, 1884. In consequence of the assassination of the French President Carnot by an Italian anarchist, in December, 1894, there was an attempt made to increase the severity of the German laws, but the proposition was rejected by the Reichstag. More recently, the assassination of the Empress Elizabeth of Austria, by an Italian anarchist, in 1898, and also that of the Spanish statesman Cánovas by an Italian anarchist led the Italian Government to feel that it was its duty to call for some international action for the suppression of anarchists and an anti-anarchist conference was held at Rome in the later part of 1898. It had, however, no further result than a proposition to institute a sort of international intelligence service for the watching of anarchists. King Humbert of Italy was, notwithstanding this vigilance, assassinated by an anarchist, in 1900 (July 29).

The cause of anarchy appears to have made recently no marked advance in any part of the world, although the "propaganda of action" continues to be manifest in repeated deeds of violence in various countries. In France, where the anarchistic party has the greatest number of adherents, there are two newspapers devoted to the cause, the "Revolt" and "Père Peinard." In 1892 France passed the law imposing the death penalty upon those who should cause damage to property by the use of explosives. After the attempt of Vailant in the Chamber of Deputies and the murder of President Carnot, special laws against anarchists were passed in 1893 and 1894, whereby the glorification of anarchistic crime and the incitement thereto were made criminal offenses and the punishment of anarchists was provided for. In 1894, Switzerland passed a law against the criminal use of explosives and the incitement of such crimes. Similar laws were also passed in 1894-1896 in Spain and Italy. According to a recent investigation of the Paris "Figaro" there are about 2,000 anarchists in France known to the police, 500 of them being Frenchmen and 1,500 foreigners. Of the foreign contingent 45 per cent. are Italian.

It was asserted that anarchistic ideas among the Armenian revolutionists were responsible for the beginning of the outrages of 1896; that the use of dynamite



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bombs in Constantinople was designed to cause the great powers to interfere in Turkish affairs, but they only aroused the rage of the Mohammendans and fearful massacres ensued.

SYLVESTER BAXTER.

**Anarchists**, members of the revolutionary sect or body devoted to the doctrines of anarchism. Their principal journals have been "La Révolte" (Paris), the "Freiheit" (New York), "Liberty" (New York), and the "Anarchist" (London). The congress of anarchists at London, in 1881, decided that all means were justifiable as against the organized forces of modern society.

In Europe, the anarchistic crimes committed in the name of liberty have been numerous, especially in the last few years. Vaillant, who threw a bomb with murderous effect upon the floor of the French Chamber of Deputies, Dec. 9, 1893, was executed February, 1894. Emile Henry, convicted of causing the bomb explosions in Paris, Feb. 12, 1894, was guillotined May 1. Guiseppe Fornaro and Francesco Polti, convicted May 4, 1894, of bomb throwing in London, were sentenced to imprisonment for 20 and 10 years respectively. Six men, convicted of bomb throwing and attempted assassination, were executed May 21, 1894, at Barcelona, Spain. President Carnot of France was assassinated June 24, 1894, at Lyons, by an Italian anarchist named Sante Ironimo Caserio. On Aug. 13, 1894, four Bohemians were sentenced at Jung-Bunzlau, Bohemia, to imprisonment for different terms for circulating an anarchist paper. March 4, 1895, a man named Olivieri was arrested in Rome for threatening King Humbert. On Aug. 8, 1897, Cánovas del Castillo, prime minister of Spain, and virtually ruler of the country, was shot and killed at Santa Agüeda. A dastardly crime was committed in the assassination of Empress Elizabeth of Austria, at Geneva, Sept. 29, 1898, by Luchini, an Italian anarchist. He was sentenced to imprisonment for life. On April 4, 1900, the Prince of Wales was twice fired upon, while passing through Brussels, by a young man of anarchist proclivities. The bullets did not take effect. On July 29, 1900, King Humbert was shot and killed by an anarchist named Bresei, who was sentenced to imprisonment for life.

In the United States, the followers of anarchist doctrines committed no overt act till the Haymarket riot, which took place in Chicago, May 4, 1886, in which seven policemen were killed and 60 wounded while attempting to disperse a meeting of anarchists. The injuries of the policemen were caused chiefly by a dynamite bomb thrown by someone in the crowd, supposed to have been a man named Schnaubelt, who was never arrested. The anarchists, August Spies, Adolph Fischer, George Engle and

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Albert R. Parsons, were hanged Nov. 11, 1887, for complicity in the riot, while Louis Lingg escaped the gallows by committing suicide in prison. Samuel Fielden and Michael Schwab were committed to prison for life and Oscar W. Neebe for a term of 15 years. These three were pardoned by Governor Altgeld, in 1893. The execution of the anarchists was opposed by some of the foremost people in Chicago, on the ground that the case against them was not proven.

On the afternoon of Friday, Sept. 6, 1901, the world was horrified by a telegraphic announcement from Buffalo, N. Y., that President McKinley had been shot twice by an avowed anarchist, named Leon Czolgosz, while holding a public reception in the Temple of Music of the Pan-American Exposition. The President died Sept. 14, and his assassin was executed at the State prison in Auburn, N. Y., Oct. 29 following.

This assassination at once suggested a variety of anti-anarchist legislation, which later resolved itself into (1) a bill for the protection of the President and (2) several bills providing for the suppression of anarchism in the United States and for the exclusion of foreign anarchists. On Dec. 4, 1901, Senator Hoar introduced a bill in the United States Senate, which provided as follows:

"That any person who shall, within the limits of the United States, or any place subject to the jurisdiction thereof, wilfully kill or cause the death of the President of the United States, or any officer thereof, or who shall wilfully kill or cause the death of the ruler or chief magistrate of any foreign country, shall be punished with death.

"That any person who shall, within the limits of the United States, or any place subject to the jurisdiction thereof, make an attempt on the life of the President of the United States, or any officer thereof; or who shall make an attempt on the life of the ruler or chief magistrate of any foreign country, shall be punished with death.

"That any person who shall, within the limits of the United States, or any place subject to the jurisdiction thereof, advise the killing of the President of the United States, or any officer thereof, or shall conspire to accomplish the same; or who shall advise or counsel the killing of the ruler or chief magistrate of any foreign country, or shall conspire to accomplish the same, shall be punished by imprisonment not exceeding 20 years.

"That any person who has conspired as aforesaid may be indicted and convicted subsequently, although the other party or parties to the conspiracy are not indicted or convicted.

"That any person who shall wilfully and knowingly aid in the escape from punishment of any person guilty of either of the acts mentioned in the foregoing sections shall be deemed an accomplice after the fact, and shall be punishable as if a principal, although the other party or parties to the said offense shall not be indicted or convicted."

The same day Senator McComas presented to the Senate a resolution declaring that Congress had power and should by law provide:

"That a person or persons who wilfully kill or assault with intent to kill the President or Vice-President, or both, or any officer upon whom the powers and duties of President may devolve under



the constitution and laws, shall be punished with death, the Federal courts to have jurisdiction of such offenses; also for the exclusion and deportation of alien anarchists. Also that Congress shall support the Executive Department in procuring an amendment to all extradition treaties similar to the provision in the convention with Belgium for the extradition of criminal anarchists."

Senator Burrows, also on the same day, introduced a bill "to provide for the exclusion and deportation of alien anarchists." The first section was as follows:

"That no alien anarchists shall hereafter be permitted to land at any port of the United States or be admitted into the United States; but his prohibition shall not be so construed as to apply to political refugees or political offenders other than such anarchists."

The second section directed the special board of inquiry authorized by the immigration laws to make diligent investigation concerning the antecedents of any alien seeking admission into the United States who is suspected of being an anarchist, and authorized the board to go even to the extent of examining the person of suspected aliens for marks indicative of membership in anarchistic societies. Section 3 provided for the return of persons to their native countries who had secured admission to the United States contrary to law and who had afterward been found to be anarchists. The fourth section provided that when any alien was convicted of crime in any United States court, and it should appear from the evidence that he was an anarchist, the presiding judge should direct a further hearing, and if satisfied that the convicted alien is an anarchist, or that his remaining in this country would be a menace to the government or society in general, he may direct that, in addition to other punishments adjudged, the convicted alien, after undergoing such punishments, shall be deported at the expense of the United States to the country from which he came, and if he returns to the United States shall be punished by imprisonment at hard labor for a period not exceeding five years and afterward again deported. Provision was also made for the appointment of 12 immigration agents, at a salary of \$2,500 each, to make investigations in foreign countries concerning intended immigrants. The sixth and last section of the bill provided that "the fact that an alien has declared his intention to become a citizen of the United States shall constitute no bar to proceedings against him under this act."

To these several bills Senator Vest added a resolution directing the Judiciary Committee to inquire if Congress has power to legislate for the punishment of anarchists who assassinate or attempt to assassinate the President of the United States, and if not, whether it is expedient to amend the Federal Constitution to enable Congress so to legislate. Also whether it is necessary

and expedient so to amend the Federal Constitution as to empower Congress to prevent by such means as may be deemed necessary the teaching by anarchists of the doctrine that all governments should be destroyed; also whether it is necessary and expedient so to amend the Federal Constitution that Congress shall have power to punish all persons belonging to anarchistic associations; also what amendments, if any, are necessary to the naturalization laws to prevent the coming into this country of anarchists and their becoming citizens of the United States; also whether it is necessary or expedient so to amend the Federal Constitution as to give Congress the power to establish a penal colony on some suitable island under the jurisdiction of the United States, to which, after trial and conviction, every anarchist holding the doctrine that all governments should be destroyed by the assassination of their chief rulers shall be deported; and that the committee, after due examination and inquiry, shall recommend to the Senate such amendments to the Federal Constitution as may be necessary to prevent the teaching and promulgation of anarchical doctrines in the United States.

The bill for the protection of the President was passed in the Senate on March 21, 1902, somewhat changed from its original form, but without a number of amendments that were offered on the day of its passage. As passed, the bill provides that any person within the United States, who shall wilfully and maliciously kill the President or any officer on whom the duties of the President may devolve, or any sovereign of a foreign country, or shall attempt to kill any of the persons named, shall suffer death; that any person who shall aid, abet, advise, or counsel the killing of any of the persons named, or shall conspire to accomplish their death shall be imprisoned not exceeding 20 years; that any person who shall threaten to kill or advise or counsel another to kill the President, or any official on whom the duties of President may devolve, shall be imprisoned not exceeding 10 years; that any person who shall wilfully aid in the escape of any person guilty of any of the offenses mentioned shall be deemed an accomplice and shall be punished as a principal. The Secretary of War is directed to detail from the regular army a guard of officers and men to protect the President, "without any unnecessary display," and the Secretary is authorized to make such regulations as to the dress, arms, and equipment of such guard.

**Anastasia, St.** (1) A Christian martyr, slain during the reign of Nero (54-68 A. D.). She is said to have been a pupil of St. Peter and St. Paul. Her martyrdom is commemorated on April 15. (2) A Chris-



tian martyr, who perished in the persecution, by Diocletian, presumably in 303.

**Anastasius** (an-a-stā'shus), the name of four Popes, the first and most eminent of whom held that office for only three years (398-401). He enforced celibacy on the higher clergy, and was a strong opponent of the Manichæans and Origen.

**Anastasius I.**, Emperor of the East, succeeded Zeno, A. D. 491, at the age of 60. He was a member of the imperial life-guard, and owed his elevation to Ariadne, widow of Zeno, whom he married. He distinguished himself by suppressing the combats between men and wild beasts in the arena, abolishing the sale of offices and building the fortifications of Constantinople. His support of the heretical Eutychians led to a dangerous rebellion and his anathematization by the Pope. He died A. D. 518.

**Anastatic Printing** (derived from a Greek adjective signifying resuscitation), a process by which the perfect facsimile of a page of type or an engraving, old or new, can be reproduced and printed in the manner of a lithograph or page of letterpress. The print or page to be transferred is dipped in diluted nitric acid, and while retaining a portion of the moisture, is laid face downward on a polished zinc plate and passed through a roller-press. The zinc is immediately corroded by the acid contained in the paper, excepting on those parts occupied by the ink of the type or engraving. The ink while rejecting the acid is loosened by it, and deposits a thin film on the zinc, thus protecting it from the action of the acid. The result is, that those parts are left slightly raised in relief, and the plate being then washed with a weak solution of gum, and otherwise treated like a lithograph, the raised parts being greasy, readily receive ink from the roller, and give off a facsimile impression of the original.

**Anathema**, a word originally signifying some offering or gift to the gods, generally suspended in the temple. It also signifies a thing devoted; a thing devoted to destruction (the equivalent of the Hebrew *Cherem*); and was ultimately used in its strongest sense, implying perdition, as in Rom. ix., 3; Gal. i., 8, 9. In the Catholic Church, from the 9th century, a distinction has been made between excommunication and anathematizing; the latter being the extreme form of denunciation against obstinate offenders. The first general council (Nice, 325 A. D.) anathematized those who held the Aryan heresy. It thus declared that they were excluded from the communion of the Church, and that if they persisted in their offense they must perish eternally. *Anathema Maranatha* (I Cor. xvi., 22) is not, as commonly understood, a more fearful kind of curse;

the Syriac words, *Maran athá* ("Our Lord cometh"), should, according to the best authorities, be read as a separate sentence, as in the Revised Version.

**Anatomy** (Greek, "a cutting up"), strictly the art of dissection. It implies generally the science which treats of the structure of living beings, it being reserved for the related science of physiology to study the functions of living beings. The term "living beings" includes both plants and animals. So there is vegetable anatomy or phytotomy, having to do with the structure of plants; and the anatomy of animals or zoötoomy, a special branch of which is human anatomy or anthropotomy. Comparative anatomy discusses the resemblances and differences between the structure of the bodies of various animals and man, a comparison which is a great aid to exact knowledge; while special anatomy is concerned only with the structure of single types. By minute anatomy, general anatomy, or histology, is meant the study of the elements of which a tissue or organ is built up, a study conducted by means of highly magnifying microscopes, and aided by the use of chemical reagents and dyeing materials which, by attacking the various elements of a tissue in different ways, render them more easily distinguished from one another. The tracing of the development of form and structure from the earliest stage of an organism to its most complete form belongs to developmental or embryotical anatomy. Morbid or pathological anatomy treats of the changes of structure due to or accompanying disease or congenital malformations; and teleological or physiological anatomy treats of structure and structural change with reference to the functions of the parts. We also speak of regional anatomy, or the anatomy dealing with the surgical regions of the body.

The chief method of obtaining anatomical knowledge is by dissection. The dissection of the human body was but little practised by the ancients. The old Egyptians held it in great abhorrence, and even pursued with stones those men who, in embalming the dead, were obliged to cut open their bodies. The Greeks were prevented by the principles of their religion from studying anatomy, since these required them to bury the bodies of the deceased as soon as possible. Even in the time of Hippocrates anatomical knowledge was imperfect, and was probably derived from the dissection of animals; the skeleton, however, was better known. Neither Hippocrates nor his disciples and followers, such as Polybus, Syennesis of Cyprus, and Diogenes of Apollonia, had any really definite and correct knowledge of the circulatory and nervous systems; and, moreover, the later Hippocratic writings contain much that is purely fanciful and



speculative in addition to the statement of known facts. With Aristotle comparative anatomy took a great step in advance. That philosopher reached much more accurate conceptions as to the blood-vessels and the heart than his predecessors, and on many other points, too, his knowledge was substantially correct, but in regard to the nervous system his ideas were very confused.

When, in later times, under the Ptolemies, Alexandria in Egypt became the seat of the arts and sciences, anatomy was also brought to a high degree of perfection by Herophilus of Chalcedon, 300 B. C., and by Erasistratus of Chios. The work of these men is, however, known to us only through the references and quotations of later writers. According to the testimony of Celsus, the former obtained permission to open living criminals. He enriched anatomy with many important discoveries respecting the brain, the functions of the nerves, the blood-vessels of the mesentery which go to the liver, etc. Erasistratus determined many facts in the construction of the brain with greater distinctness, and, among other improvements, gave to the valves in the vena cava the names which are yet used. In the work on medicine by Celsus (53 B. C.—7 A. D.) which has come down to us there are many anatomical references; and from these we may gather that that celebrated physician, in addition to a very accurate and extensive knowledge of osteology, had a good acquaintance with the windpipe, œsophagus, lungs, heart, stomach, liver, kidneys, uterus, and other parts. In later times the study of anatomy was again neglected, particularly by the empirics.

Galen (A. D. 130–193), educated in Alexandria, collected all the anatomical knowledge of his contemporaries and of earlier physicians, but seems not to have much enriched human anatomy himself, as he was principally occupied with the dissection of animals, and only applied his observations on them to the structure of the human body. His osteology is the most accurate and complete part of his system, and to him we owe the first really complete account of the vertebræ, and their division into cervical, dorsal, and lumbar. In his knowledge of the muscles he was much ahead of those already mentioned, but, of course, not satisfactory from a modern standpoint. In respect of angiology, he proved that the view that the arteries contained air and not blood was erroneous, but beyond that he did not go very far. He accepted the distinction made by earlier anatomists between the nerves of sensation and those of motion; the former he regarded as originating in the brain, the latter as proceeding from the spinal cord. Of the brain and the leading viscera his knowledge was very accurate. The only post-

Galenian, ancient anatomists worthy of note are Soranus of Ephesus, who lived under Trajan and Hadrian, and Oribasius, born in Pergamus, Galen's birthplace, who was the friend of Julian the Apostate. Of these the former is remembered for his dissection of the female genital organs, while the latter has left a good description of the salivary glands.

Among the Arabians anatomy was not practised: it was forbidden by their religion. Their physicians, therefore, took their anatomical information merely from the writings of the Greeks, particularly from those of Galen. Thus anatomy was checked in its progress for several centuries. Finally, in the 14th century, individuals arose who, not satisfied with the anatomical instruction of the age, ventured to make investigations of their own. The superstitious fear of the dissection of human corpses which had hitherto prevailed appeared to subside by degrees, when a philosophical spirit gave birth to more liberty of thought. Mondino di Luzzi, professor at Bologna, first publicly dissected two corpses in 1315, and soon afterward published a description of the human body, which for a long time was the common compendium of anatomy, though many errors were contained in it. To him has been traced the first conception of the circulation of the blood. From this time it became customary in all universities to make public dissections once or twice a year. Anatomy, however, made but slow progress, since the dissections were intended only as illustrations of the writings of Galen and the compendium of Mondino. Montagnana alone, professor at Padua in the 15th century, could boast of having performed 14 dissections, which was then a great number.

In the 16th century there were many celebrated anatomists, by whose influence the study of anatomy became more general. Dubois (1478–1555), Fallopio (about 1550), Eustachi (about 1500), Etienne (1503–1564), Vesalius (1514–1564), Varoli (1545), and many others, enriched anatomy with new discoveries. In the 17th century there were likewise many famous anatomists, and many discoveries were made; thus Harvey discovered the circulation of the blood, Wirsung the pancreatic duct, Schneider the mucous membrane, Asellius the mode of absorption of the nutritious part of foods into the circulation, Bartoline the lymphatic system; and other notable names are those of Glisson, Wharton, Willis, Malpighi, Steno. Ruysch, Brunner, Tassin, Duverney, Collins, Nieussens, Santorini, and Morgagni. In the 18th century Pacchioni, Valsalva, Keil, Lancisi, Haller, Boerhaave, Vieq-d'Azir, the two Hunters, and others, distinguished themselves by their skill in anatomy. The



younger Meckel, Sömmering, Loder, Reil, Bichat, Portal, Rosenmüller, Quain, Cooper, Bell, Carus, Häckel, Gegenbaur, Owen, and Huxley, are worthy to be mentioned as renowned anatomists of later times.

According to the parts of the body described the different divisions of anatomy receive different names; as, osteology, the description of the bones; myology, of the muscles; desmology, of the ligaments and sinews, etc.; splanchnology, of the viscera or bowels, in which are reckoned the lungs, stomach, and intestines, the liver, spleen, kidneys, bladder, pancreas, etc. Angiology describes the vessels through which the liquids in the human body are conducted, including the blood-vessels, which are divided into arteries and veins, and the lymphatic vessels, some of which absorb matters from the bowels, while others are distributed through the whole body, picking up juices from the tissues and carrying them back into the blood. Neurology describes the system of the nerves and of the brain; dermatology or dermatology of the skin.

Among anatomical labors are particularly to be mentioned the making and preserving of anatomical preparations. Thus the whole system of bones, cleared from all the adherent muscles, tendons, and other parts, is prepared by drying and washing with acids, the latter process giving firmness and whiteness to the bones. The intestines and other soft parts of the body are prepared by putting them into various liquids, such as alcohol, spirits of turpentine, etc. For the preservation of vessels, and in order to show clearly their course and distribution, injections are used. The most usual liquid for this purpose is a mixture of linseed oil and turpentine with certain metallic compounds, to which is added a suitable coloring substance, such as red for arteries, green or blue for veins, and white for lymphatic vessels.

Until 1832 the law in Great Britain made very insufficient provision for enabling anatomists to obtain a sufficient supply of subjects for dissection. The only act under which such supply could be got down to that date was 9 Geo. IV. cap xxxi. sec. 4, which empowered a criminal court, when it saw fit, to direct that the body of a person executed for murder should be dissected after execution. The consequence of this deficiency was that the price of bodies for anatomical purposes was so great as to lead people to resort to illegal and nefarious practices in order to get dead bodies to sell to the doctors. Resurrectionists, as they were called, used to dig up newly-buried corpses with this object, and in more than one case it was discovered that murder was systematically practised for the same purpose. To remedy these evils the

law that still regulates the supply of bodies for dissection, 2 and 3 Will. IV. cap. lxxv., was passed in the year mentioned, and its operation is said to be such as, generally speaking, to meet the wants of anatomical students. This act, after reciting in the preamble the evils that it is intended to counteract, "empowers the principal secretary of state (the home secretary) and the chief secretary for Ireland to grant a license to practise anatomy to any fellow or member of any college of physicians or surgeons, or to any graduate or licentiate in medicine, or to any person lawfully qualified to practise medicine, or to any professor or teacher of anatomy, medicine, or surgery, or to any student attending any school of anatomy." The main provision for the supply of subjects for dissection is contained in the seventh clause, which says that executors or others having lawful possession of the body of any deceased person, unless intrusted with the body only for the purpose of interment, may permit such body to undergo anatomical examination, unless, to the knowledge of such executors or others, such person shall have expressed a desire, either in writing during life or verbally in the presence of two or more witnesses during the illness whereof he or she died, that his or her body after death might not undergo such examination, or unless the surviving husband or wife, or any known relative of the deceased person, shall require the body to be interred without such examination. This clause enables anatomists to acquire the bodies of a considerable number of persons who die friendless in almshouses, hospitals, etc. The eighth clause requires that, if any person has duly expressed a desire that his or her body be anatomically examined after death, those having lawful possession of the body after death shall see that this desire is carried out, unless the surviving husband or wife, or the nearest known relative of the deceased, shall require the body to be interred without such examination. Inspectors are appointed to supervise the carrying out of the act. No body may be removed from the place of death till 48 hours after the decease, nor till after 24 hours' notice of the intended removal has been given to the inspector of the district, or if there be no inspector to some physician or qualified person, nor till the cause of death has been duly certified. The act does not prohibit post mortem examination directed to be made by any competent legal authority.

**Anaxagoras** (an-aks-ag'ō-ras), a famous Greek philosopher of the Ionic school, born at Clazomenæ, in 500 (?) B. C. He explained eclipses and advanced physical science. In philosophy, he taught that the universe is regulated by an eternal self-existent and



infinitely powerful principle, called by him mind; matter he seems to have asserted to be eternal, what is called generation and destruction being merely the temporary union and separation of ever existing elements; he disproved the doctrine that things may have arisen by chance. Fragments of his "Treatise on Nature" are still in existence. He died in 428 B. C.

**Anaximander** (an-ax-im'an-der), a Greek mathematician and philosopher, successor of Thales as head of the physical school of philosophy, was born at Miletus, in 611 B. C. He is said to have discovered the obliquity of the ecliptic, and he certainly taught it. He appears to have applied the gnomon, or style set on a horizontal plane, to determine the solstices and equinoxes. The invention of geographical maps is also ascribed to him. As a philosopher, he speculated on the origin (*arche*) of the phenomenal world, and this principle he held to be the infinite or indeterminate (*to apeiron*). From it he conceived all opposites, such as hot and cold, dry and moist, to proceed through a perpetual motion, and to return to it again. Of the manner in which he imagined these opposites to be formed, and of his hypothesis concerning the formation of the heavenly bodies from them, we have no sufficient information. Some of his particular opinions were, that the sun is in the highest region of the heavens, is in circumference 28 times greater than the earth, and resembles a cylinder from which flow continual streams of fire; also that the earth is of the form of a cylinder, that it floats in the midst of the universe, and that it was formed by the drying up of moisture by the sun. He died in 547.

**Anaximenes** (an-ax-im'en-ēz), a philosopher of Miletus, flourished about 556 B. C. He was a disciple of Anaximander, from whose doctrines he, however, deviated. According to him, the air is the infinite, divine, perpetually active, first principle of all things. Pliny attributes to him the invention of the sun-dial.

**Anaya, Pedro Maria** (an-ī'ya), a Mexican general, born at Huichapan, in 1795. He held many important military and civil offices; was acting president for a short time while Santa Ana was resisting the army of General Scott in the war of 1846-1847; and commanded the Mexican force of 800 men which defended the Convent of Churubusco, and only surrendered after his ammunition was exhausted, Aug. 20, 1847. On Santa Ana's restoration, in 1853, he was made postmaster-general, an office he held until his death in 1854.

**Anbert Kend**, a celebrated book of the Brahmins, wherein the Indian religion and philosophy are contained. It is divided into 50 *beths* or discourses, each consisting of

10 chapters. It has been translated into Arabic, under the title of "Morat al Maani," i. e., the marrow of intelligence.

**Ancachs** (än-kächs'), a Department of Peru, bounded N. by the Department of Libertad, S. by that of Lima, and extending from the Pacific eastward to the head-waters of the Amazon. Area, 17,405 square miles; pop. 284,091. It is rich in minerals, and is traversed by a railway. Capital, Huaraz.

**Anchises** (an-kī'sēz), the father of the Trojan hero Aeneas, who carried him off on his shoulders at the burning of Troy and made him the companion of his voyage to Italy. He died at Drepanum, in Sicily.

**Anchitherium** (an-kē-thē'rē-um), a fossil mammal belonging to the family *palæotheridæ*. It has been called also hipparitherium, suggesting an affinity to the horse in the neighboring family of *equidæ*. The anchitherium aurelianense occurs in miocene rocks in Spain, France, Germany, and in Nebraska.

**Anchor**, a well known instrument for preventing a ship from drifting, by mooring her to the bottom of the sea, provided that the water is shallow enough to permit of this being done. Its invention was at a very early period. Those of the early Greeks were simply large stones, sacks filled with sand, or logs of wood loaded with lead. Then the Tuscans, or Midas, King of Phrygia, introduced a tooth, or fluke, which was ultimately exchanged for two. The modern anchor consists of a long bar or shank of iron *c*, branching out at the lower extremity into two arms *b* ending in flukes *a*, barbed at their extremity, and with a stock of oak or wood *d* at the upper one, while it terminates in a ring, to which a rope or chain is affixed. The arms or flukes are designed to penetrate and fix themselves in the sea-bottom. They consist of a blade, a palm, and a bill. The one end of the shank is made square to receive and hold the stock steadily in its place without turning. To keep the stock also from shifting along the shank there are raised on it from the solid iron, or welded on it, two square, tenon-like projections, called nuts. The end of the shank next the stock is called the small round. The other extremity, where the arms and the shank unite, is called the crown; and the points of the angle between the arms and the shank, the throat. A distance equal to that between the throat of one arm and its bill is marked on the shank from the place where it joins the arms, and is called the trend. The use of the shank is to present an attachment for the cable. That of the stock is to make the anchor fall in such a way as to enable one of the flukes easily to infix itself in the ground. Large vessels have more anchors than one, which are stowed in different parts of the ship.



The best bower to the starboard, the small bower to the port-cathead, with the flukes on the bill-board, the sheet anchor on the afterpart of the fore-channels on the starboard side, and the spare anchor on the port side. Some technical phrases which have found their way into English literature have already been given. Others are the following: An anchor is said to come home when it is wrenched out of the ground and dragged forward by the violence of the wind or the sea, or by the strength of a current. It is foul if it become entangled with the cable; awash, when the stock is hove up to the surface of the water; a-peak, when the cable is so drawn as to bring the ship directly over it; a-cockbill, when hanging vertically; a-tip, when drawn out of the ground in a perpendicular direction; and a-weigh, when it has been drawn just out of the ground and hangs vertically. To back an anchor is to lay down a small anchor ahead of the one by which the ship rides, with the cable fastened to the crown of the principal one to aid in preventing its "coming home." To cat the anchor: To draw the anchor to the cathead by means of a machine called the "cat." To fish the anchor: To employ a machine called a "fish" to hoist the flukes of an anchor to the top of the bow. To steer the ship to her anchor: To steer the ship to the spot where the anchor lies while the cable is being heaved on board the ship. To shoe the anchor: To cover the flukes of it with a triangular plank of wood, to enable it to fix itself more tenaciously in a soft bottom. To sweep the anchor: To dredge at the bottom of the anchoring ground for a lost anchor. To throw the anchor: The same as cast the anchor.

An anchor, in architecture, is a kind of carving somewhat resembling an anchor. It is generally used as part of the enrichment of the bottoms of capitals in the Tuscan, Doric, and Ionic orders, or as that of the boultins of bed-moldings in Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately throughout the whole building.

**Anchoret, Anachoret, or Anchorite**, any person who, from religious motives, has renounced the world, and retired from it into seclusion. The peculiarity of the anchorites, properly so called, was, that though they had retired for solitude to the wilderness, yet they lived there in fixed abodes (generally caves or hovels) in place of wandering about. When they did travel they slept wherever night overtook them, so that visitors might not know where to find them. They were most numerous in the Egyptian desert, where they lived on roots and plants, believing that to afflict the body was the best method of spiritually benefiting the soul. Most of them were laymen;

there were also female anchorites. They first arose, it is said, about the middle of the 3d century, and in the 7th the Church extended its control over them, and ultimately threw difficulties in the way of any one who wished to adopt such a mode of life. It is also applied to any person of similar habits to those of the old anchorites just described. The mistaken desire to retreat from the world to the wilderness is not distinctively Christian; it tends to manifest itself to a greater or less extent in all religions and in all ages. Anchorites of various Hindu ascetic sects are at present to be found among the jungles and hills of India, and they were much more numerous when the dominant faith in that land was Buddhism.

**Anchovy**, a fish, the *engraulis encrasicolus* of Fleming; the *engraulis vulgaris* of Cuvier. It belongs to the *clupeidæ*, or herring family. In general, its length is from 4 to 5 inches; but specimens have been found 7½ inches long. It is common in the Mediterranean and parts of the ocean. Shoals of anchovies annually enter the Mediterranean, and various fisheries exist along its northern shores, the most celebrated being at Gorgona, a small island W. of Leghorn. Sometimes another species, the *engraulis maletta*, is either mixed with, or substituted for, the genuine fish.

**Anchovy Pear**, the English name of the genus *grias*, which is placed by Lindley doubtfully under the order *barringtoniaceæ* (Barringtoniads). *Grias cauliflora*, the stem-flowering anchovy pear, is an elegant tree, with large leaves, which grows in the West Indies. The fruit, which is eaten, tastes like that of the mango, and is pickled in the same way.

**Anchylosis**, the coalescence of two bones, so as to prevent motion between them. If anything keep a joint motionless for a long time, the bones which constitute it have a tendency to become anchylosed, in which case all flexibility is lost. In other cases, when anchylosis is the lesser of two evils, the bones which nature is about to weld together should be kept in the positions in which they will be of the greatest use when the union between them takes place.

**Ancile**, a shield said to have fallen from heaven during the reign of Numa Pompilius. It was believed to be the shield of Mars; and as the prosperity of Rome was supposed to depend upon its preservation, 11 others were made like it, that any one wishing to steal it might not know which to take. It is conjectured to have been originally a lump of meteoric iron.

**Ancona**, capital of a province in Italy, is situated on a promontory of the Adriatic coast, 127 miles S. E. of Ravenna by rail. The seat of a bishop, it contained (1901) 56,825 inhabitants. Its harbor had become



much silted up, but in 1887-1890 was improved and deepened; while plans had been adopted by the government for new docks, an arsenal, and separate dry-docks for the navy and mercantile marine. Its commerce is much less considerable than it once was, but it is still the most important seaport on the Adriatic between Venice and Brindisi. The manufactures are silk, ships' rigging, leather, tobacco, and soft soap; the exports (declining in recent years) are cream of tartar, lamb and goat skins, asphalt, bitumen, corn, hemp, coral, and silk. Since 1815, the old citadel was the only fortification until, recently, strong forts were erected on the neighboring heights, and the citadel turned into a large depôt for soldiers. A mole of 2,000 feet in length, built by the Emperor Trajan, and a triumphal arch of the same emperor, are the most notable monuments of antiquity. One of the most venerable buildings is the Cathedral of San Ciriaco, built in the 11th century, and possessing the oldest cupola in Italy. But the houses are in general mean, and the streets narrow. Ancona is supposed to have been founded about 380 B. C. by Syracusans, who had fled from the tyranny of Dionysius the Elder. It was destroyed by the Goths, rebuilt by Narses, and again destroyed by the Saracens in the 10th century. It afterward became a republic; but in 1532 Pope Clement VII. annexed it to the States of the Church. In 1797 it was taken by the French; but in 1799 General Meunier was obliged to surrender it to the Russians and Austrians, after a long and gallant defense. In 1832 a French force took possession of the town and kept it in their hands till 1838, when both French and Austrians retired from the Papal States. In 1849 a revolutionary garrison in Ancona capitulated after enduring a siege by the Austrians of 25 days. In 1861 the flag of the kingdom of Italy waved over the ancient city. "The March of Ancona" was the name applied to the territory lying between the Adriatic and the Apennines, from Tronto N. W. to San Marino. Erected into an independent marquisate under the Longobards, the district was a papal dependency from the 13th century, but passed into the hands of Victor Emmanuel in 1860.

**Ancre** (änk'er), **Baron de Lussigny, Marshal d'**, originally Concino Concini, a Florentine by birth, who went to the French court in 1600, in the train of Marie de Medici, the wife of Henry IV. He married Leonore Galigai, one of the queen's women, and aided her in promoting the disagreement between the king and queen. After Henry's death, he became chief favorite and adviser of the queen-regent, and was raised to post after post of profit and honor, becoming at length Marquis, and, in 1614, even Marshal of France, though he had

never seen war. His prodigality was immense, and he squandered enormous sums on the decoration of his palaces. Hated alike by nobility and populace, he was assassinated in the Louvre in open day, on April 24, 1617, the young King Louis XIII. himself being privy to the plot. His body was dragged by the mob through the streets, and burned before the statue of Henry IV. His wife was soon executed, on a charge of having practiced witchcraft to gain influence over the queen.

**Ancrum Moor**, Roxburghshire, 5¼ miles N. W. of Jedburgh, was in 1544 the scene of the defeat of 5,000 English, under Sir Ralph Evers and Sir Brian Latoun, by a Scottish force under the Earl of Angus and Scott of Buccleuch. A defaced monument marks the spot where a Scottish maiden, named Lilliard, is said to have done prodigies of valor.

**Ancus Marcius** (mar'shus), the fourth King of Rome, was the grandson of King Numa Pompilius. Following the example of Numa, he endeavored to restore the almost forgotten worship of the gods and the cultivation of the arts of peace among the Romans. But, despite his inclination for peace, he became involved in several wars with the neighboring Latin tribes, whom he subdued and reduced to order. He carried their inhabitants to Rome, and settled them on the Aventine. Against the Etruscans he fortified the Janiculum, connected it with Rome by a wooden bridge, and gained possession of both banks of the Tiber, as far as its mouth, where he founded Ostia as the port of Rome; and built the first Roman prison of which we read. He died in 616 B. C., after reigning 24 years.

**Andalusia**, a large and fertile region occupying the S. of Spain. Its shores are washed both by the Mediterranean and the Atlantic; and, though it is not now a political division of Spain, it is more frequently spoken of than the eight modern provinces into which it has been divided. The name is a form of Vandalitia or Vandalusia, from the Vandals, who overran it in the 5th century. When it was a Phœnician trade emporium, it was called Tartessus (probably the "Tarshish" of the Bible); the Romans named it Bætica, from the river Bætis, the modern Guadalquivir. In the 8th century, the Moors founded here a splendid monarchy, which quickly attained a high degree of civilization. The four great Moorish capitals were Seville, Cordova, Jaën, and Granada. During the darkness of the Middle Ages, Cordova was "the Athens of the West, the seat of arts and sciences." The Moorish kingdoms were finally conquered by the Castilians in 1235-1248. Christian intolerance seriously and permanently impoverished the country; but later, under the Spaniards, painting here arose in a new



form in the schools of Velasquez and Murillo. Andalusia mainly consists of the great basin of the Guadalquivir, and the mountainous districts which bound it. In the S., the Sierra Nevada attains a height of 11,657 feet. Andalusia was called the garden and the granary of Spain; but now such names are merited only by portions of the country on both sides of the Guadalquivir, where, even with careless cultivation, the soil is luxuriantly productive, and vegetation generally assumes a tropical character. Cotton and sugar-cane flourish in the open air, and the cactus and aloe form impenetrable hedges. Wine and oil abound; but some tracts are very barren, especially in the W., owing to deficiency of water. On the whole, however, Andalusia is still one of the most fertile districts of Spain, owing to its delicious southern climate and the abundance of water supplied by its snowy mountains. Its breeds of horses and mules have long been celebrated. The mountains yield silver, copper, lead, iron, and coal; and some ores are extensively worked. The Andalusians are lively, imaginative, and active, but boastful, unwarlike, and superstitious. They speak a dialect of Spanish, manifestly tinged with traces of Arabic. Andalusia is divided into the Provinces of Almeria, Jaën, Malaga, Cadiz, Huelva, Seville, Cordova, and Granada. The chief towns are Seville, Cordova, Jaën, and Cadiz. Area, 33,340 square miles. Pop. (1900) 3,562,606.

**Andamans**, a group of thickly wooded islands toward the E. side of the Bay of Bengal, about 680 miles S. of the Hooghly mouth of the Ganges, between 10° and 14° of N. latitude, and 92° and 94° of E. longitude. They consist of the Great and Little Andaman groups, surrounded by many smaller islands. The Great Andaman group is more than 150 miles long and 20 miles broad, and comprises four islands, the North, Middle, and South Andaman, and Rutland Island. The Little Andaman, which lies about 30 miles S. of the larger group, is 28 miles long by 17 miles broad. The total area is 2,508 square miles. The native inhabitants stand in the lowest stage of civilization, and belong to the same family as the original small statured races in Southern India; their number in Great Andaman is about 2,000; in Little Andaman, from 1,000 to 1,500. Those that have come into contact with the convicts here have deteriorated morally. Their height seldom reaches five feet; their complexion is very dark, the hair crisp and wooly. The men go naked; the women wear round the loins a girdle of leaves. They have no settled dwellings, but go freely from island to island, and subsist on the fruits and beasts of the wood, and upon fish. A British settlement was made on North Andaman in 1789, but abandoned

in 1796 for Penang. The capital of the present settlement is at Port Blair, on South Andaman, the largest island of the group. The harbor here is one of the finest in the world. Since 1858, the Andamans have been a penal settlement for Sepoy mutineers and other life convicts. In 1872 Lord Mayo, Viceroy of India, was assassinated at Hope-town, on Viper Island, by a Mussulman convict.

**Anderab**, or **Inderab**, a town in Afghanistan, on the N. slope of the Hindu Kush; 65 miles S. of Kunduz, and about 95 miles N. by E. of Kabul. It lies at the junction of the Anderab and Kiasan rivers, at the foot of a hill, and is surrounded by fine gardens, fruit trees, and vineyards. The road that leads to the extreme E. pass over the Hindu Kush passes through it, and it has thus a large transit trade.

**Andernach**, a town of Rhenish Prussia; on the left bank of the Rhine; 10 miles N. W. of Coblenz. Its strong walls and massy gates (the Rhine Gate is said to belong to the time of the Merovingians) give it an air of antiquity, but it has narrow, dirty streets, and does not possess any edifice particularly deserving of notice except the church of St. Genoveva, built in the 13th century, and the watch-tower. Andernach has manufactures of ultramarine, cigars, soap, and perfumes, and has long been famous for its millstones and its *trass*, or cement. Pop. (1900) 7,889.

**Andersen**, **Hans Christian**, a Danish novelist, poet, and writer of fairy tales; born in Odense, April 2, 1805. His father, a poor shoemaker, had acquired some literary tastes, and though he died when his son was quite young he seems to have given his mind the earliest bent to the studies which determined his future career. Hans learned to read and write in a charity school, and eagerly availed himself of these elements of instruction for further improvement. His reading consisted of national ballads, poetry, and plays, many of which he learned to repeat. He wrote juvenile plays, overcharged with horrors and couched in an extravagant poetical diction, and was deeply mortified when they were laughed at; and he acted plays which he had either read or written in a marionette theater in which he was his own manager. He was put to work in a manufactory, and amused the workmen with singing—an accomplishment in which he excelled; but their habits and his were uncongenial to each other, and he returned home to his favorite pursuits. His mother purposed to make him a tailor, but his heart was set on the theater; and in autumn, 1819, he went to Copenhagen, and failing to procure employment of the kind he wished worked for a short time as a joiner. Getting dis-



heartened with this work he applied to Professor Siboni of the conservatory, who, after hearing his voice, undertook to educate him as a singer for the stage; but after six months his voice broke, and his patron recommended him to return home and learn a trade. Rejecting this unpalatable advice, he applied to the poet Guldberg, who obtained him a subordinate employment in a theater. Here he struggled on for a year or two, prosecuting his studies amid all difficulties, till Councillor Collin, who had become director of the theater, perceiving his abilities, procured for him free entry into a government school at Slagelse. Meisling, rector of this school, was transferred to the college at Helsingör, and took Andersen with him; but notwithstanding this kindness, he was merciless in his ridicule of his pupil's eccentricities, and Andersen's sensibilities were so much hurt that he was constrained to leave him. Another friend, L. C. Möller, introduced him to the university. His poetical contributions had already been received with favor in some of the leading Danish journals; and in 1828, the year of his admission to the university, he published his first considerable work, "A Journey on Foot from Holmen's Canal to the East Point of Amager," which was received with marked favor. During the same year he produced at the Royal Theater a comic vaudeville in rhymed verse, entitled "Love on St. Nicholas' Tower," and at Christmas he published his first collection of poems. In 1830 he made a tour in Fünen and Jutland, and in 1831 he published "Fancies and Sketches," which was severely criticized, and was less successful than his previous works. This and other disappointments — one of which was in the more serious affair of love — broke down his spirits, and he was advised to travel for his health. After an excursion to Germany he published "Shadow Pictures of a Tour in the Hartz and Saxon Switzerland," "Vignettes of Danish Poets," and a new volume of poems called "The Twelve Months of the Year." Through the influence of Oehlenschläger and other friends he received a royal grant to enable him to travel, and in 1833, after passing through France, he visited Italy, his impressions of which he published in "The Improvisatore" (1835) — a work which rendered his fame European, and which he dedicated, with appropriate gratitude and affection, to his friend Collin. The scene of his following novel, "O. T.," was laid in Denmark, and in "Only a Fiddler" he described his own early struggles. In 1834, immediately on his return from Italy, he published the poem of "Agnete and the Mer-man," and in 1835 appeared the first volume of his "Fairy Tales," of which successive volumes continued to be published year by year at Christmas, first under the title of "Eventyr" and afterward of "Histo-

rier," and which have been the most popular and widespread of his works. Among his other works are "Picture-books without Pictures," "A Poet's Bazaar" — the result of a voyage in 1840 to the East — and a number of dramas. In the last species of composition he did not excel so much as in tales of imagination, although some of his fairy comedies attained great success. Among his numerous travels he visited England in 1848, and acquired such a command of the language that his next work, "The Two Baronesses," was written in English. In 1845 he received an annuity from the government which made him independent. Among his later works may be mentioned, "In Sweden" (1849); an autobiography, under the title, "My Life's Romance" (1853), an English translation of which, published in 1871, contained additional chapters by the author, bringing the narrative down to the time of the Odense festival of 1867; "To Be or Not To Be" (1857); "Tales from Jutland" (1859); "The Sandhills of Jutland" (1860); "The Ice Maiden," and "In Spain" (1863). Many of his works, particularly "The Improvisatore" and "The Fairy Tales," have been translated into most of the European languages. A German translation, in 35 volumes 12mo, appeared at Leipsic, in 1847, and many of the English and other translations have been made from the German instead of the original. He died in Røghed, Aug. 4, 1875. Andersen's tales are distinguished by simplicity, humor, tenderness, and poetical imagination. Personally he was egotistical to an extraordinary degree, but with an inoffensive egotism; he was also, from his over-sensitiveness, somewhat irritable.

**Anderson**, a city and county-seat of Anderson Co., S. C.; is the seat of Anderson Female College and of Patrick Military Institute; has a cotton mill, shoe factory, churches and high school. Pop. (1890), 3,018; (1900), 5,498; (1910) 9,654.

**Anderson**, city and county-seat of Madison Co., Ind.; on several railroads and a hydraulic canal with a fall of nearly 50 feet; 36 miles N. E. of Indianapolis. It is principally engaged in manufacturing, and has a National bank, public library, high school, daily and weekly newspapers, and a property valuation of over \$2,250,000. Pop. (1900), 20,178; (1910), 22,476.

**Anderson, Adam**, a Scotch economist; born in 1692. For many years he was a clerk in the South Sea house, where he wrote a book entitled "Historical and Chronological Deduction of the Origin of Commerce." He died in London, Jan. 10, 1765.

**Anderson, Alexander**, an American wood engraver, born in New York City, April 21, 1775; began engraving on copper and type



metal when 12 years old, without instruction and with a knowledge of the art gained solely by watching jewelers. He was graduated at the Medical Department of Columbia College in 1796, and engaged in practice for two years, when he applied himself wholly to engraving, having found it possible to engrave pictures on blocks of box wood, and having made his own tools for his work. He produced the first wood engravings ever made in the United States, and for many years was the only engraver on wood in New York. He died in Jersey City, N. J., Jan. 17, 1870.

**Anderson, Alexander**, the "Surfaeman-poet," was born at Kirkeconnel, Dumfriesshire, April 30, 1845; worked for some years as a surfaeman and plate-layer on the Glasgow and Southwestern railway, and in 1880 went to Edinburgh as assistant university librarian. For three years he was secretary to the Edinburgh Philosophical Institution. Among his publications are poems, ballads, and sonnets.

**Anderson, Sir Edmund**, an English jurist, born in Flixborough, or Broughton, Lincolnshire, in 1530; was Lord Chief Justice of the Court of Common Pleas in 1582-1605; and is remembered as a bitter opponent of the Puritans. He died Aug. 1, 1605.

**Anderson, Elizabeth Garrett**, an English physician, born in London in 1837, and brought up chiefly at Aldborough, Suffolk. In 1860 she studied medicine with much credit at the Middlesex Hospital; but a petition from the students against the admission of women prevented her return. Miss Garrett experienced considerable difficulty in qualifying, but in 1865 she passed the Apothecaries' Hall examination with credit, and the next year received her first dispensary appointment. In 1870 she was made a visiting physician to the East London Hospital, and headed the poll in the election for the London School Board. In this year, also, the University of Paris conferred on her the degree of M.D. Since her marriage to Mr. Anderson, in 1871, she has practiced regularly as a physician for women and children. She has written several papers on professional and social subjects. From 1876 to 1898 she was Dean of the London Medical School for Women.

**Anderson, John**, founder of the college in Glasgow bearing his name, was born in the parish of Roseneath, Dumbartonshire, in 1726. He studied at the University of Glasgow, in which he was for four years Professor of Oriental Languages; in 1760 he was transferred to the chair of Natural Philosophy. In addition to his usual class in physics, he instituted one for artisans, which he continued to teach to the end of his life. In 1786 appeared his "Institutes of Phys-

ics," which went through five editions in 10 years. He invented a species of gun, the recoil of which was stopped by the condensation of common air within the body of the carriage; but having in vain endeavored to attract the attention of the British Government to it, he went to Paris in 1791 and presented his model to the National Convention. It was hung up in their hall, with the following inscription over it: "The Gift of Science to Liberty." Afterward, when the allied monarchial forces had drawn a military cordon around the frontiers of France, Anderson ingeniously suggested the expedient, which was adopted, of making small balloons of paper, to which newspapers and manifestoes might be tied, and so carried to Germany. Anderson died in 1796, and by his will he directed that the whole of his effects, of every kind, should be devoted to the establishment of an educational institution in Glasgow, for the use of the unacademical classes.

Anderson's College was originally intended to be a university of four colleges. The funds being inadequate to the proposed plan, the institution was opened with only a single course of lectures on natural philosophy and chemistry, by Dr. Thomas Garnett, in 1796. In 1798 a professor of mathematics and geography was appointed. In 1799 Dr. Birkbeck, the successor of Dr. Garnett, commenced the system of giving a familiar exposition of mechanics and general science, and this was the origin of mechanics' institutes.

The institution gradually enlarged its sphere of instruction, till it came to have a staff of nearly 20 professors and lecturers. Courses of instruction are given in physical and medical science and in chemistry; there are also taught mathematics, Latin, Greek, Hebrew, French, music, etc. As a school of medicine, in particular, it possesses a high reputation. Between 1861 and 1870 the endowments were largely augmented by large benefactions from Mr. Freeland, Mr. Ewing, and Mr. Young, of Kelly. The college possesses a number of valuable bursaries.

**Anderson, Martin Brewer**, an American educator, born in Brunswick, Me., Feb. 12, 1815; was graduated at Waterville College in 1840; became Professor of Rhetoric and organized and taught the course in Modern History at Waterville, and was chosen President of the newly organized University of Rochester (N. Y.) in 1853, holding the post till 1888. He died Feb. 26, 1890.

**Anderson, Mary (Mrs. A. de Navarro)**, an American actress, born in Sacramento, Cal., July 28, 1859. She played for the first time at Louisville, in 1875, in the character of Juliet. Her success was marked and immediate, and during the following



years she played with increasing popularity in the principal cities of the United States in various rôles. In 1883 she appeared at the Lyceum Theater, in London, and speedily became well known in England.

**Anderson, Rasmus Bjorn**, an American author, born in Albion, Wis., Jan. 12, 1846, of Norwegian parents. He was educated at Norwegian Lutheran College, Decorah, Ia.; becoming Professor of Scandinavian Languages in the University of Wisconsin in 1875-1884, and United States Minister to Denmark in 1885. His books include "America Not Discovered by Christopher Columbus" (1874); "Norse Mythology" (1875); "Viking Tales of the North" (1877), and "Translation of the Younger Edda" (1880).

**Anderson, Robert**, an American military officer; born near Louisville, Ky., June 14, 1805; was graduated at the United States Military Academy in 1825, and entered the artillery; was private secretary to the United States minister to Colombia in 1825-1826; instructor at the Military Academy for a while; on ordnance duty in 1828-1835; served in the Black Hawk War in 1832 as colonel of volunteers, taking part in the battle of Bad Axe; and in the Florida War in 1837-1838 on General Scott's staff, and was made assistant adjutant-general on the staff in May of the latter year. He was with General Scott in his campaign in Mexico, taking part in the engagements at Vera Cruz, Cerro Gordo, Amozoque, and at Molino del Rey, where he was severely wounded. He was commissioned major and was placed in command of Charleston harbor, to succeed Colonel Gardiner, with headquarters at Fort Moultrie, in 1860. After arriving at Fort Moultrie he informed the government of the weakness of the forts in the harbor, and urged the necessity of immediately strengthening them. As the government did not respond, and he was left to his own resources, he began to strengthen Castle Pinckney and Fort Moultrie. Fearing that Fort Moultrie would be attacked at any moment he applied to the government for instructions. Receiving none he decided to remove with his garrison to Fort Sumter. This he did on the evening of Dec. 26. The Confederates were much surprised the next day on discovering the change, and asked him to explain his conduct in acting without orders, to which he replied that he did it to save the government works. He was attacked and surrendered the fort after a heavy bombardment, April 12-13, 1861. In 1861 he was promoted Brigadier-General, U. S. A., and placed in command of the Department of Kentucky and of the Cumberland, but failing health caused him to retire from active service in 1863, when he was brevetted Major-General. He died in Nice, France, Oct. 26, 1871.

**Anderson, Rufus**, an American missionary, born in North Yarmouth, Me., Aug. 17, 1796; was graduated at Bowdoin College in 1818, and Andover Theological Seminary in 1822; Assistant Secretary of the American Board of Commissioners for Foreign Missions in 1824-1858; a founder of Mount Holyoke Seminary. His numerous publications include "Observations on the Peloponnesus and Greek Islands" (1830); "The Hawaiian Islands" (1864); "A Heathen Nation Evangelized" (1870), and "History of the Missions, etc., to the Oriental Churches" (1872). He died in Boston, May 30, 1880.

**Andersonville**, a village in Georgia, noted as having been the seat of a Confederate States military prison, which was notorious for unhealthfulness and for barbarity of discipline. Between Feb. 15, 1864, and April 1865, 49,485 prisoners were received, of whom 12,926 died in that time of various diseases. Henry Wirz, the superintendent, was tried for injuring the health and destroying the lives of the soldiers confined here, was found guilty, and hanged, Nov. 10, 1865. The long trenches where the soldiers were buried have since been laid out as a cemetery.

**Andersson, Carl Jan**, an African traveler; born in the province of Wernmland, Sweden, in 1827. In 1850 he accompanied the English traveler Galton to Africa, and with him penetrated into the land of the Damaras and Ovampos, thus opening up a region hitherto little known. The purposed destination of the travelers, Lake Ngami, was not reached, however, on this journey; but in 1853 Andersson made his way thither, and explored also the Tioje, the N. and principal feeder of the lake. After publishing an account of this journey—"Lake Ngami, or Discoveries in South Africa" (2 vols. 1856)—he returned in 1856 to Africa, where, after being for a time mine-overseer on the Swakop river, near the Tropic of Capricorn, he started in 1858 to explore the Kunene, which enters the sea between lat. 17° and 18° S. On this journey he discovered, in 1859, the Okavango, or upper course of the Tioje, which was the subject of his next publication, "The Okavango River" (1861). In 1860 he married and settled as an ivory dealer at Otjimbingue, in the land of the Damaras, among whom he acquired the position of a chief. In a war against the neighboring tribe of the Namaquas, in 1864, he had one of his legs shattered. He died in the land of the Ovampos, in Western Africa, in July, 1867.

**Andes, The**, or, as they are called by the Spanish in South America, CORDILLERAS (ridges) DE LOS ANDES, or simply CORDILLERAS, a range of mountains, of such vast extent and altitude as to render them one



## Andes

of the most remarkable physical features of the globe. It follows the whole of the W. coast of South America, from Cape Horn to the Isthmus of Panama and the Caribbean Sea. Sometimes it is spoken of as a continuation of the Rocky mountains in North America, but there seems to be no other reason for doing this than the continuity of the two divisions of America, and the fact that both ranges lie in the W. of their respective continents. There is a sufficiently marked break between the ridges of the Isthmus of Panama and the range of the Andes of South America, and a still more distinct hiatus between the Sierras of Central America and Mexico and the Rocky mountains.

The S. part of this huge chain begins to be continuous about lat.  $52^{\circ}$  S. From this point to about lat.  $42^{\circ}$  S., a distance of nearly 1,100 miles, the range presses close to the Pacific Ocean. Its average height in this part is only about 3,000 feet, though several summits rise some thousands of feet higher, namely, Mount Melimoyu, Yanteles (the highest, above 8,000 feet), and the volcanoes of Corcobado and Minchinmadiva. The width of the chain in the extreme S. is about 20 miles, farther N. it increases to 40 miles, and it attains a still greater width before it reaches lat.  $42^{\circ}$  S. About this latitude the chain begins to recede from the coast, leaving wide plains on the W. 1,000 or 1,500 feet above sea-level. N. of lat.  $35^{\circ}$  S. a double range may be traced, and the whole system of mountains widens out to about 130 miles. At about lat.  $21^{\circ}$  S. the direction of the chain, which up to this point is N. and slightly E., begins to change a little to the W., and round this elbow, as it were, there is a large knot of mountains, partly in the Argentine Republic and partly in Bolivia, and consisting of chains running in various directions, some of which are not connected with the chain of the Andes. This knot of mountains forms part of the watershed which divides the rivers of the La Plata from those of the Amazon basin. Among the peaks, up to lat.  $21^{\circ}$  S., are the active volcanoes of Antuco, Maypu, and Tupungato; but the culminating point of this portion, and, so far as is known, of the whole Andes, is Aconcagua, which rises to the height of 23,028 feet, and is distinctly visible from Valparaiso, 100 miles distant. The Chilean Andes, under the 35th parallel of S. latitude, are about 150 miles from the Pacific; but this distance decreases to about 80 miles in the latitude of Valparaiso.

At the point we have now reached, lat.  $21^{\circ}$  S., the Andes range bifurcates, forming two chains of great elevation, the Andes of Bolivia and Peru, which inclose the lofty table-land or longitudinal valley of the Desaguadero and Lake Titicaca. Of these two chains the W. or Peruvian has the peaks of

## Andes

Sahama, Parinacota, Gualateiri, and Pomarape, above 21,000 feet in height; and the E. or Bolivian (Cordillera Real) has those of Illimani and Sorata or Illampu (21,484 feet). Of these the highest seems to be Gualateiri, the loftiest active volcano in the chain, 21,960 feet in height. Sahama, another active volcano, is 21,054 feet. These parallel cordilleras, the united breadth of which nowhere exceeds 250 miles, are united at various points by enormous transverse groups or mountain knots, or else by single ranges crossing between them like dikes. The descent to the Pacific is exceedingly steep; the dip is also very rapid to the E., whence offsets diverge to the level plains. The table-land of the Desaguadero, thus inclosed, has itself an absolute altitude of 12,900 feet, a length of 400 miles, and an area of 150,000 square miles. A large E. offset, the Sierra de Cochabamba, leaves the E. cordillera under the 17th parallel, bounding the rich plain of Cochabamba N., and ending nearly under the 63d meridian of W. longitude, at Santa Cruz de la Sierra. The two main cordilleras once more unite in the group of Vilcañota, in lat.  $15^{\circ}$  S., and the united range then runs about 280 miles N. W. to about lat.  $10^{\circ}$  S., where the Andes separate into three nearly parallel chains — the Eastern, Central, and Western Cordilleras, which inclose between them the Huallaga and Upper Marañon rivers; the Western or Coast Cordillera running N. as far as the group of Loja, near the S. extremity of Ecuador.

About lat.  $6^{\circ}$  S., opposite the Point Aguja, the Andes chain again takes a course N., and slightly E., forming, as in Chile, a single mass or rocky plateau, 80 miles broad, covered with a double series of highly-elevated summits, inclosing longitudinal valleys, one of which, that of Cuenca, in the group of Assuan, is upwards of 15,000 feet high, or nearly within the region of perpetual snow. N. of this point the chain again divides, the W. range comprising Mounts Chimborazo (21,060 feet), Iliniza, and Piehinchá; while on the E. range are the volcanoes Sangay, Tunguragua, Cotopaxi, Antisana (19,137 feet), and Mount Cayambe (19,535 feet). Shortly after entering New Granada, crossing the equator, the chain, in lat.  $1^{\circ} 5'$  N., again meets in the knot or plateau of Los Pastos, on which is the volcano of Cumbal (15,620 feet); but a little N. of the city of Pastos it once more bifurcates, inclosing the mountain plain of Almaguer, comprising the volcano of Purace (17,034 feet) on its E. branch; and finally, somewhat N. of the town of Popayan, the Andes separate into three distinct ridges — the Sierra di Choeo, running N. to the Isthmus of Panama; the Sierra di Quindiu, running E. of the Cauca river; and the Sierra Suma Paz, extending E. of the Magdalena to Lake Maracaybo and the city of Valen-



cia in Venezuela. N. of the 5th N. parallel the only summits within the snow line on these cordilleras belong to the E. chain, which also is very precipitous on its E. slope. On the Quindiu or central chain is the volcano of Tolima (18,325 feet), in lat.  $4^{\circ} 46'$  N. The Choco or coast chain is of comparatively small elevation, its highest point not exceeding 9,000 feet. The total length of the Andes has been estimated at about 4,400 miles.

*Passes, Roads, and Railways.*—This gigantic mountain chain is traversed in its different parts by numerous roads or passes, at heights almost equal to those of the extreme summits of the European ranges. Most of them are narrow, rugged, steep, and sometimes slippery and dangerous, passing through gorges, across yawning chasms, and up nearly perpendicular rocks; nor can they be attempted with success except by the active and well-practised native, or the enterprising, courageous, and well-provided traveler. It is worthy of remark, likewise, that nearly all these roads cross the ridge, running transversely and direct, not, as is sometimes the case in the Alps, by a circuitous course through the longitudinal valleys. Subjoined is a list of most of the known mountain passes, with their position, connected localities, and highest elevation, commencing with those on the S.:

| Names.  |   | Feet.        |
|---|---|--------------|
| Portillo, lat. $33^{\circ} 40'$ S.....              | from Santiago to Es-tacada .....            | above 14,000 |
| Penquenes, lat. $33^{\circ} 40'$ S.....             | from Santiago to Es-tacada .....            | above 13,000 |
| Cumbre, lat. $32^{\circ} 52'$ S.....                | from Valparaiso to Mendoza .....            | above 12,400 |
| Pass of Tolapalca.                                  | from Potosi to Oruro .....                  | above 14,000 |
| Pass of Condur Pacheta .....                        | from Potosi to Oruro .....                  | above 14,000 |
| Pass of Pacuani..                                   | from La Paz to the Valley of the Beni ..... | above 15,000 |
| Pass of Gualillas, lat. $17^{\circ} 50'$ S...       | from Arica to La Paz .....                  | 14,750       |
| Pass of Chullunquiani .....                         | from Arica to La Paz .....                  | above 15,000 |
| Pass of Alto de Toledo, lat. $16^{\circ} 2'$ S..... | from Arequipa to Puno .....                 | above 15,500 |
| Angostura .....                                     | between Tacora & Lake Titicaca .....        | above 10,500 |
| Pass by San Mateo, lat. $11^{\circ} 48'$ S. ....    | from Lima to Tarma and Pasco.....           | above 15,700 |
| Alto de Tacaibamba Pass.....                        | from Jauja to Huanuco .....                 | above 15,000 |
| Alto de Lachagual Pass .....                        | from Jauja to Huanuco .....                 | above 15,000 |
| Road over the Paramo de Assuay                      | from Alausi to Cuenca .....                 | above 15,500 |
| Road over the Quindiu Pass...                       | from Alausi to Cartago                      | 11,502       |

Besides the routes just mentioned, a great commercial road runs longitudinally along the Andes the whole distance from Truxillo, lat.  $8^{\circ} 5'$  S., to Popayan, lat.  $2^{\circ} 25'$  N., in the valley of the Cauca, not much less than 1,000 miles, and attaining at its highest point, the Paramo de Bolicha, an elevation of 11,500 feet. Two railways across the

Andes have already been completed, both in the republic of Peru. The one that was first in operation is from the port of Mollendo, near the S. of Peru, by Arequipa to Puno on Lake Titicaca, a distance of 217 miles. The E. terminus of this railway is situated in a table-land 12,196 feet above the level of the sea. The first locomotive reached the shores of Lake Titicaca on Jan. 1, 1874. The other and more recent railway is from Lima to Oroya, a distance of 145 miles. The crest of the Andes is traversed by a short tunnel at an altitude of 15,645 feet above sea-level; the steep and irregular slope up to this point being ascended by a series of sharp curves, and the ravines spanned by bridges. A transandine railway from Buenos Ayres to Valparaiso is nearly completed.

*Rivers and Lakes.*—From the Andes rise two of the largest water systems of the world—the Amazon and its affluents, and the La Plata and its affluents. Besides which, in the N., from its slopes flow the Magdalena to the Caribbean Sea, and some tributaries to the Orinoco. The mountain chain pressing so close upon the Pacific Ocean, no streams of importance flow from its W. slopes. The number of lakes interspersed through this vast mountain system is not great, and in this respect it presents a striking contrast to the Swiss Alps. The largest and most important, and the only one worthy of notice, is that of Titicaca on the Bolivian plateau.

*Geology, etc.*—In considering the geology of the Andes, the first fact that strikes the observer is the vast development of volcanic force along the whole length of the chain, and even continued N. through Guatemala and Mexico. These volcanic vents occur in three linear groups, the extreme S. extending from the 42d to the 33d parallel of S. latitude; the next from the 27th to the 15th parallel, and the last from lat.  $2^{\circ}$  S. to about lat.  $5^{\circ}$  N. Mention has already been made of the principal volcanoes. Another striking circumstance in the geology of this range is the fact that it consists almost entirely of sedimentary rocks, showing that its highest parts must at one time have been submerged. Granite comes so rarely to the surface in the N. parts of the chain, that, according to Humboldt, a person might travel for years in the Andes of Peru without meeting this species of rock; and he never saw any at a greater absolute elevation than 11,500 feet. Gneiss is sometimes found in connection with the granite; but mica-schist is by far the commonest of all the crystalline rocks. Quartz is likewise extremely abundant, generally mixed with mica, and rich in gold and specular iron. Vast tracts of red sandstone, with gypseous and saliferous marls, occur in Peru. Porphyry and greenstone abound all over the range at every elevation, both on the slopes



## Andes

and extreme ridges; and trachyte is almost as abundant as porphyry, both in Peru and Chile, great masses of it, from 14,000 to 18,000 feet thick, being visible on Chimborazo and Pichincha. As respects volcanic products, the W. face of the Andes presents immense quantities of lava, tufa, and obsidian, none of which are found on the E. side; this remark applies especially to that part of the chain lying between Chile and the equator. Fossil remains are by no means common; but in the limestone strata of the coast toward the N. extremity of the range, Humboldt found many marine shells of the Silurian period, about 30 miles from the coast; and Pentland observed others of the same era at a height of 17,500 feet on Mount Antakawa in Bolivia, as well as in several other parts.

*Earthquakes.*—Many of the volcanoes, as before observed, are in a state either of constant or occasional action; it cannot, therefore, be matter of surprise that there should be frequent and violent earthquakes. All the districts of the Andes system, but Chile especially, have suffered more severely from these oscillations than any other part of the world; and among the towns either destroyed or greatly injured by these visitations may be mentioned Bogotá, Quito, Riobamba, Lima, Callao, Valparaiso, and Concepcion. In 1819 Copiapo was entirely overturned, not a house being left standing. Concepcion was twice destroyed—in 1730 and 1751; and in November, 1822, an earthquake was felt on the same day at this town, in lat.  $37^{\circ}$  S., and at Lima in lat.  $12^{\circ}$  N., more than 1,700 miles distant; it was on this occasion that Valparaiso, Melipella, and Quillota, were all but completely annihilated. This earthquake, too, had the remarkable effect of upheaving the land on the coast, upward of 100 miles in extent, to the height of three or four feet, and elevating a portion of the shore above high-water mark. These shocks continued at brief intervals till the autumn of 1823; and since that time the volcanoes of Maypú, until then for many years quiescent, have had frequent eruptions. In August, 1868, the towns of Arequipa, Iquique, Tacna, and many other smaller towns in Peru and Ecuador, were destroyed. In fact, earthquakes, slight or more serious, are of yearly occurrence, and faint oscillations of the soil are regarded with scarcely more attention than a hail storm in the temperate zone.

*Mineral Productions.*—The Andes are extremely rich in the precious metals. In Chile, Bolivia, Peru, and Colombia, gold is obtained. Silver occurs in Chile in the provinces of Coquimbo and Atacama, and the mines of these districts are remarkable for the richness of their ores. The Peruvian Andes have numerous silver mines scattered over their whole extent, from the province of Caxamarca S., to the confines of Chile;

## Andes

but incomparably the richest are the mines of Cerro de Pasco, which have been worked upward of two centuries. The mines of Chota likewise, which are situated on Mount Hualgayoc, are productive. The ore, which is richer even than that of Pasco, lies either on or very near the surface. Close to the Pacific, at Huantajaya, in the district of Arica, are several mines celebrated for the quantity of virgin silver found therein, sometimes in masses of great weight. The most famous mines are those of the Cerro de Potosi, in Bolivia, lat.  $19^{\circ} 36'$  S., which is perforated in all directions by thousands of openings, some of which are within 100 feet of the summit (16,000 feet). Quick-silver is found in several parts of the Andes, but impure, in combination with sulphur, forming the red sulphuret of mercury, commonly known as cinnabar. Copper is found both in the E. and W. cordilleras of Peru; but the E. chain is too far from the coast to admit of mines being profitably worked. The copper mines of Chile are the most valuable. They are situated chiefly in the desert of Atacama. Tin also, wrought in Chile, forms an article of export; but lead and iron, though plentiful, are not wrought. Considerable platinum is obtained from the State of Choco in Colombia.

*Climate and Meteorology.*—On the W. side of the range little or no rain falls, except at the S. extremity; and scanty vegetation appears only on spots, or in small valleys, watered by streams from the mountains; while, on the opposite slope, excessive heat and moisture combine to give the range a thick covering of tangled forest trees and dense brushwood. Currents of cold W. and N. W. winds blow nearly all the year from the ice-topped cordilleras, on the plateau beneath, daily accompanied during four months by thunder, lightning, and snow storms. Currents of warm air are also occasionally found on the crest of the Andes; they usually occur two hours after sunset, being both local and narrow, like the hot blasts in the Alps, not exceeding a few yards in width. They run parallel to each other, and so closely that five or six of them may be passed in a few hours. They blow chiefly from S. S. W. to N. N. E. and are especially frequent in August and September. Notwithstanding the great number of snow-clad summits, glaciers are of rare occurrence in the Andes, being found only, and then of but small extent, in the narrow ravines which furrow the sides of some of its giant summits.

*Vegetation.*—In the low burning plains that flank the bases of the Andes reign the banana, cycas, plantain, cassava, cacao, the cotton tree, indigo and coffee plant, and sugar cane, all of which are extensively and profitably grown below the altitude of 4,000 feet. Maize is likewise plentiful, and may be said to form the bread of the Peru-



## Andesite

vians; it is of three different kinds, and, according to Humboldt, is cultivated 7,000 feet above the sea. Within the same limits also are found, either a wild or cultivated state, the pineapple, pomegranate, shaddock, orange, lime, lemon, peach, apricot, together with olives, aji or pepper plants, tomatoes, and sweet potatoes, and gum opal, copaiba balsam, dragon's blood, sarsaparilla, and vanilla. To these groups succeed, in the humid and shaded clefts on the slopes of the cordilleras, the tree ferns, and cinchona or cascarilla, from which we derive the febrifuge bark and quinine. Between the heights of 6,000 and 9,000 feet is the climate best suited for the European cereals. To these may be added the quinoa (*Chenopodium Quinoa*), a most useful production for domestic uses. In this region also, and a little above it, grow the potato (indigenous to Chile and thence introduced into Europe), and various tuberoscous congeners, all pretty extensively used as food; and here likewise grow the chickpea, broad bean, cabbage, and other European vegetables. Within the cereal limits are found the oak, elm, ash, and beech, which never descend lower than 5,500 feet, and seldom rise higher than 9,200 feet above the sea. Above this level the larger forest trees, except the pine, begin to disappear.

**Zoölogy.**—The fauna of the Andes is still very imperfectly known. Among the carnivorous animals the principal are the jaguar, puma, ounce, ocelot, and wild cat. There are also bears, tapirs, raccoons, wild hogs, foxes, and otters, with both red and roe deer. The characteristic animals of the Andes, however, are the llama and its different congeners—the guanaco, vicuña, and paco or alpaca. They are the chief beasts of burden on the Andes. The forests of the warmer regions abound with members of the monkey tribe, etc. Many varieties of serpents are found. Bats are numerous and of large size, the vampire bat being one of the most remarkable. The condor soars over the highest summits and makes its nest among the highest and least accessible rocks; other birds of prey are also numerous. Curassows, wild turkeys, parrots, and parrakeets are common in the woods, and there are also a great many varieties of smaller birds.

**Andesite**, a group of volcanic rocks, gray, reddish or dark brown in color. The ground-mass of these rocks is usually composed of feldspar-microlith, scattered through which are abundant crystals of plagioclase feldspar. Hornblende and augite, one or both, are generally present, together with magnetite, which is often very abundant. Andesite occurs chiefly in Tertiary and more recent strata, and is found in Hungary, Transylvania, Siebengebirge,

## Andorra

Santorin, Iceland, the Andes, the Western part of the United States, etc.

**Andira**, a genus of leguminous American trees, with fleshy plum-like fruits. The wood is well fitted for building. The bark of *andira inermis*, or cabbage-tree, is narcotic and is used as an anthelmintic under the name of worm bark or cabbage bark. The powdered bark of *andira araroba* is used as a remedy in certain skin diseases, as herpes.

**Andocides** (an-dos'i-dēz), an Athenian orator, born in 467 B. C., took an active part in public affairs, and was four times exiled; the first time along with Alcibiades, for profaning the Eleusinian mysteries. Several of his orations are extant. He died about 393 B. C.

**Andorra** (an-dor'a), a valley in the Eastern Pyrenees, between the French department of Ariège and the Spanish province of Lerida, part of Catalonia. It is inclosed by mountains, through which its river, the Balira, breaks to join the Segre at Urgel; and its inaccessibility naturally fits it for being the seat of the interesting little republic which here holds a kind of semi-independent position between France and Spain. Area (divided into six communes), 175 square miles. Population, 6,800, according to an actual numbering made by Bladé in 1875; but it has since been estimated by others as high as 15,000. The former abundant forests have been much thinned for fuel; there is much excellent pasture; vines and fruit trees flourish on the lower grounds; and the mountains contain rich iron mines, unwrought lead supplies and mineral springs. The chief occupations are agriculture, cattle breeding, trade in wood, charcoal and wool, and especially smuggling. Andorra is said to have been declared a Free State by Charlemagne. In 1278 the counts of Foix, afterward kings of Navarre, obtained the sovereignty, reserving the rights of the Bishop of Urgel in Catalonia; and with Henry IV. the feudal superiority fell to France. Now the State stands under the common protectorate of France and of the Bishop of Urgel. The Republic is governed by a sovereign council of 24 members, chosen by certain heads of houses, and the council elects a President for four years, a syndic, under whom is a second syndic. There are two criminal judges called *viguiers* ("vicars"), of whom the first is appointed by France, and the second by the Bishop of Urgel. There is also a civil judge appointed by France and the Bishop of Urgel alternately, and there is an appeal from his judgment to the Court of Cassation at Paris, or to the Episcopal College at Urgel. In criminal cases, there is no appeal from the court of the



Republic itself. The revenue of the State is derived from lands and from some considerable taxes. A sum of 960 francs is paid annually to France, and 425 francs to the Bishop of Urgel. Since 1882, the interests of France in the State are represented by a permanent delegate. The Andorrans are good-natured, hard-working mountaineers, hospitable, moral and devoted to liberty. They are of the Catalonian stock, and speak a dialect of Catalonian. The capital is Andorra la Vieja (pop. 600); San Julian (500) and Canillo (500) are the other towns.

**Andover**, a town in Essex co., Mass.; on the Merrimac river and the Boston and Maine railroad; 23 miles N. of Boston. It is widely known as the seat of a former theological seminary, the Phillips Academy for boys, and the Abbot Academy for girls, and has manufactories of flax, shoes and woolen goods, a National bank, Memorial Hall and school libraries, and a property valuation of over \$4,000,000. Harriet Beecher Stowe lived here many years, and it was also the home of Elizabeth Stuart Phelps Ward. Pop. (1900) 6,813; (1910) 7,301.

**Andrade, José**, a Venezuelan statesman, born in Merida, State of Los Andes, in 1838; brother of Gen. Ygnacio Andrade, President of Venezuela; became President of the State of Zulia, Speaker of the National Congress, Minister of Venezuela at Paris, Rome, Madrid, Berlin, and, in 1893-1899, at Washington; and was distinguished as a scholar, linguist, and diplomat. He died in New York city March 20, 1902.

**Andral, Gabriel** (an-dräl'), a French physician and pathologist, born in Paris, Nov. 6, 1797. In 1827 he was called to the chair of hygiene, in 1830 to that of pathology, in the University of Paris. Andral may be said to have been the first to apply an analytical and inductive method to pathology. His "Medical Clinic" (1824) established his reputation, and his "Summary of Pathological Anatomy" (1829) was equally successful. Other works of importance are his "Essay on Pathological Hæmatology" (1843); "Course in Pathology—Interne;" and "Investigations into the Modification of the Relative Proportions of Hæmatic (Blood) Principles." He died Feb. 13, 1876.

**Andrassy, Julius, Count** (an-dra'shē), Hungarian statesman, born March 8, 1823; studied at the Pest University; took part in the Revolution of 1848; was condemned to death, but escaped and went into exile; appointed Premier when self-government was restored to Hungary, in 1867; became Imperial Minister for Foreign Affairs in 1871; drew up the famous Andrassy note to the Porte in 1876; was a conspicuous member of the Congress of Berlin in 1878; nego-

tiated the German-Austrian alliance with Bismarck in 1879; and the same year retired from public life. The Andrassy "Note" was a declaration relating to the disturbed condition of Bosnia and Herzegovina, formulated by the Governments of Austria, Russia and Germany, with the approval of England and France. It demanded the establishment of religious liberty, the application of local revenues to local purposes, and other reforms. The "Note" was formally presented to the Porte, Jan. 31, 1876. He died Feb. 18, 1890.

**André, John** (an-drä'), a British military officer, born in London in 1751; entered the army in 1771; went to Canada in 1774; and was made prisoner by the Americans in 1775. After his exchange, he was rapidly promoted, and in 1780 was appointed Adjutant-General, with the rank of Major. His prospects were of the most flattering kind when the treason of Arnold led to his death. The temporary absence of Washington having been chosen by the traitor as the most proper season for carrying into effect his design of delivering to Sir Henry Clinton the fortification at West Point, then under his command, and refusing to confide to any but Major André the maps and information required by the British general, an interview became necessary, and Sept. 19, 1780, André left New York in the sloop-of-war "Vulture," and on the next day arrived at Fort Montgomery, in company with Beverly Robinson, an American residing at the lines, through whom the communications had been carried on. Furnished with passports from Arnold, Robinson and André the next day landed and were received by the traitor at the water's edge. Having arranged all the details of the proposed treason, Ar-

André delivered to André drafts of the works at West Point and memoranda of the forces under his command, and the latter returned to the beach in hopes of being immediately conveyed to the "Vulture." But the ferrymen, who were Americans, refused to carry him, and as Arnold would not interpose his authority, he was compelled to return by land. Unfortunately for him he persisted, against the advice of Arnold, in retaining the papers, which he concealed in his boot. Accompanied by Smith, an emissary of Arnold, and provided with a passport under his assumed name of Anderson, he set out and reached in safety



MAJOR ANDRÉ.



## André

a spot from which they could see the ground occupied by the English videttes. At Tarrytown he was first stopped, and then arrested, by three Americans. André offered them his money, horse, and a large reward, but without avail. They examined his person, and, in his boots, found the fatal papers. He was then conveyed to Colonel Jameson, commander of the American outposts. On the arrival of Washington, André was conveyed to Tappan and tried by a board of general officers, among whom were General Greene, the president, Lafayette, and Knox. Every effort was made by Sir Henry Clinton to save him, and there was a strong disposition on the American side to do so. His execution, originally appointed for Sept. 30, did not take place till Oct. 2. If possession could have been obtained of the traitor, the life of André would have been spared. His remains, which were buried on the spot, were afterward removed to London, and now repose in Westminster Abbey.

**André, Louis Joseph Nicolas**, a French military officer, born in Nuits, Burgundy, March 29, 1838. He was graduated at the Polytechnic School, and in 1865 became captain, serving in that capacity throughout the Franco-Prussian War of 1870-1871. He became Major in 1877, Lieutenant-Colonel in 1885, and Colonel in 1888. He was made General of Brigade in 1893, and placed in charge of the Polytechnic School. He married, in 1875, Mlle. Chapuis, a talented singer of the Opera Comique. On May 29, 1900, he was appointed Minister of War by President Loubet, succeeding General the Marquis de Gallifet, who held the office during the exciting period of the Dreyfus revision.

**André, St., Jacques d'Albon**, Marquis of Fronsac, generally known as Marshal of St. André, a French nobleman, who, in 1547, was made gentleman of the bedchamber by Henry II. In 1550 he was deputed to bear the collar of his order to Henry VIII. of England, by whom he was invested with that of the Garter. On his return he was appointed to the command of the army in Champagne, where he greatly distinguished himself; but at the battle of St. Quentin was taken prisoner. On the death of Henry II. he was chosen one of the regency. Killed at the battle of Dreux, in 1562. The Huguenots called St. André "The Harquebusier of the West."

**Andrä, Jakob** (an'drā-ē), a German Protestant theologian, born in Würtemberg, March 25, 1528; became Professor of Theology and Chancellor of the University of Tübingen in 1562, and was author of over 150 works, nearly all of a polemical character, besides being the chief author of

## Andreas

the "Formula Concordiæ." He died in Tübingen, Jan. 7, 1590.



JAKOB ANDREÄ.

**Andreaä, Johann Valentin**, a very original thinker and writer, born in 1586, near Tübingen. He studied at Tübingen, became a Protestant pastor, and died in 1654 at Stuttgart, where he was chaplain to the court. Eminently practical in mind, he was grieved to see the principles of Christianity made the subject of mere empty disputations, and devoted his whole life to correct this prevailing tendency of his age. His writings are remarkable for the wit and humor, as well as for the acuteness and moral power, which they display. He was long regarded as the founder or restorer of the order of the Rosicrucians, a view based on his quaint, but misunderstood, "Chemical Jubilee of Christian Rozenkreuz" (1616). But his intention was certainly not to originate or promote a secret society of mystics, but to ridicule the follies of the age, including the theosophic Rosicrucians. He wrote mainly in Latin, but also in the Suabian dialect. Among the best of his works are his "Menippus, or a Hundred Satyric Dialogues" (1617), and his "Spiritual (Clerical) Relaxation" (1619).

**Andrea del Sarto.** See SARTO.

**Andreas, John**, a famous canonist of Florence. His austerity was such that he was said to have lain upon the bare ground for 20 years, with nothing to cover him but a bear-skin. He had a daughter of great beauty and learning, who was accustomed to lecture to his students during his absence, concealed behind a curtain, that the attention of the auditors might not be taken off by her beauty. Her name was Novella, and in her honor he called one of his commentaries "The Novellæ." Died of the plague in 1348.



## Andrée

**Andrée, Solomon Auguste** (an-drā'), a Swedish aëronaut, born Oct. 18, 1854; educated for a civil engineer. In 1882, he took part in a Swedish meteorological expedition to Spitzbergen. In 1884 he was appointed chief engineer to the patent office, and from 1886 to 1889 he occupied a professor's chair at Stockholm. In 1892 he received from the Swedish Academy of Sciences a subvention for the purpose of undertaking scientific aërial navigation. From that time Dr. Andrée devoted himself to aërial navigation, and made his first ascent at Stockholm in the summer of 1893. In 1895 he presented to the Academy of Sciences a well-matured project for exploring the regions of the North Pole with the aid of a balloon. The estimated cost amounted to about \$40,000.



SOLOMON AUGUSTE ANDRÉE.

A national subscription was opened, which was completed in a few days, the King of Sweden contributing the sum of \$8,280. With two companions, Dr. S. T. Strindberg and Herr Fraenckell, he started from Dane's island, Spitzbergen, July 11, 1897. His balloon was 67¼ feet in diameter, with a capacity of 170,000 cubic feet. Its speed was estimated at from 12 to 15 miles an hour, at which rate the Pole should have been reached in six days, provided a favorable and constant wind had been blowing. Two days after his departure, a message was received from Dr. Andrée by carrier pigeon, which stated that at noon, July 13, they were in latitude 82.2°, and longitude 15.5° E., and making good progress to the E., 10° southerly. This was the last word received from the explorer.

**Andreini, Giovanni Battista** (än-dra-ē'nē), an Italian comedian and poet, born in Florence, 1578. From his sacred drama, "Adam" (1613), Milton is by some supposed to have derived the idea of "Paradise Lost." He died in Paris about 1650.

**Andreossy** (an'dres-ē), **Antoine François, Comte**, a French general and statesman, was born on March 6, 1761, at Castel-

## Andrew

naudary, in Languedoc. He entered the artillery in 1781, joined the revolutionists, rose rapidly in military rank, served under Bonaparte in Italy and Egypt, and took part in the revolution of the 18th Brumaire. He served as Ambassador at London, at Vienna, and at Constantinople, from which he was recalled at the restoration. He was raised to the peerage by Napoleon after his return from Elba. After the battle of Waterloo, he advocated the recall of the Bourbons; but, as deputy, he generally took part with the Opposition. He was elected to the Academy in 1826, and died at Montauban on Sept. 10, 1828. He was a man of eminent scientific attainments, one of his earliest works being the "Histoire Générale du Canal du Midi." Besides his scientific works, he wrote several military "Memoirs."

**Andrew**, the first disciple, and one of the apostles of Jesus. His career after the Master's death is unknown. Tradition tells us that, after preaching the gospel in Scythia, Northern Greece, and Epirus, he suffered martyrdom on the cross at Patræ, in Achaia, 62 or 70 A. D. The anniversary of St. Andrew falls on Nov. 30. About 740, St. Andrew became the patron saint of Scotland and he is held in veneration in Russia, as the apostle who, according to tradition, first preached the Gospel in that country.

The Cross of St. Andrew is a white saltire on a blue ground, to represent the X-shaped cross on which the patron saint of Scotland suffered martyrdom, has been from an early date adopted as the national banner of Scotland. It is combined with the crosses of St. George and St. Patrick in the Union Jack. The Scottish Order of the Thistle is sometimes known as the Order of St. Andrew.

The Order of St. Andrew, the highest in the Russian Empire, founded by Peter the Great in 1698. It has but one class, and is confined to members of the imperial family, princes, and persons of the rank of general who already hold two other important orders. The badge of the Order shows on the obverse the double-headed eagle, crowned, on which is a St. Andrew's cross, enameled in blue, with a figure of the saint.

**Andrew**, King of Naples, son of Charobert, King of Hungary, was assassinated with the connivance of his queen in 1345.

**Andrew I.**, King of Hungary, in 1046-1049; compelled his subjects to embrace Christianity; he was killed in battle in 1058.

**Andrew II.**, King of Hungary, 1205-1235. He was in the crusades, and displayed great valor in battle; he attempted to ameliorate the condition of his subjects, and died in 1235.

**Andrew III.**, King of Hungary, 1290-1301. He was opposed in his claims to the throne, and involved in a civil war during his reign; he died in 1301.



## Andrews

**Andrews, Charles McLean**, an American historical and descriptive writer, born in Wethersfield, Conn., Feb. 22, 1863; became Professor of History at Bryn Mawr College; author of "Historical Development of Modern Europe," "River Towns of Connecticut," "The Old English Manor," etc.

**Andrews, Christopher Columbus**, an American diplomat and writer, born at Hillsboro, N. H., Oct. 27, 1829; was brevetted Major-General in the Civil War; United States Minister to Sweden from 1869 to 1877, and Consul-General to Brazil from 1882 to 1885. Among his numerous works are "Minnesota and Dakota" (1857); "Practical Treatise on the Revenue Laws of the United States" (1858); "History of the Campaign of Mobile" (1867), and "Brazil, Its Condition and Prospects" (1887).

**Andrews, Elisha Benjamin**, an American educator, born in Hinsdale, N. H., Jan. 10, 1844; he was graduated at Brown University, 1870, and Newton Theological Seminary, 1874; President of Brown University in 1889-1898; became Superintendent of Public Schools in Chicago in 1898, and Chancellor of the University of Nebraska in 1900; author of a "History of the United States," "An Honest Dollar: a Plea for Bimetallism," etc.

**Andrews, Ethan Allen**, an American educator and lexicographer, born at New Britain, Conn., April 7, 1787; Professor of Ancient Languages at the University of North Carolina, 1822-1828; edited the "Religious Magazine" with Jacob Abbott, whom he succeeded as principal of the Young Ladies' School in Boston; but his chief work was compiling classical text-books. He edited the well known "Latin-English Lexicon" (1850), based on Freund; and "Andrews and Stoddard's Latin Grammar" was for many years the leading one in America. He died in 1858.

**Andrews, Jane**, an American juvenile story writer, born in Massachusetts in 1833; among her stories for children which have enjoyed great popularity are "Seven Little Sisters Who Live on the Round Ball That Floats in the Air" (1876); "The Stories Mother Nature Told;" "The Seven Little Sisters Prove their Sisterhood" (1878); "Ten Boys on the Road from Long Ago to Now" (1885); "Only a Year and What It Brought" (1887). She died in 1887.

**Andrews, John N.**, an American military officer, born in Delaware, in 1838; was graduated at West Point in 1860; served with distinction through the Civil War; commissioned Colonel of the 12th United States infantry in 1895; and appointed a Brigadier-General of Volunteers for the war against Spain in 1898.

**Andrews, Lorrin**, an American missionary, born in East Windsor, Conn., April 29, 1795; was educated at Jefferson College and

## Andromeda

Princeton Theological Seminary, and went as a missionary to the Hawaiian Islands in 1827. He founded, in 1831, the Lahainaluna Seminary, which later became the Hawaii University, where he served 10 years as a professor. He translated a part of the Bible into the Hawaiian language. In 1845 he became a judge under the Hawaiian Government and Secretary of the Privy Council. He produced several works on the literature and antiquities of Hawaii, and a Hawaiian dictionary. He died in 1868.

**Andrews, Stephen Pearl**, an American writer, born at Templeton, Mass., March 22, 1812; was a prominent abolitionist, practiced law in the South, and settled in New York in 1847. He paid much attention to phonographic reporting, and also to the development of a universal philosophy which he called "Integralism," and of a universal language, "Alwato." Besides numerous works relating to these subjects, he wrote "Comparison of the Common Law with the Roman, French, or Spanish Civil Law on Entails, etc.;" "Love, Marriage, and Divorce;" "French, With or Without a Master;" "The Labor Dollar" (1881); "Transactions of the Colloquium" (a society founded by himself and his friends for philosophical discussion, 1882-1883). He contributed to the London "Times" and other papers, and was a member of the American Academy of Arts and Sciences and the American Ethnological Society. He died at New York, May 21, 1886.

**Andromache** (an-drom'ak-ē), a daughter of Ætion, King of Thebes in Cilicia, and wife of Hector. After the conquest of Troy she became the prize of Pyrrhus, son of Achilles, who carried her to Epirus, and had three sons by her, but afterward left her to Helenus, brother of Hector, to whom she bore a son. Euripides has made her the chief character of a tragedy.

**Andromachus** (an-drom'ak-us), physician to the Emperor Nero, and the inventor of a celebrated compound medicine, called *theriacle*, described in Galen's works. Lived in the 1st century A. D.

**Andromeda** (an-drom'e-da), in classical mythology a daughter of Cepheus, King of Ethiopia and Cassiope. It was fabled that she was chained to a rock by order of Jupiter Ammon, and then exposed to the attacks of a monster. Perseus released, and afterward married her. On her death she was changed into the constellation which bears her name.

In astronomy, a constellation, fancifully supposed to resemble a woman chained. It is in the northern hemisphere, and is surrounded by Cassiopeia, Lacerta, Pegasus, Pisees, Triangulum, and Perseus. It contains the bright stars Almach and Mirach, and Alpherat is on the boundary line be-



tween it and Pegasus. There is in the girdle of Andromeda a fine elliptic nebula, visible to the naked eye, and continually mistaken by the uninitiated for a comet. On Sept. 21, 1898, the astronomers of the Pulkowa Observatory in Russia announced



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that they had discovered a stellated condensation in the center of this nebula, indicating that its nucleus is composed of stars instead of gas, like the matter surrounding it.

In botany, a genus of plants belonging to the order *ericaceæ*, or heath-worts. A species (the *A. polifolia*, or marsh andromeda) occurs in the bogs of Britain, the desolate character of the localities which it inhabits recalling to classical minds of fanciful tendency the barren rock to which Andromeda was chained. The marsh andromeda is an evergreen shrub, with beautiful, rose-colored drooping flowers. Its shoots poison sheep, as do those of the *A. mariana*, which grows in America; and the *A. ovalifolia*, of Nepaul, acts with similar effect upon goats.

**Andronicus** (an-dron'ē-cus), of Cyres-thes; a Greek architect, celebrated for having constructed, at Athens, the tower of the winds, an octagonal building, on each side of which was a figure representing one of the winds. On the top of the tower was a small pyramid of marble supporting a brazen Triton, which turned on a pivot, and pointed with its rod to the side of the tower on which was represented the wind that was then blowing. As each of the sides had a sort of dial, it is conjectured that it formerly contained a clepsydra or water clock.

**Andronicus I.** (Comnenus), grandson of Alexius I., was one of the most conspicuous characters of his age, which produced no man more brave, more profligate, or more perfidious. In his youth he served against the Turks, in 1141 was for some

time a prisoner, and was afterward appointed to a military command in Cilicia, but was unsuccessful. Having engaged in a treasonable correspondence with the King of Hungary, he was thrown into prison by his cousin, the Emperor Manuel; but after 12 years he succeeded in making his escape, and reached Kiev, the residence of Prince Jaroslav. He regained the favor of his cousin by persuading Jaroslav to join him in the invasion of Hungary, and by his gallantry in that war; but soon incurred his displeasure again, and was sent in honorable banishment to Cilicia. After a pilgrimage to Jerusalem, and his scandalous seduction of Theodora, the widow of Baldwin, King of Jerusalem, he settled among the Turks in Asia Minor, with a band of outlaws, making frequent inroads into the province of Trébizonde; but at length made his peace with the Emperor, and was sent to Cœne in Pontus. After the death of Manuel in 1182, he was recalled to become, first guardian, then colleague, of the young Emperor Alexius II. Soon after, he caused the Empress-mother to be strangled, and afterward Alexius himself, with whose youthful widow he contracted an indecent marriage. His reign, though short, was vigorous, and restored prosperity to the provinces; but tyranny and murder were its characteristics in the capital. At last, a destined victim, Isaac Angelus, one of his relatives, having fled to the Church of St. Sophia for sanctuary, a crowd gathered, and a sudden insurrection placed Isaac on the throne, while Andronicus, now 73 years of age, was put to death by the infuriated populace, after horrible mutilations and tortures, on Sept. 12, 1185.

**Andronicus, Livius.** See LIVIUS ANDRONICUS.

**Andros**, an island of the Greek Archipelago, the most northern of the Cyclades, separated from Eubœa by a channel, the Doro Channel, 6 miles broad. The island is 25 miles long, and about 10 miles in its greatest breadth, the area being 156 square miles. Its eastern coast is very irregular. It is mountainous, and on some of its mountains snow lies during great part of the year. The soil is remarkably fertile, and wine, silk, olives, and lemons are produced. The population in 1879 was 22,562. The chief town, Andros, is situated on a bay of the eastern coast. It has a little harbor, and about 1,800 inhabitants.

**Andros Islands**, a group of islands belonging to the Bahamas, lying between lat. 23° 41' and 25° 10' N.; long. 77° 30' and 78° 32' W. The passages between these islands are intricate and dangerous. The principal island, Andros, which gave its name to the others, is about 70 miles long by 10 broad, at its broadest part. The interior of the largest of these islands is composed of extensive salt marshes and fresh



## Andros

water swamps, in which are islands valuable for their timber; consisting mostly of cedar of superior quality. The sea board is habitable only during the summer months, owing to the myriads of mosquitoes and other insects that infest the low ground.

**Andros, Sir Edmund**, an English provincial governor, born in 1637; was Governor of New York in 1674-1682, and of New England, with New York included, in 1686-1689. His harsh execution of the orders of the Duke of York caused him to be generally execrated, and, after his attempt to deprive Connecticut of its royal charter, he was seized by the people of Boston and sent to England under charges. He was also Governor of Virginia in 1692-1698, and of the Island of Jersey in 1704-1706. He died in 1714.

**Androscoggin**, a river of the United States; rises in the W. of Maine near the N. E. corner of New Hampshire, flows S. partly through New Hampshire, then E., re-entering Maine, then S. and S. E., passing Auburn and Brunswick, and finally joins the Kennebec a few miles above Bath; not navigable.

**Andujar**, a city in the province of Jaén, Spain; on the Guadalquivir river, 44 miles N. E. of Cordova. Here an engagement took place between the French and Spanish and the convention of Bailen was signed, both in 1808; and the French assumed superior authority over the Spanish officials in 1823. Pop. (1900) 16,302.

**Anecdote**, originally something kept unpublished, secret history, or an ancient work not in fact published, though there was no intention of keeping its contents undivulged. The best collection of anecdotes, in this first sense of the word, is generally said to have been that of Muratori, in A. D. 1709; but the thing, if not the name, must have been much older. It is also a short, but generally striking, narrative of some single event in a person's history, related generally with a view of exhibiting his characteristic peculiarities. Among the best collections of anecdotes, in the modern sense, are the "Percy Anecdotes," sent forth by George Byerley and Joseph Clinton Robinson.

**Anegada** (an-e-gä'da), the most northerly of the Virgin Islands, lying E. of Porto Rico in the West Indies. It contains about 13 square miles, with a scanty population of 200, and belongs to England. A little cotton is grown. The island is of coral formation, and beset with reefs; but the shipwrecks for which these were notorious are now rare, thanks to the lighthouse on Sombrero.

**Anemometer**, an instrument designed to measure the velocity of the wind, on which its strength depends. It was invented by Wolfins in 1709. Anemometers have been

## Aneurin

made of three kinds; 1st, those in which a windmill twists string round an axle against pressure; 2d, those in which a defined surface, say of a foot square, is pressed against a spring; 3d, those in which water or some other liquid is made to stand at a higher level in one leg of an inverted siphon than in the other. The anemometer now most commonly in use is more akin to the first, which also was the earliest type of the instrument, than it is to the second or the third. Four light metallic hemispheres, called from Dr. Robinson, who first employed them, Robinson's cups, are made to revolve like a vane or weather-cock, and are found to do so at the rate of exactly one-third the velocity of the wind. The result is then recorded in pencil marks by a self-registering apparatus.

**Anemone**, a genus of plants belonging to the order *ranunculaceæ*, or crowfoots. What to the uninitiated seems a corolla is in reality a petaloid calyx highly developed. *A. coronaria* and *hortensis* are common garden flowers.

In zoölogy, it is a popular name given to various radiated animals which present a superficial resemblance to the anemone, but really look more like the chrysanthemum or some others of the *compositæ*. The anemone, meaning the sea-anemone, is *A. mesembryanthemum*, called also the bendlet; the snake-headed anemone is the *sagartia viduata*, and the plumose anemone is the *actinoloba dianthus*.

**Anemoscope**, an instrument for rendering visible the direction of the wind. In that commonly used there is a vane exposed to the wind acting upon an index moving round a dial-plate on which the 32 points of the compass are engraved.

**Aneroid**, not containing any liquid; used chiefly in the expression, "aneroid barometer."

An aneroid barometer is a barometer not containing a liquid, but constructed on a totally different principle from a mercurial barometer. Various forms of the instrument exist. One of these consists of a cylindrical metal box exhausted of air, and having its lid of thin corrugated metal. As the pressure increases, the lid, which is highly elastic, and has a spring inside, is forced inward; while, again, as it diminishes, it is forced outward. Delicate multiplying levers then transmit these motions to an index which moves on a scale, and is graduated empirically by a mercurial barometer. It is wonderfully delicate, but is apt to get out of order, particularly when it has been exposed to great variations of pressure. From its portability it is much used for determining the heights of mountains.

**Aneurin** (an-ū'rin), a poet and prince of the Cambrian Britons, who flourished about



600 A. D., author of an epic poem, the "Gododin," relating the defeat of the Britons of Strathclyde by the Saxons at the battle of Cattraeth.

**Aneurism**, a morbid dilatation of the aorta, or one of the other great arteries of the body. Four varieties of this malady have been described. In the first the whole circumference of the artery is dilated; in the second, or true aneurism, the dilatation is confined to one side of the artery, which then takes the form of a sac; in the third, or false aneurism, the internal and middle coats of the artery are ulcerated or ruptured, while those which are external or cellular expand into a sac; in the fourth, or mixed variety, the false supervenes upon the true aneurism, or upon dilatation.

**Angara**, a Siberian river which flows into Lake Baikal at its N. extremity, and leaves it near the S. W. end, latterly joining the Yenisei as the Lower Angara or Upper Tunguska.

**Angel**, a messenger, one employed to carry a message, a *locum tencens*, a man of business.

In a special sense an angel is one of an order or spiritual beings superior to man in power and intelligence, vast in number, holy in character, and thoroughly devoted to the worship and service of God, who employs them as his heavenly messengers. Their existence is made known to us by Scripture, and is recognized also in the Parsee sacred books.

"We find, as far as credit is to be given to the celestial hierarchy of that supposed Dionysius, the senator of Athens, the first place or degree is given to the angels of love, which are termed seraphim; the second to the angels of light, which are called cherubim; and the third, and so following places, to thrones, principalities, and the rest, which are all angels of power and ministry, so as the angels of knowledge and illumination are placed before the angels of office and dominations." (Lord Bacon's "Advent of Learning," bk. i.)

We learn from Scripture that many angels, originally holy like the rest, fell from their pristine purity, becoming so transformed in character that all their powers are now used for the purpose of doing evil instead of good. These are to be identified with the devils so frequently mentioned in Holy Writ.

The word is also applied to a spirit which has assumed the aspect of some human being. The reference probably is to the Jewish belief that each person has his or her guardian angel.

Angel is likewise the name of a beautiful fish, which has its body covered with large green scales, and the laminae above the gills armed with cerulean spines. It is one of the chætodons, and occurs on the coast of Carolina. It is quite different from the angel fish.

In numismatics, an angel is a gold coin, named from the fact that on one side of it was a representation of the Archangel Michael in conflict with the Dragon (Rev. xii: 7). The reverse had a ship with a large cross for the mast, the letter E on the right side, and a rose on the left; while against the ship was a shield with the usual arms. It was first struck in France in 1340, and was introduced into England by Edward IV. in 1465. Between his reign and that of Charles I. it varied in value from 6s. 8d. to 10s. It is not now current either in France or England. The last struck in England were in the reign of Charles I.

**Angel Fish**, a fish of the *squalidæ*, or shark family, the reverse of angelic in its look, but which derived its name from the fact that its extended pectoral fins present the appearance of wings. It is called also monk-fish, fiddle-fish, shark-ray, and kingston. It is the *squatina angelus* of Duméril, the *squalus squatina* of Linnæus. It has an affinity to the rays as well as to the sharks. It lies close to the bottom of the sea, and feeds ravenously on flat-fishes. It sometimes attains the length of seven or eight feet. It is found on the coasts of Europe and North America.

**Angelica**, a genus of plants of the natural order *umbelliferæ*, by some botanists divided into two, *angelica* and *archangelica*. The species are mostly herbaceous and perennial, natives of the temperate and colder regions of the northern hemisphere. Wild angelica (*A. sylvestris*) is a common plant in moist meadows, by the sides of brooks, and in woods in Britain and throughout many parts of Europe and Asia. The garden angelica (*A. archangelica* or *archangelica officinalis*) is a biennial plant, becoming perennial when not allowed to ripen its seeds. The whole plant, and especially the root, is aromatic and bitter, with a pleasant, somewhat musky color, and contains much resin and essential oil. The root was greatly valued in the Middle Ages as a specific against poisons, pestilential diseases, witchcraft, and enchantments, and was long employed as an aromatic stimulant and tonic, and in nervous and digestive ailments. The garden angelica was at one time also much cultivated for the blanched stalks, which were used as celery now is. The tender stalks and midribs of the leaves, candied, are still, however, a well-known article of confectionery, and an agreeable stomachic; the roots and seeds are employed in the preparation of gin and of bitters. The roots are occasionally ground and made into bread in Norway, and the Icelanders eat the stem and roots raw, with butter. Several species of angelica are natives of North America.

**Angelico, Fra**, the commonest designation of the great friar-painter — in full,



"Il beato Fra Giovanni Angelico da Fiesole," "the blessed Brother John the angelic of Fiesole." Born in 1387 at Vicchio, in the Tuscan province of Mugello, in 1407 he entered the Dominican monastery at Fiesole, in 1436 he was transferred to Florence, and in 1445 was summoned by the Pope to Rome, where thenceforward he chiefly resided till his death in 1455. Of course, his frescoes, such as have not perished, are all in Italy — at Cortona, at Fiesole, in the Florentine convent of San Marco (now a museum), at Orvieto, and in the Vatican chapel of Nicholas V. Of his easel pictures, the Louvre possesses a splendid example, "The Coronation of the Virgin," and the London National Gallery (since 1860) a "Glory," or Christ with 265 saints. One supreme aim pervades all the creations of Fra Angelico — that of arousing devotional feeling through the contemplation of unearthly loveliness.

**Angell, George Thorndike**, an American reformer, born in 1823. He was graduated at Dartmouth, 1846, and admitted to the bar, 1851; was active in promoting measures for the prevention of crime, cruelties, and the adulteration of food; and founded the American Humane Educational Society. He died March 16, 1909.

**Angell, James Burrill**, an American educator and diplomatist, born in Scituate, R. I., Jan. 7, 1827; was graduated from Brown University in 1850. He assumed the presidency of the University of Vermont in 1866, and that of the University of Michigan in 1871. He was Minister to China, 1880–1881, and to Turkey, 1897–1898. In 1900–1910 he resumed the presidency of the University of Michigan.

**Angell, Joseph Kinnicut**, an American lawyer, born in Providence, R. I., in 1794; best known for his works on "Treatise on the Right of Property in Tide-Waters," and "The Limitation of Actions at Law and in Equity and Admiralty." He died in 1857.

**Angeln** (ang'eln), a district in Schleswig of about 300 square miles, bounded N. by the Bay of Flensburg, S. by the Schlei, E. by the Baltic, the only continental territory which has retained the name of the ANGLES.

**Angelo (Michael Angelo Buonarroti)**, the most distinguished sculptor of the modern world, was born on March 6, 1475. His father, Ludovico di Leonardo Buonarroti Simoni, was a poor gentleman of Florence, who, though bankrupt in fortune, did not lack the consideration which is paid to ancient lineage. When the sculptor was born, his father was *podesta*, or mayor, of Caprese and Chiusi, two townships in Tuscany. He returned to Florence when his term of office was expired, and the child was intrusted to the fostering care of a stonemason's wife at Settignano, where Ludovico owned a small property. The boy's enthusiasm for art revealed itself at an early age, and, though he

was sent to the school of Messer Francesco di Urbino to learn the elements, his best energies were devoted to drawing. To his father's aristocratic prejudice sculpture seemed a calling unworthy of a gentleman. The lad, however, was resolute, and, in 1488, while yet only 13 years of age, he entered the *bottega* of Domenico Ghirlandajo, to whom he was bound apprentice for three years. None was ever more fortunate than Michael Angelo in the time and place of his birth. From his boyhood he was familiar with the masterpieces of Donatello, and he joined his contemporaries in making a pilgrimage to the Convent of the Carmine, where he studiously copied the supreme examples of Masaccio's art. By Ghirlandajo he was recommended to Lorenzo de Medici, and entered the school which the "Magnifico" had established in his garden on the Piazza. Here was gathered together, under the care of Bertoldo, a priceless collection of antiques, and here Michael Angelo encountered what proved the most enduring influence of his life. His talent was not long in arresting the notice of Lorenzo, who henceforth gave him a room in his house and a seat at his table; and to the beneficence of his patron he owed the acquaintance of Poliziano and many of the most learned of the day. To this period belong two interesting reliefs. In the "Battle of the Centaurs" (now in the Casa Buonarroti at Florence) the classical influence of Lorenzo's garden is strikingly apparent. In truth it has little of the dignified calm which distinguishes the work of Phidias and his contemporaries; the style of a later period was its inspiration; but it reveals the lasting characteristics of Michael Angelo's genius. The inexhaustible variety of pose, the straining muscles, the contorted limbs, which mark the artist's mature work, are already visible. A marvellous contrast to the "Centaurs" is the "Madonna," conceived and executed in the spirit of Donatello, which, without a suggestion of movement, is quiet and harmonious in composition, and though not consciously antique, is far more classical.

In 1492, when Michael Angelo had spent some three years in his house, Lorenzo died, and the school which had conferred so great benefits upon art was straightway dissolved. Piero, Lorenzo's son and successor, it is true, retained for a time the services of Michael Angelo, but he is said to have treated him with scant courtesy; and Michael Angelo fled to Bologna. Nor did he here wait long for a patron; Gianfrancesco Aldrovandi commissioned him to execute a statue. In Bologna the sculptor lingered for a year; then he once more (in 1495) returned to Florence. It was during this sojourn in his native city that he fashioned the marble "Cupid," to which he owed his first intro-



duction to Rome. Baldassare del Milanese persuaded him to give the work the air of an antique by burial, and dispatch it to Rome. Here it was purchased by Cardinal San Giorgio, who, though he speedily discovered the fraud which had been put upon him, was quick to detect the talent of the sculptor who had tricked him. He therefore summoned him to Rome, and on June 25, 1496, Michael Angelo arrived for the first time in the Eternal City. The influence of Rome and the antique is easily discernible in the "Bacchus," now in the National Museum at Florence; it is modeled with an elegance and restraint which are evidence of the hold which the classical tradition, as interpreted by the Græco-Roman sculptors, had upon Michael Angelo. To the same period belongs the exquisite "Cupid" of the South Kensington Museum. The "Pieta," which is now in St. Peter's, was executed in 1497, but presents an amazing contrast. There is in it a touch of the Middle Ages, a suggestion of realism which is wholly at variance with the antique ideal. But it is beautifully composed, the drapery is handled with a masterly breadth, and the body of the dead Christ is an epitome of anatomical research.

For four years the sculptor remained in Rome, perpetually urged to return to Florence by his father, who, though he objected to his son's craft as unbefitting his station, was nothing loth to profit by the wealth which was the reward of artistic success. Michael Angelo went back; and Soderini, who was then gonfaloniere, permitted him to convert into a statue the colossal block of marble upon which Agostino d'Antonio had been at work many years before, and out of the irregular block grew the celebrated "David." The sculptor was compelled to modify his composition on account of the shape and size of his material. Indeed, it is characteristic of this Titan's impetuous genius that obstacles were ever an incentive. His "David" is the Gothic treatment of a classic theme. The influence of the antique is obvious, but the personal touch of the sculptor is also apparent (especially in such details as the treatment of the hands). The figure is modeled with strength and simplicity; the surface is not furrowed by an endless series of lines; there is no parade of anatomical knowledge; in pose and composition there is a stately grandeur, a dignified solemnity, which do not for an instant suggest that the artist was hampered by material difficulties. Indeed, so far from being a *tour de force*, it is a complete, well-ordered achievement. In 1504 it was placed upon its pedestal in the Piazza de' Signori, whence it was removed in 1873 to the Academy of Arts. Michael Angelo's sojourn in Florence was a period of great activity. A second "David" (this time of bronze) was

commissioned and sent to France, where all trace of it is lost. The sculptor also designed two marble reliefs, one of which passed into the possession of Sir George Beaumont, and is now at Burlington House. The "Holy Family of the Tribune" and the "Manchester Madonna," in the National Gallery belong to the same time, and prove that Michael Angelo had not wholly neglected the art of painting. His genius, however, was essentially plastic. He had far more interest in form than in color; indeed, in his hands pictorial art was but an opportunity for the vigorous modeling of the human form. The zeal of Soderini, the gonfaloniere, in the cause of art inspired the scheme of decorating the Great Hall of the Council. For one wall Leonardo da Vinci was commissioned to design a fresco; a second was intrusted to Michael Angelo. The latter chose as his subject an incident in the war of Pisa, and executed a cartoon which Vasari, with devout exaggeration, proclaims to have been of divine rather than of human origin. A body of soldiers were represented bathing; their camp has been attacked by the enemy, and they are hastening to seize their arms and repulse the assault. The motive is admirable, and gave the artist scope for the variety of pose and the violent action in which he took peculiar delight. The fresco was never completed, and on the return of the Medici to Florence the cartoon was removed to the hall of their palace, to which painters were permitted unrestrained access. The result was that over-zealous admirers of Michael Angelo cut the cartoon to pieces. The original is lost, as irretrievably as the masterpieces of Zeuxis and Apelles; and our impression of it is obtained from literary sources, from the engravings of Marcantonio and Agostino Veneziano, who reproduced single groups, and from a suspicious copy at Holkham Hall.

In 1503 Julius II. succeeded to the pontificate, and, being not merely a warrior, but a patron of the arts as well, he lost no time in summoning Michael Angelo to Rome. In Michael Angelo the sturdy Pope met his match. The two men, indeed, were not unlike in temperament. Each was endowed with the extraordinary vigor of mind and body which was the best characteristic of the renaissance. But both had the defects of their qualities; Michael Angelo, no less than Julius, was violent and overbearing; the sculptor could as little brook opposition as the Pope, and their dealings were continually interrupted by bitter quarrels and recriminations. It is impossible to accept Vasari's anecdotes as statements of the literal truth, but there is no doubt that they have solid foundation in fact. Had Michael Angelo known the misery and disappointment which were in store for him, he might



well have hesitated before obeying the summons of Julius. The Pope commissioned the sculptor to design his tomb, and thus began what Condivi aptly calls *la tragedia della sepoltura*. For 40 years Michael Angelo clung to the hope that he would yet complete the great monument in honor of Pope Julius and his own genius. But intrigue and spite were too strong for him. Other demands were continually made upon his energy, and the sublime statue of Moses is the best fragment that is left to us of the tomb of Julius. However, at the outset both Pope and sculptor were full of enthusiasm. The plans were approved and the work would have at once proceeded had not the sculptor one day asked audience of the Pope in vain. In a sudden fit of temper, Michael Angelo left Rome, and the entreaties of the Pope availed not to procure his return. After much fruitless negotiation, they met at Bologna, and, with the generosity that was characteristic of both, were instantly reconciled. Michael Angelo, as a pledge of renewed friendship, commenced a statue of Julius II., which was cast in bronze and placed over the gate of San Petronio (afterward melted down and converted into a cannon). Michael Angelo followed the Pope to Rome, eager to resume his work upon the monument. In the meantime, however, Bramante, if Vasari's account be true, had poisoned the Pope's mind against the sculptor; instead of being allowed to devote himself to the monument, which he deemed the work of his life, he was ordered to decorate the ceiling of the Sistine Chapel with paintings. In vain he protested that sculpture was his profession, in vain he urged Raphael's higher qualifications for the task; the Pope was obdurate, and in 1508 Michael Angelo began the work for which his training had ill adapted him. However, he set himself resolutely to the toil, and in four years achieved a masterpiece of decorative design. The flat oblong space of the ceiling is divided into nine compartments, each of which contains an incident drawn from the Old Testament. The lunettes above the windows, the spandrels, as well as the ressaunts between the lunettes, are filled with heroic figures. The designs are admirably accommodated to the space they are intended to fill, and the broad effect is one of harmony and homogeneity. It is only when you analyze the composition and examine each compartment by itself that you realize the superhuman invention, the miraculous variety of attitude and gesture, which place this marvelous work among the greatest achievements of human energy. Michael Angelo, however, had not forgotten the monument of Pope Julius, and no sooner had he finished his work in the Sistine Chapel than he returned with eagerness to the tomb. But once again

his favorite project was interrupted. In 1513 Pope Julius II. died, and, though he had commanded the cardinals, Santi Quattro and Aginense, to see that his monument was completed in accordance with his expressed wishes, the cardinals were thrifty men, and demanded of Michael Angelo another and a more modest design. This was furnished, but before the work could be undertaken, Pope Leo X. had dispatched Michael Angelo on business of his own to Florence. Leo was of the Medici family, and professed no interest in the tomb of his predecessor; his whole anxiety was to do honor to his ancestors by the adornment of Florence. He, therefore, commissioned Michael Angelo to rebuild the façade of the Church of San Lorenzo and enrich it with sculptured figures. The master reluctantly complied, and set out for Carrara to quarry marble. Even here the Pope would not permit Michael Angelo to work his will, but urged him to leave Carrara and seek what material he needed at Serravezza, which lay in Leo's own territory. In vain the sculptor insisted that the marble was of inferior quality, and that to convey it to Florence, roads must be cut through mountains and laid upon stakes over marsh-land and swamp. Leo X. was deaf to reason, and for eight years Michael Angelo was forced to devote himself to toil as idle as that of Sisyphus; from 1514 to 1522 his artistic record is a blank. Nor were the next years fruitful of achievement. The sculptor remained in Florence still working on the tomb of Julius and building the Sacristy of San Lorenzo. In 1528 the unsettled state of his native city turned him again from the practice of his art. He devoted himself heart and soul to the science of fortification, and when, in 1529, Florence was besieged, Michael Angelo was foremost in its defense. The city was forced to surrender in the following year, and for some time Michael Angelo, fearing treachery, lay in concealment. His safety, however, being assured, he resumed his work upon the tombs of the Medici, and completed the monuments to Giuliano and Lorenzo de' Medici, which are among the greatest of his works. In 1533 yet another compact was entered into concerning Pope Julius' ill-fated sepulcher; it was at last determined to reduce it to a mere façade, and Michael Angelo would doubtless have carried it to completion had he not been once again commissioned to adorn the Sistine Chapel with frescoes. After a delay of some years, he began, in 1537, to paint "The Last Judgment." The design was finished and displayed on the Christmas-day of 1541, and was the master's last pictorial achievement. In the following year he was appointed architect of St. Peter's, and devoted himself to the work with loyalty and devotion until his death, which took place on Feb. 18, 1564.



## Angelus

**Angelus**, in the Roman Catholic Church, a short form of prayer in honor of the incarnation, consisting mainly of versicles and responses, the angelic salutation three times repeated, and a collect, so named from the word with which it commences, *Angelus Domini* (Angel of the Lord). Hence, also, the bell tolled in the morning, at noon, and in the evening, to indicate the time when the angelus is to be recited. The monk's dress is called "angelicus," or "angelica vestis," "*quod et ipsi dicantur angeli a patribus*," as in the Revelation, the ministers of the churches of Asia are addressed as "angels."

**Angerman=Elf**, the most beautiful river in Sweden, flows S. E. through Westerbotten and West Norrland into the Gulf of Bothnia at Hernäsand; navigable from Solleftea downward (about 65 miles).

**Angers** (an-zhā'), a town and river-port of France, capital of the Department of Maine-et-Loire, and formerly of the province of Anjou, on the banks of the Maine, 5½ miles from the Loire, 150 miles S. W. of Paris. Has an old castle, once a place of great strength, now used as a prison, barracks, and powder magazine; a fine cathedral of the 12th and 13th centuries, with very fine old painted windows; is the seat of a bishop, and has a school of arts and manufactures, a public library, an art gallery, a large modern hospital, the remains of a hospital founded by Henry II. of England in 1155, courts of law, theater, etc.; manufactures sail cloth, hosiery, leather, and chemicals, foundries, etc. In the neighborhood are immense slate quarries. Pop. (1901), 82,966.

**Angevins** (an'je-vins), natives of Anjou, often applied to the race of English sovereigns called Plantagenets. Anjou became connected with England by the marriage of Matilda, daughter of Henry I., with Geoffrey V., Count of Anjou. The Angevin kings of England were Henry II., Richard I., John, Henry III., Edward I., Edward II., Edward III. and Richard II.

**Angilbert, St.** (äng-ēl-bār'), the most celebrated poet of his age, secretary and friend of Charlemagne, whose daughter, Bertha, he married. In the latter part of his life he retired to a monastery, of which he became abbot. Died in 814.

**Angina Pectoris**, the name first given by Dr. Heberden in 1768, and since then universally adopted as the designation of a very painful disease, called by him also a disorder of the breast; by some others, spasm of the chest, or heart stroke, and popularly breast pang. It is characterized by intense pain in the præcordial region, attended by a feeling of suffocation and a

## Angle

fearful sense of impending death. These symptoms may continue for a few minutes, half an hour, or even an hour, or more. During the paroxysm the pulse is low, with the body cold, and often covered with clammy perspiration. Death does not often result from the first seizure, but the malady tends to return at more or less remote intervals, generally proving fatal at last. There are several varieties of it: an organic and functional form, and again a pure or idiopathic and a complex or sympathetic one have been recognized. Angina is produced by disease of the heart. It especially attacks elderly persons of plethoric habits, men oftener than women, generally coming on when they are walking, and yet more, if they are running upstairs or exerting great effort on ascending a hill. Stimulants should be administered during the continuance of a paroxysm, but it requires a radical improvement of the general health to produce a permanent effect on the disorder.

**Angiosperm**, a term for any plant which has its seed inclosed in a seed vessel. Exogens are divided into those whose seeds are inclosed in a seed vessel, and those with seeds produced and ripened without the production of a seed vessel. The former are angiosperms, and constitute the principal part of the species; the latter are gymnosperms, and chiefly consist of the *coniferæ* and *cycadaceæ*.

**Angirases, The**, in Hindu mythology, a class of beings between men and gods; sometimes called "the fathers of the human race;" also charged with the protection of the sacrifices performed according to the Atharvaveda.

**Angle**, the point where two lines meet, or the meeting of two lines in a point. Technically, the inclination of two lines to one another. Angles may be ranked under two leading divisions, plane and solid angles. A plane angle is the inclination of two lines to one another in a plane, which two lines meet together. A solid angle is that which is made by the meeting in one point of more than two plane angles, which, however, are not in the same plane. Each of the leading divisions, plane and solid angles, may again be subdivided into rectilinear, curvilinear, and mixed angles. A plane rectilinear angle is the inclination to each other of two straight lines, which meet together, but are not in the same straight line. A curvilinear angle is the inclination to each other of two curved lines which meet in a point. A mixed angle is one formed by the meeting of a curve and a straight line.

Angles are measured by arcs, and it is im-



## Angler Fish

material with what radius the latter are described. The result is generally stated in degrees, minutes, and seconds, ° ' " ; thus  $36^{\circ} 14' 23'' = 36$  degrees, 14 minutes, and 23 seconds. When an angle is isolated from other angles, it may be named by a single letter; but when two or more angles meet at one point they are named by three letters, never by one or two. In such cases the letter at that point is always named in the middle. The point at which the lines forming the angle meet is called the angular point or the vertex of the angle, and the lines themselves the sides or legs of the angle.

Plane rectilincal angles are generally divided into right and oblique, or into right, obtuse, and acute. When a straight line standing upon another straight line makes the two adjacent angles (those on the right and left of it) equal to one another, each of them is called a right angle. An oblique angle is one which is not a right angle. An obtuse angle is that which is greater than one right angle, but less than two. An acute angle is that which is less than a right angle: both are oblique. A spherical angle is one formed by the intersection or the meeting of two great circles of a sphere. Many other designations are applied to angles; thus, in geometry, there are opposite, exterior, interior, alternate, vertical, and other angles, also angles of contact, etc.

In mechanics, there are angles of direction, of friction, of repose, etc.

Optics has angles of incidence, of reflection, of refraction, of deviation, of polarization, etc.

Astronomy has angles of position, of situation, of elevation, inclination, depression, etc.

In fortification, a dead angle is an angle so formed that a small plot of ground in front of it can neither be seen nor defended from the parapet.

In anatomy, the angle of the jaw is the point at which the vertical hinder edge of the ramus, descending from the condyle, meets the horizontal inferior border.

**Angler Fish**, a fish called also sea devil, frog, or frog fish; and in Scotland, widegab, signifying wide mouth. It is the *lophius piscatorius* of Linnæus, and is placed under the order *acanthopterygii*, and the family which has the pectoral fins feck-like. It has an enormous head, on which are placed two elongated appendages or filaments, the first of them broad and flattened at the end. These, being movable, are maneuvered as if they were bait; and when small fishes approach to examine them, the angler, hidden amid mud and sand, which it has stirred up by means of its pectoral and ventral fins, seizes them at once; hence

## Anglesey

its name. It occurs along the British coasts, and is three, or, occasionally, five, feet long.

**Angles**, a German tribe who appear to have originally dwelt on the E. side of the Elbe between the mouth of the Saale and Ohre, and to have removed N. from their old abodes to the modern Schleswig, where they dwelt between the Jutes and Saxons. As they never approached the Rhine and the Roman frontiers we do not find their name mentioned by the Roman authors, who comprehended them, with many others, under the general name of Chauci and Germani, till the conquest of Britain made them better known as a separate nation. In the 5th century they joined their powerful N. neighbors, the Saxons, and took part in the conquest of Britain, which from them derived its future name of England. A part of them remained in their continental homes, where, to the present day, a small tract of land on the E. coast of the duchy of Schleswig, between the Schlei and the Gulf of Flensburg, bears the name of Angeln.

**Anglesey**, or **Anglesea**, an island and county of England, in North Wales, in the Irish Sea, separated from the mainland by the Menai Strait. It is about 20 miles long and 17 miles broad, and has an area of 175,836 acres, of which fully 150,000 acres are under crops and pasture. The surface of the island, with the exception of Holyhead, Parys and Bodafon mountains, is comparatively flat, and the climate is milder than that of the adjoining coast. There are no streams of any importance, but the coast affords some natural harbors, the principal of which are Holyhead and Beaumaris. The soil is various, but generally rather light and moderately fertile. The Menai Strait is crossed by a magnificent suspension bridge, 580 feet between the piers and 100 feet above high-water mark, allowing the largest vessels which navigate the strait to sail under it; and also by the great Britannia tubular bridge, for the conveyance of railway trains, Holyhead being the point of departure for the Irish mails. The market towns are Holyhead, Beaumaris, Llangefni, and Amlwch. Holyhead is by far the largest town. The county returns one member to Parliament. On the coast are several small islands, the chief being Holyhead and Puffin Island. Pop. (1901) 50,590.

**Anglesey, Henry William Paget, Marquis of**, English soldier and statesman, was the eldest son of Henry, first Earl of Uxbridge, and was born in 1768. He was educated at Oxford, and in 1790 entered Parliament as member for the Carnarvon boroughs. In 1793 he entered the army, and in 1794 he took part in the campaign in Flanders under the Duke of York. In 1808 he



## Anglia, East

was sent into Spain with two brigades of cavalry to join Sir John Moore, and in the retreat to Coruña commanded the rear guard. In 1812 he became, by his father's death, Earl of Uxbridge. On Napoleon's escape from Elba he was appointed commander of the British cavalry, and at the battle of Waterloo, by the charge of the heavy brigade, overthrew the Imperial Guard. For his services he was created Marquis of Anglesey. In 1828 he became Lord-lieutenant of Ireland, and made himself extremely popular, but was recalled in consequence of favoring Catholic emancipation. He was again Lord-lieutenant in 1830; but lost his popularity by his opposition to O'Connell and his instrumentality in the passing of the Irish coercion acts; and he quitted office in 1833. He died in 1854.

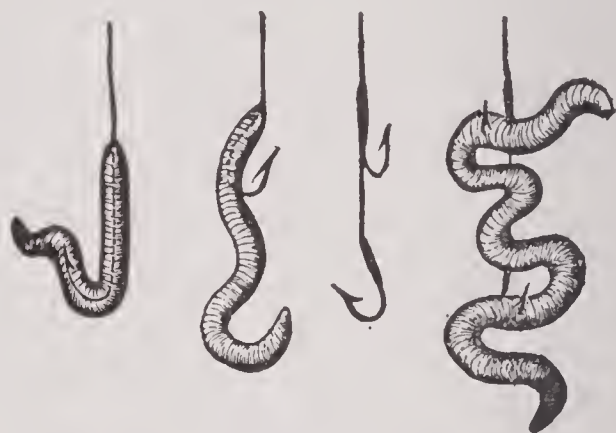
**Anglia, East**, a kingdom founded by the ANGLES (q. v.) about the middle of the 6th century, in the eastern part of Central England, in what forms the present counties of Norfolk and Suffolk — names which doubtless refer to a twofold settlement now entirely forgotten. At first to some extent dependent on Kent, and afterward on Mercia, on the fall of the latter it was attached to Wessex, without, however, losing its own kings until the time of the Danish invasion, when it was seized by the invaders, and formed into a Danish kingdom under Guthrum (878). Edward, the son and successor of Alfred, after a long struggle, forced the Danes to acknowledge him in 921. Under him Wessex grew to be England, and East Anglia was henceforward part and parcel of the kingdom. It was one of the four great earldoms of the kingdom under Canute. The modern see of Norwich is equivalent in extent to East Anglia, being an incorporation that took place about the end of the 9th century of the see founded for the Northfolk at Elmham (removed first to Thetford in 1078, then to Norwich in 1101), and that founded at Dunwich for the Southfolk.

**Anglican Church**, or **Anglican Communion**, collectively, that group of churches which are in communion with, or have sprung from, the Church of England. They are the following: The Church in Ireland, the Episcopal Church in Scotland, the Protestant Episcopal Church in the United States of America, the Church in Canada, the Church in Australia, the Indian Church, and the Church in South Africa, which are all autonomous bodies under the jurisdiction of their own metropolitans, and not amenable to the ecclesiastical courts of the Church of England, though they all look to the Archbishop of Canterbury as patriarch. In addition to these autonomous churches in connection with the Anglican communion, there are 25 missionary bishops, representing the English Church in various remote

## Angling

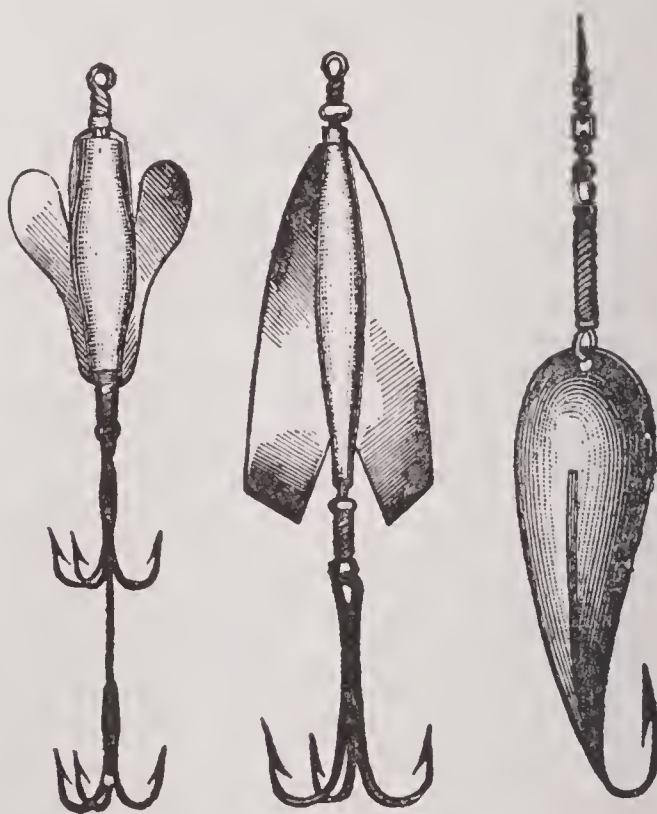
parts of Asia, Africa, and America. While the Anglican Church coheres only by general agreement in doctrine, worship, and basis of communion, it has common representation through its bishops in the various branches at the Lambeth Conference, held from time to time at Lambeth Palace, the official residence of the Archbishop of Canterbury. The first conference that was held there met in 1867, the second in 1878, the third in 1888, the fourth in 1897, the fifth in 1908. See ENGLAND, CHURCH OF; PROTESTANT EPISCOPAL CHURCH; REFORMED EPISCOPAL CHURCH.

**Angling**, the art of catching fish with a hook, or angle (Anglo-Saxon, ongel), baited



HOOKS BAITED WITH WORMS.

with worms, small fish, flies, etc. We find occasional allusions to this pursuit among the Greek and Latin classical writers; it is



TROLLING SPOONS.

mentioned several times in the Old Testament, and it was practiced by the ancient Egyptians. The oldest work on the sub-



## Angling

ject in English is the "Treatyse of Fysshinge with an Angle," printed by Wynkyn de Worde in 1496, along with treatises on hunting and hawking, the whole being ascribed to Dame Juliana Berners, or Barnes, prioress of a nunnery near St. Alban. Walton's inimitable discourse on angling was first printed in 1653.

The chief appliances required by an angler are a rod, line, hooks, and baits. Rods are made of various materials, and of various sizes. The cane rods are lightest; and, where fishing-tackle is sold, they most commonly have the preference; but in country places the rod is often of the angler's own manufacture. Rods are commonly made in separate joints, so as to be easily taken to pieces and put up again. They are made to taper from the butt end to the top, and are usually possessed of a considerable amount



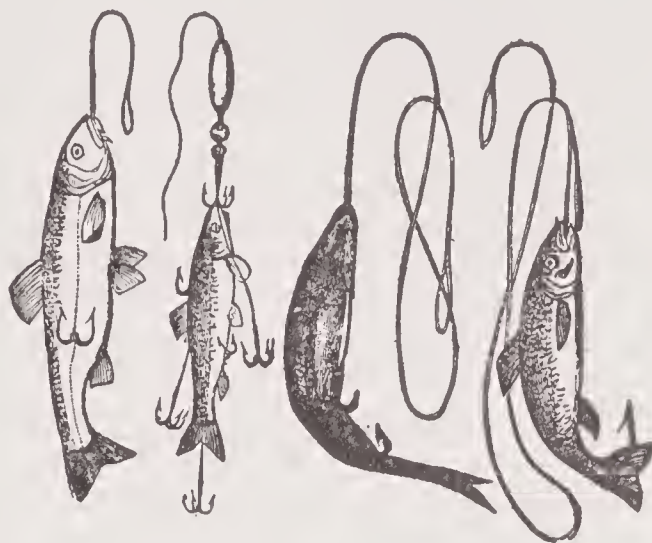
ARTIFICIAL FLIES.

of elasticity. In length they may vary from 10 feet to more than double, with a corresponding difference in strength—a rod for salmon being necessarily much stronger than one suited for ordinary brook trout. The reel, an apparatus for winding up the line, is attached to the rod near the lower end, where the hand grasps it while fishing. The best are usually made of brass, are of simple construction, and so made as to wind or unwind freely and rapidly. That part of the line which passes along the rod and is wound on the reel is called the reel line, and may vary from 20 to 100 yards in length, according to the size of the water and the habits of the fish angled for; it is usually made of twisted horse hair and silk, or of oiled silk alone. The casting line, which is attached to this, is made of the same materials, but lighter and finer. To the end of this is tied a piece of fine gut, on which the hook, or hooks, are fixed. The

## Angling

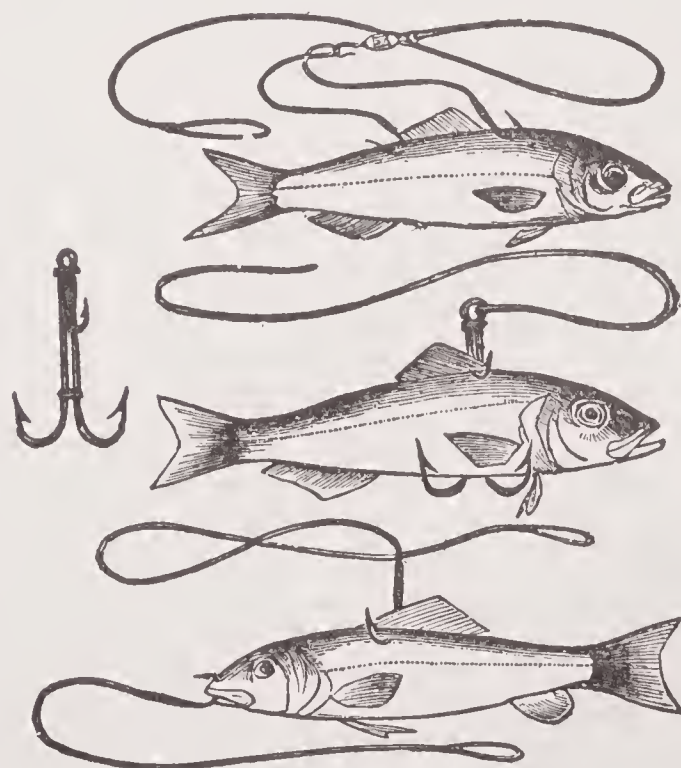
casting or gut lines should decrease in thickness from the reel line to the hooks.

The hook, of finely tempered steel, should readily bend without breaking, and yet retain a sharp point. It should be long in the shank and deep in the bend; the point straight and true to the level of the shank; and the barb long. Their sizes and sorts must, of course, entirely depend on the kind



HOOKS BAITED WITH SMALL FISH.

of fish that are angled for. Floats formed of cork, goose and swan quills, etc., are often used to buoy up the hook so that it may float clear of the bottom. For heavy fish or strong streams a cork float is used; in slow water and for lighter fish quill floats.



HOOKS WITH LIVE BAIT.

Baits may consist of a great variety of materials, natural or artificial. The principal natural baits are worms: common garden worms, brandlings and red worms, maggots or gentles (the larvæ of glow-flies such as are found on putrid meat), insects,



## Anglo-American Commission

small fish (as minnows), salmon roe, etc. The artificial flies so much used in angling for trout and salmon are composed of hairs, furs and wools, of every variety, mingled with pieces of feathers, and secured together by plated wire, or gold and silver thread, marking silk, wax, etc. The wings may be made of the feathers of domestic fowls, or any others of a showy color. Some angling authorities recommend that the artificial flies should be made to resemble as closely as possible the insects on which the fish is wont to feed, but experience has shown that the most capricious and unnatural combinations of feather, fur, etc., have been often successful where the most artistic imitations have failed. Artificial minnows, or other small fish, are also used by way of bait, and are so contrived as to spin rapidly when drawn through the water in order to attract the notice of the fish angled for. Angling, especially with the fly, demands a great deal of skill and practice, the throwing of the line properly being the initial difficulty. Nowhere is the art pursued with greater success and enthusiasm than in the United States.

**Anglo-American Commission**, a joint international commission appointed in 1898, by the United States and Great Britain, to negotiate a plan for the settlement of all controversial matters between the United States and Canada. The subjects submitted for the consideration of the commission were officially determined as follows: "The Bering Sea sealing question, reciprocal mining regulations, the preservation of the fisheries of the Great Lakes, the North Atlantic fishery question, the boundary question, the alien labor laws, and reciprocity of trade." Lord Herschell, Sir Wilfred Laurier, Sir Richard Cartwright, Sir Louis H. Davies, and Mr. J. Charlton, a member of the Dominion Congress, were appointed British commissioners. The American commissioners were United States Senators Fairbanks and Gray, Congressmen Dingley, Reciprocity Commissioner Kasson, and Ex-Secretary of State Foster. The commission met at Quebec, Aug. 23, Lord Herschell being chosen chairman; W. C. Cartwright, of the Foreign Office, and H. Bourassa, member of Parliament for Labelle county, Quebec, were chosen British secretaries, and C. P. Anderson United States secretary. Later in the year an adjourned session was held in Washington, D. C., which adjourned without practical results. See ALASKA.

**Anglo-American League, The**, an organization formed July 13, 1898, at a meeting held at Stafford House, London. Its object is to give practical effects to the terms of the following resolution, passed at that meeting:

## Anglo-Saxons

"Considering that the peoples of the British Empire and of the United States of America are closely allied in blood, inherit the same literature and laws, hold the same principles of self-government, recognize the same ideas of freedom and humanity in the guidance of their national policy, and are drawn together by strong common interests in many parts of the world, this meeting is of opinion that every effort should be made, in the interest of civilization and peace, to secure the most cordial and constant co-operation between the two nations."

Membership is open to all British subjects and citizens of the United States. A very strong and representative committee was formed, with the Right Hon. James Bryce, M. P., as chairman.

**Anglo-Catholic**, a term sometimes used to designate those Churches which hold the principles of the English Reformation, the Anglican or Established Church of England and the allied Churches. The term is also applied to that party in the English Church which favors doctrines and religious forms closely approaching those of the Roman Catholic Church, objects to be called Protestant, and corresponds closely with the Ritualistic section of the Church.

**Anglo-Saxons**, the name used, with doubtful propriety, by modern historians to include the Angles, Saxons, and Jutes, who settled in Britain in the 5th and 6th centuries after Christ, and thus became the ancestors of the English people. These tribes came from Germany, where they inhabited the parts about the mouths of the Elbe and Weser, and the first body of them who gained a footing in England are said to have landed in 449, and to have been led by Hengist and Horsa. The Jutes settled chiefly in Kent, the Saxons in the S. and middle of the country, and the Angles in the N. Among the various Anglo-Saxon States that afterwards arose those founded by the Angles first gained the preponderance, and the whole country came in time to be called after them *Engla-land*, that is, the land of the Angles. As an outline of Anglo-Saxon history will be found in the article ENGLAND, we shall here confine ourselves to giving some particulars regarding the institutions and customs of the Anglo-Saxons.

Among them we find the English constitution already existing in all its essentials, but its origin is not to be attributed to Alfred, as is sometimes done, though he restored it, and brought it to a greater pitch of completeness. In a rudimentary form it was the common property of the Germanic peoples before the emigration of the Saxons and Angles from the Continent. It developed itself more independently, however, among the Anglo-Saxons than among those Teutonic races who came into closer connection with the Romans, and afterward with the Romish hierarchy. The whole Anglo-Saxon community was frequently spoken of as consisting of the *eorls* and the *ceorls*, or



the nobles and common freemen. The former were the men of property and position, and were themselves divided into different ranks; the latter were the small landholders, handicraftsmen, etc., who generally placed themselves under the protection of some nobleman, who was hence termed their *hlaford* or lord. Besides these there was the class of the serfs or slaves (*theowas*), who might be either born slaves or freemen who had forfeited their liberty by their crimes, or whom poverty or the fortune of war had brought into this position. They served as agricultural laborers on their masters' estates, and though they were mere chattels, as absolutely the property of their master as his cattle, their lot does not appear to have been very uncomfortable. They were frequently manumitted by the will of their master at his death, and were also allowed to accumulate savings of their own, so as to be able to purchase their freedom or that of their children.

One of the peculiar features of Anglo-Saxon society was the *wergyld*, or life-price, which was established for the settling of feuds. "A sum, paid either in kind or in money where money existed, was placed upon the life of every freeman, according to his rank in the state, his birth, or his office. A corresponding sum was settled for every wound that could be inflicted upon his person; for nearly every injury that could be done to his civil rights, his honor, or his domestic peace; and further fines were appointed according to the peculiar adventitious circumstances that might appear to aggravate or extenuate the offense. From the operation of this principle no one was exempt, and the king as well as the peasant was protected by a *wergyld*, payable to his kinsmen and his people" (Kemble, "Saxons in England").

The king (*cyning*, *cyng*) was at the head of the State; he was the highest of the nobles and the chief magistrate. He was not looked upon as ruling by any divine right, but by the will of the people, as represented by the *witan* or great council of the nation. Accordingly we find that the new king was not always the direct and nearest heir of the late king, but one of the royal family whose abilities and character recommended him for the office. The king was invested with certain honors and privileges in order that he might maintain his position with becoming dignity. Besides his *wergyld* as an *ætheling* or person of royal blood, his life was further guarded by a sum of equal amount, called *cynebót* or price of royalty, and the former sum was to be paid to his relations, the latter to the people. As king he held possession of the crown lands, which were national property, and distinct from any private estates he might himself purchase. Among other privileges he was entitled to a portion of the

finer and confiscations laid upon offenders; he had the right of maintaining a standing army of household troops, the duty of calling together the council of the *witan*, and of laying before them measures which concerned the welfare of the State, with certain distinctions of dress, dwelling, etc., all his privileges being possessed and exercised by the advice and consent of the *witena-gemot* or parliament.

The queen also was held in high honor. She sat on a throne by the king in the assemblies, and she possessed a separate establishment from that of the king, though on a smaller scale. Next in rank and dignity to the king were the *ealdormen*. These were at the head of the administration of justice in the shires, possessing both judicial and executive authority, and had as their officers the *seír-geréfan* or sheriffs. One of their most important functions was the leading of the armed force of the county, a duty which often fell to their share during the period of the Danish invasions. The ealdorman, as such, held possession of certain lands attached to the office, and he was also entitled to a share of fines and other moneys levied for the king's use and passing through his hands. "Thus the position which his nobility, his power, and his wealth secured to the ealdorman was a brilliant one. In fact, the whole executive government may be considered as a great aristocratical association, of which the ealdormen were the members, and the king little more than the president. They were in nearly every respect his equals, and possessed the right of intermarriage with him; it was solely with their consent that he could be elected or appointed to the crown, and by their support, coöperation, and alliance that he was maintained there. Without their concurrence and assent, their license and permission, he could not make, abrogate, or alter laws; they were the principal *witan* or counsellors, the leaders of the great *gamót* or national inquest, the guardians, upholders, and regulators of that aristocratical power of which he was the ultimate representative and head" (Kemble, vol. ii. p. 142).

Under the Danish kings the ealdorman fell into a subordinate position, and the *eorl* or earl took his place in the county. The ealdorman and the king were both surrounded by a number of followers called *thegns* or thanes, who were bound by close ties to their superior. The king's thanes were the higher in rank, and formed a kind of nobility by themselves. They possessed a certain quantity of land, smaller in amount than that of an ealdorman, and they filled offices connected with the personal service of the king or with the administration of justice. According to Leppenberg they were in all respects the predecessors of the Norman barons. We frequently hear of a class



of functionaries called *geréfan* or reeves, such as the *seír-geréfa* (shire-reeve or sheriff), the *port-geréfa* (port-reeve), the *tun-geréfa* (farm-reeve or bailiff; Scotch, *grieve*). These, of course, had different duties to perform, those of the shire-reeve being the most important. He presided at the county court along with the ealdorman and bishop, or alone in their absence; and he had to carry out the decisions of the court, to levy fines, collect taxes, etc. In virtue of his office he had a portion of land allotted to him, and hence called reeve-land. The shires were divided into hundreds and tithings, the former being equal to 10 of the latter. The tithing consisted of 10 heads of families, who were jointly responsible to the State for the good conduct of any member of their body. For the trial and settlement of minor causes there was a hundred court held once a month. The place of the modern Parliament was held by the *witena-gemót*, the representative council of the nation. Its members, who were not elected, comprised the æthelings or princes of the blood royal, the bishops and abbots, the ealdormen, the thanes, the sheriffs, etc.

Agriculture, including especially the raising of cattle, sheep, and swine, was the chief occupation of the Anglo-Saxons. Large tracts of the marshy land in the E. of England were embanked and drained by them, and brought into cultivation. Gardens and orchards are frequently mentioned, and vineyards were common in the S. counties. The forests were extensive, and valuable both from the mast they produced for the swine, and from the beasts of the chase which they harbored. Hunting was a favorite recreation among the higher ranks, both lay and clerical. Fishing was largely carried on, herrings and salmon being the principal fish caught. The whale fishery was also pursued, when the Anglo-Saxon vessels used to go as far as Iceland. The manufactures were naturally of small moment. Iron was made to some extent, and some cloth, and salt works were numerous. In embroidery and working in gold, however, the English were famous over the continent, and some very elegant specimens of gold work have come down to our times. There was already a considerable trade at London, which was frequented by Normans, French, Flemings, and the merchants of the Hanse towns. The Anglo-Saxon forefathers were notorious for their excessive fondness for eating and drinking, and in this respect formed a strong contrast to the Normans who invaded the country. Ale, mead, and cider were the common beverages, wine being limited to the higher classes. Pork was a favorite article of food, and so were eels, which were kept and fattened in eel ponds, and sometimes paid as rent. The houses were rude, ill-built structures, mostly of wood and without proper chimneys,

but were often richly furnished and hung with fine tapestry. The dress of the Anglo-Saxons was loose and flowing, the materials being linen, woolen, and also silk; and their garments were often adorned with embroidery. The men looked upon the hair as one of their chief ornaments, and wore it long and flowing over their shoulders, while they also usually wore beards.

Christianity was introduced among the Anglo-Saxons in the end of the 6th century by St. Augustine, who was sent by Pope Gregory the Great, and became the first Archbishop of Canterbury. Kent, then under King Ethelred, was the first place where it took root, and thence it soon spread over the rest of the country. It must, of course, be remembered that the Britons and Scots had already embraced Christianity, and missionaries from these labored in the conversion of the Anglo-Saxons. Monasteries were founded at an early period, and became numerous. For a time the Anglo-Saxon Church remained independent of Rome, notwithstanding the continual efforts of the Popes to bring it under their power. Many Anglo-Saxon ecclesiasties were distinguished for learning and ability, but the Venerable Bede holds the first place. St. Boniface, the apostle of Christianity to the Germans, was an Anglo-Saxon.

*Anglo-Saxon Language.*—The Anglo-Saxon language, the parent or earliest form of the modern English, is a member of the Teutonic class of languages, and belongs to the Low German, as distinguished from the High German and Scandinavian branches of those languages. It was not called Anglo-Saxon by those who spoke it, but English (*Englisc*), and many condemn the former name as a misnomer, and tending to mislead. It is now common to call Anglo-Saxon Old English, which indeed it is, but the former designation is employed by the best scholars, both British and foreign; and as one point in its favor we may state that the language in its earliest form is so different from modern English that even by an Englishman it has to be studied as a foreign tongue, like German or Icelandic. Besides the Anglo-Saxon, other Low German dialects formerly spoken were the Mæso-Gothic, as we find it in Ulphilas's translation of the Gospels, a dialect which has left no lineal descendants; the Old Friesian, once spoken extensively between the mouths of the Rhine and Elbe, and now represented by the modern Friesian and the Dutch; and the Old Saxon. To all these Anglo-Saxon was more or less closely allied, as English is to their descendants at the present day. To any one who intends to investigate the English language scientifically and thoroughly the study of all the Teutonic tongues is of the utmost importance.

The tribes that came from North Ger-



many to Britain spoke several different dialects, and though some of these would no doubt coalesce in time, we find in the existing remains of Anglo-Saxon literature three different dialects at least, a northern, a middle, and a southern. The northern and the southern were the principal. The former was spoken in the N. where the Angles chiefly settled, and where numbers of Danes afterward established themselves, and consequently it shows a considerable intermixture of Danish elements; the latter prevailed in the Saxon settlements of the S., and is more nearly akin to the old Friesic and Old Dutch dialects. When the kingdom of Wessex acquired political and ecclesiastical supremacy over the others, early in the 9th century, the dialect of Wessex came into vogue as the language of literature and of the court, and so continued. The principal Anglo-Saxon literary remains are in this dialect.

The Anglo-Saxon alphabet, as regards the forms of its letters, followed the Latin alphabet as modified in certain ways, with the addition of one or two characters of runic origin. It had two special characters for *th*, the one answering to soft *th*, as in *thy*, the other to hard *th*, as *thing* (but they were not uniformly used in this distinctive way), and a special character for *w*. The letter *k* was little used (and *q* still less), *c* having always this sound. There was no *j*, *sh*, or *v* in the alphabet. Nouns and adjectives were declined much as in German or in Latin, thus—nominative, *wulf*, a wolf; genitive, *wulfes*, of a wolf; dative, *wulfe*, to a wolf; accusative and vocative, *wulf*; instrumental or ablative, *wulfe*, with or by a wolf; plural, nominative, *wulfas*, wolves; genitive, *wulfa*; dative, *wulfum*; accusative and vocative, *wulfas*; instrumental, *wulfum*. There were several declensions. The adjective had different forms for the three genders, for the two numbers, and for four cases; and so had the article and the pronoun. The adjective had two modes of declension, according as it stood alone with a noun or was preceded by the article or a pronoun also agreeing with the noun. With regard to the pronouns, the most remarkable fact is that those of the first and second person had a dual number, “we two” or “us two” and “you two,” besides the plural for more than two. The infinitive of the verb is in *an*, and there is a gerund similar in its usage to the Latin gerund. The present indicative of the verb *wesan*, to be, is thus conjugated: Singular, 1, *eom*, 2, *eart*, 3, *is*; plural, 1, 2, and 3, *synd* (or *syndon*). The indicative present of *lufian*, to love, is—singular, 1, *lufige*, 2, *lufast*, 3, *lufath*; plural, 1, 2, and 3, *lufiath*; past tense, *lufode*, *lufodest*, *lufode*; plural, *lufodon*. The verb had four moods—indicative, subjunctive, imperative, and infinitive, but only two tenses, the present

or indefinite and the past. Other tenses and the passive voice were formed by auxiliary verbs. There was no future tense, the present being used instead, and whether the meaning was future or not had to be gathered from the context.

Anglo-Saxon words terminated in a vowel much more frequently than the modern English, and thus the language must have been much more sonorous and full-toned, but the correct pronunciation of Anglo-Saxon words is a matter of some uncertainty. The final *a*, *e*, *o*, and *u*, which were so common in the Anglo-Saxon, were afterward softened to *e*, which latterly fell away or remained silent, as the language gradually assumed the form used in speaking and writing at the present day. The large number of words of Latin origin that the English language contains, and great numbers of which were introduced through the Norman-French, does not prevent English from being essentially a Teutonic language. The bone and sinew, the framework of the language, so to speak, is still Anglo-Saxon, and a conversation could be carried on and pages written without having recourse to words of any other origin. Many chapters of the New Testament do not contain more than 4 per cent. of alien words, and as a whole it averages perhaps 6 or 7. If we examine to what classes belong the words of Teutonic origin, we shall see how indispensably necessary they are to us, and how they form the groundwork of the English mother tongue. The articles, pronouns, conjunctions, prepositions, auxiliary verbs, and the numerals up to but exclusive of million, are all Anglo-Saxon. It may also be noted that though abstract words are generally derived from the Latin, those whose signification is specific are generally Anglo-Saxon. The general term motion, for instance, is Latin, but particular acts of motion, as walk, run, ride, crawl, creep, fly, are Teutonic; and so with the general word color, and red, white, blue, green, the individual colors. The language of the common people and of everyday occupations is largely Anglo-Saxon.

*Anglo-Saxon Literature.*—The existing remains of Anglo-Saxon literature (a large proportion of which has been printed only in recent times) include numerous compositions in prose and verse, some of which must be referred to a very early period. The longest and most important poem is the “Tale of Beowulf,” which from internal evidence, must have been composed before the Angles and Saxons emigrated to England, though it afterward received considerable modifications on English soil. It extends to more than 3,000 lines (each of which in some editions is printed as two). Its hero Beowulf is a Scandinavian prince, famed for strength and valor, who slays a fiendish or demonic cannibal (Grendel) and



his equally formidable mother — having sought the latter in her mysterious abode beneath the waters of a mere — and is at last slain in a contest with a frightful fire-breathing dragon. It presents a spirited and picturesque series of semi-romantic scenes and incidents, curiously illustrative of early Teutonic manners and superstitions, and its scene appears to be laid entirely in Scandinavia. The Anglo-Saxon poetical remains have been divided into the ballad epic, of which *Beowulf* is the principal example; the Bible epic, to which belong the poems of *Cædmon* and some others; ecclesiastical narratives, as lives of saints and martyrs, etc.; psalms and hymns; secular lyrics; allegories, gnomes, riddles, etc. The religious class of poems was the largest, and of these *Cædmon's* are the most remarkable. He wrote in the latter half of the 7th century, and died about 680. He was originally a poor ignorant hind in the service of the monks of Whitby, and his poetical faculties are said to have been roused in a miraculous manner by a dream. His poems consist of loose versions of considerable portions of the Bible history, and in subject and thought sometimes bear a far-off resemblance to Milton's "*Paradise Lost*." They sing of the creation, the temptation, the fall, the exodus of the Israelites, the story of Daniel, the incarnation of Christ, the rage and despair of Satan and the devils in consequence and the harrowing of hell, or release of the ransomed souls by Christ. It is probable that the language of the poems as we possess them has been modernized from the language of the writer. *Cynewulf* is another poet of whose works we possess several specimens, but of whom little or nothing is known. Grein's "*Bibliothek der Angelsächsischen Poesie*" (new edition by Wüker) contains the Anglo-Saxon poetry complete.

Rhyme was rarely used in Anglo-Saxon poetry, alliteration being employed instead, as in the older northern poetry generally. The style of the poetry is highly elliptical, and it is full of harsh inversions and obscure metaphors.

The Anglo-Saxon prose remains consist of translations of portions of the Bible, homilies, moral treatises, history, biography, laws, leases, charters, popular treatises on science and medicine, grammars, etc. Many of these were translations from the Latin. The uses to which prose was applied were generally of a practical cast and the common language of the people was used (as in charters and leases) when in other countries at the same period nothing but Latin would have been employed. The Anglo-Saxon versions of the Gospels, next to the *Mæso-Gothic*, are the earliest scriptural translations in any modern language. The

Psalms are said to have been translated by Bishop Aldhelm, and also under Alfred's direction, and the Gospel of St. John by Bede, but it is not known who were the authors of the extant versions. A translation of the first seven books of the Bible is believed to have been the work of Ælfric, who was Archbishop of Canterbury at the close of the 10th century, and did much to diffuse knowledge among his countrymen. We have also a collection of 80 homilies from his pen, several theological treatises, a Latin grammar, etc. King Alfred was a diligent translator of Latin works. He was more than a translator, however, as he often adds to his author passages of his own, either containing valuable facts or apt comments on his text. We have under his name translations of Bæthius "*De Consolatione Philosophiæ*," the "*Universal History of Orosius*," Bede's "*Ecclesiastical History*," the "*Pastoral Care of Gregory the Great*," etc. Among his works are an account of Germany as it existed at his time, and of the voyage of Wulfstan and Ohthere, two Northmen, both of which are inserted in his translation of Orosius. The most valuable to us of the Anglo-Saxon prose writings is the "*Saxon Chronicle*," as it is called, a collection of historical records made in different religious houses. A chronicle was kept at the monasteries in Alfred's time, and it has been supposed that this was done by his direction. The "*Chronicle*" has been often printed. Mr. Thorpe's edition (1861) contains seven parallel texts, and a translation. The latest text comes down to 1154. A considerable body of law remains, which has been repeatedly printed. The editions of Thorpe and of Schmid (with Latin and German translation, notes, and a glossary) are the best. A large collection of charters is embraced in Mr. Birch's "*Cartularium Saxonicum*," and a mass of documents of the same kind, with leases, ecclesiastical constitutions, wills, etc., is contained in Kemble's "*Index Diplomaticus Ævi Saxonici*."

**Angola**, a name formerly given to the West African coast from Cape Lopez to Benguela, but now applied to the Portuguese West African possessions, extending from the Kongo river southward to the Cunene, which, at its mouth, notes the boundary between the Portuguese and German territories. This region is divided into four districts — Ambriz, or Kongo, extending from the Kongo river to the mouth of the Loje; Loanda, Benguela and Mossamedes. Capital, St. Paul de Loanda. The limit toward the interior is vague, but the Portuguese influence extends some 1,500 miles inland. The area of the whole dependency is stated at 312,000 square miles, and its population estimated at 2,000,000. The coast strip is level, hot and unhealthy, but be-



## Angora

yond is hilly country. The main rivers are the Kwango, running N. to the Kongo, and the Coanza and Cunene, running W. to the Atlantic. The country is well watered, and has a luxuriant vegetation of the tropical African type. Yams, tobacco, indigo, rice, cotton, and sugar are freely produced. Wax, buffalo hides, ivory, copal gum, and palm oil are exported. Iron is found in the mountains; and copper, lead, sulphur, and petroleum are obtained. Horses and camels cannot live here; the ox is ridden, but the burden-bearers are usually men. Angola was long notorious for its great slave trade. The natives are Kongo negroes, and belong to the great Bantu stock. In the 16th century they were mostly converted by the Jesuits to a kind of Christianity, but soon fell back into fetichism. The number of white men in Angola, mostly Portuguese, does not exceed 3,000, many of whom are transported convicts, and there are some 30,000 mulattos. The Portuguese under Diego Cam discovered this coast in 1486, and soon began to settle in it; but St. Paul de Loanda was not built till 1578. The finances, in spite of very heavy taxes, are most unprosperous. But the neighborhood of the Kongo Free State has inspired some attempts at reform.

**Angora, or Engour** (the ancient AN-CYRA), a town of Asiatic Turkey; 215 miles E. S. E. of Constantinople, with which there is now railway communication. It has ruinous walls, and there are some remains of Byzantine architecture belonging to the ancient city, and a few relics of earlier times, both Greek and Roman. Among the latter are the remnants of the Monumentum Acyrarum, raised in honor of the Emperor Augustus, who much embellished the ancient city. Angora is celebrated for the long-haired goats bred in its vicinity called by the Arabs the chamal goat, meaning "silky or soft"; hence camlet, the name of a fabric extensively manufactured from the hair here. The hair is about eight inches long, and is shorn twice a year. All the animals of this region are said to be long-haired, especially the dogs, cats, and rabbits. It is also asserted that they degenerate and lose this peculiarity when removed to a distance, but this is certainly not the case with the goats which have been introduced into the Cape Colony. Goat's hair forms an important export; other exports being goats' skins, dyestuffs, principally madder, and yellow berries; mastic, tragacanth, and other gums; also honey and wax. British manufactures are imported to some extent. Estimated pop. 35,000.

**Angora Cat**, the large and long-haired white variety of the common cat, said to belong originally to Angora. It is a very

## Angostura

dignified animal, and moves about with a grave solemnity that bears a great resemblance to the stately march of a full plumed peacock conscious of admiring spectators. It has a superb coat of long silky hair and a long bushy tail.



ANGORA CAT.

**Angora Goat**, a variety of the common goat with long, silky hair. There are two or three varieties of the breed. The animal's coat is composed of two sorts of material—one hairy, short, and close to the skin; the other longer and woolly, farther from the skin. The latter is the most plentiful and most valuable. The annual export of wool from Angora is said to have a value of \$1,000,000. Good goats are worth \$250 or \$300 apiece at Angora. Of this goat's hair, often called camel's wool, camlets



ANGORA GOAT.

are extensively manufactured here. Many of the animals in this region are characterized by the length and softness of their hair, especially the dogs, rabbits, and cats; but this peculiarity disappears in Europe. The Angora goat is bred for his hair, called mohair in the United States and in Cape Colony, and has also been introduced into Australia.

**Angostura**, city and capital of the State of Bolivar, Venezuela; on the Orinoco river; 263 miles S. E. of Caracas. It has considerable export trade in cotton, indigo, coffee, tobacco, cattle, etc., and contains a college, a hospital, and a handsome hall made memorable by the assembly in it of the Congress of Angostura in 1819. Pop. 11,686.



## Angostura Bark

**Angostura Bark**, the aromatic, bitter medicinal bark obtained chiefly from *galipea officinalis*, a tree of 10 to 20 feet high, growing in the northern regions of South America; natural order *rutaceæ*. The bark is valuable as a tonic and febrifuge, and is also used for a kind of bitters. From this bark being adulterated, indeed sometimes entirely replaced, by the poisonous bark of *strychnos nux vomica*, its use as a medicine has been almost given up.

**Angoulême** (än-gö-lām'), the capital of the French Department of Charente, and formerly of the province of Angoumois, stands 220 feet above the winding Charente, 83 miles N. E. of Bordeaux by rail. Its old town has narrow, crooked streets, and it contains a fine Romanesque cathedral (1136), and a striking hotel de ville, with which is incorporated the remnant of the ancient castle of Angoulême, where was born the celebrated Marguerite of Navarre, author of the "Heptameron." Ravallac was also a native. The old bastions have been converted into fine terrace walks. There are manufactures of machinery, paper, and wire, and a brisk trade in brandy. Pop. (1906) 37,507. The province of Angoumois was in early times a county; but in the 14th century Philip the Fair took possession of it, and it became an appanage of the younger branches of the royal family. It was made a duchy by Francis I., and was sometimes bestowed upon natural sons of the French kings, such as Charles de Valois (1573-1650), son of Charles IX., a distinguished general in the reigns of Henry IV. and Louis XIII. It was given by Louis XIV. to the Duc de Berri, after whose death (1714) the title was attached to the princes of the elder Bourbon line.

**Angoulême, Charles de Valois, Duc d'**, a French military officer; illegitimate son of Charles IX. and Marie Touchet, born in 1573; was created Duc d' Angouleme in 1619. He was imprisoned in the bastille in 1605-1616 for conspiring with the Marquise de Verneuil; directed the sieges of Soissons and La Rochelle; and won distinction at Arques and Ivry. He died in 1650.

**Angoulême, Louis Antoine de Bourbon, Duc d'**, the eldest son of Charles X. of France, and Dauphin during his father's reign, born at Versailles Aug. 6, 1775. At the Revolution he retired from France with his father, and after some years of military studies at Turin, and abortive military operations at the head of a body of French *émigrés* in 1792, he joined the other royal exiles, and lived with them at Holyrood, on the Continent, and latterly in England. In 1799 he married his cousin, Marie Thérèse, the only daughter of Louis XVI. and Marie Antoinette. On the recall of his uncle, Louis

## Anhalt

XVIII., he was appointed Lieutenant-general of the kingdom; and, when Napoleon returned from Elba, he made a weak attempt to oppose him, but was soon deserted by his troops, and obliged to surrender. After the second restoration he was charged with the suppression of the disorders in the southern provinces, and in 1823 he led the French army of invasion into Spain. On the revolution in July, 1830, he signed, with his father, an abdication in favor of his nephew, the Duc de Bordeaux; and when the Chambers declared the family of Charles X. to have forfeited the throne, he accompanied him into exile, to Holyrood, to Prague, and to Görz, where he died June 3, 1844.

**Angra**, the capital of the Azores, a seaport at the head of a deep bay on the S. coast of the Island of Terceira. It is a station for ships between Portugal and Brazil and the East Indies; but the harbor is very much exposed. It is the seat of a bishop; is well built, but dirty; has fine churches, and is strongly fortified. Pop. (1900) 10,843. There is a considerable export of wine, cheese, honey, and flax. Since 1834 it has added to its name the words "do heroismo," for the conduct of its citizens in the struggle against Don Miguel (1830-1832.)

**Angra-Pequena** (än'grä-pe-kā'na), a bay on the S. W. coast of Africa. It gives name to the southern littoral of Great Namaqualand, extending 200 miles from 26° S. lat. to the Orange river, or Cape Colony, and reaching 90 miles inland—a sandy, waterless region, but rich apparently in metals, and having a healthful climate. In 1883 Angra-Pequena was ceded by a Namaqua chieftain to Lüderitz, a Bremen merchant; and next year it was taken under German protection, with all the coast to the N. as far as Cape Frio, except Walvisch Bay, which belongs to England.

**Angus, Richard Bladworth**, a Canadian capitalist; born in Scotland, 1830; removed to Canada and engaged in banking in Montreal in 1867; became general manager of the St. Paul, Minneapolis and Manitoba railway in 1879; and in 1880-1885 had personal charge of the construction of the Canadian Pacific railway. He is the owner of one of the most valued private collections of paintings in Canada, and is a liberal patron of art.

**Anhalt**, a duchy of North Germany, lying partly in the plains of the Middle Elbe, and partly in the valleys and uplands of the Lower Harz, and almost entirely surrounded by Prussia; area, 906 square miles. All sorts of grain, wheat especially, are grown in abundance; also, flax, rape, potatoes, tobacco, hops, and fruit. Excellent cattle are bred. The inhabitants are principally oc-



occupied in agriculture, though there are some iron works and manufactures of woollens, linens, beet-sugar, tobacco, etc. The Dukes of Anhalt trace their origin to Bernard (1170-1212), son of Albert the Bear. In time the family split up into numerous branches, and the territory was latterly held by three Dukes (Anhalt-Köthen, Anhalt-Bernburg, and Anhalt-Dessau). In 1863 the Duke of Anhalt-Dessau became sole heir to the three duchies. The united principality is now incorporated in the German Empire, and has one voice in the Bundesrath and two in the Reichstag. Pop. (1905) 328,029. The chief towns are Dessau, Bernburg, Köthen, and Zerbst.

**Anhwei** (awn'whā-ē). See NGAN-IIWUY.

**Anhydride**, or anhydrous acid, a chemical substance formed by the substitution of an acid radical for the whole of the hydrogen in one or two molecules of water. (Graham's "Chemistry," 2d. ed., vol. ii, 542.) By the action of water they are converted into acids. Anhydrides do not act on litmus or other vegetable colors.

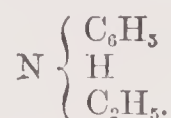
**Anhydrite**, a mineral classed by Dana under his celestite group. Its crystals are orthorhombic. The hardness is 3-3.5; the sp. gr. 2.899-2.985; the luster vitreous, or somewhat pearly; the color white, or brick-red. Composition. Sulphuric acid, 55.80 to 59.78; lime, 40.21 to 43.06, with smaller portions of silica, sesquioxide of iron, and water. It is altered, by the absorption of moisture, into gypsum. It is divided by Dana into Var. 1. Ordinary: (a) crystallized; (b) fibrous; (c) fine granular; (d) scaly granular, under which is ranked vulpinite. Var. 2. Pseudomorphous. It occurs in various parts of Europe and in North America.

**Ani**, the name given to the birds belonging to the genus *crotophaga*, and indeed to those ranked under the sub-family *Crotophaginæ*, a division of the *Cuculidæ*, or cuckoos; the typical anis, those of the genus *crotophaga*, are found in South America, the West Indies and Florida. They are about the size of our blackbird.

**Anichini, Ludwig** (an-ē-kē'ne), a Venetian engraver of great celebrity. On seeing his pieces, Michael Angelo is said to have exclaimed that the art of engraving had reached the summit of perfection; time of his death not known.

**Aniline**, a substance which has become of great importance, as being the basis of a number of brilliant and durable dyes. Aniline was first obtained by distilling indigo with caustic potash. It occurs in the heavy oils from coal-tar. It is prepared from benzene,  $C_6H_6$ , which is converted into nitrobenzene,  $C_6H_5(NO_2)$ , by the action of strong nitric acid. The nitrobenzene is reduced to aniline by the action of acetic acid and

iron filings, or by sulphide of ammonium. Aniline is the basis of most of the coal-tar colors. It is an oily, colorless, refractive, volatile liquid, boiling at  $182^\circ$ . Its specific gravity at  $0^\circ$  is 1.036. It solidifies at  $-8^\circ$  to a crystalline mass; when exposed to the air and light it becomes brown. It is nearly insoluble in water, but dissolves in ether, alcohol, and benzene. It forms crystalline salts with acids. It does not turn red litmus paper blue. A slight trace of aniline gives a deep purple color with a solution of bleaching powder. Aniline combines with the iodides of alcohol radicals like amines. The atoms of H united to N in aniline can be replaced by alcohol radicals, as ethyl aniline —



The H in the benzol ring ( $C_6H_5$ ) can also be replaced by radicals forming substitution compounds of aniline, of which, when one atom of H is replaced by an atom of Cl or a radical, there can be always three modifications; thus, three modifications of nitroaniline ( $C_6H_4(NO_2)(NH_2)$ ) are known; also chloraniline,  $C_6H_4Cl(NH_2)$ , and bromaniline,  $C_6H_4Br(NH_2)$ . M. Langorrois has found that the putrefaction and decomposition of animal matter can be prevented, even when it is exposed to the air, and in an elevated temperature, by the use of small quantities of aniline.

**Animal**, an organized and sentient living being. Life in the earlier periods of natural history was attributed almost exclusively to animals. With the progress of science, however, it was extended to plants. In the case of the higher animals and plants there is no difficulty in assigning the individual to one of the two great kingdoms of organic nature, but in their lowest manifestations, the vegetable and animal kingdoms are brought into such immediate contact that it becomes almost impossible to assign them precise limits, and to say with certainty where the one begins and the other ends. From form no absolute distinction can be fixed between animals and plants. Many animals, such as the sea-shrubs, sea-mats, etc., so resemble plants in external appearance that they were, and even yet popularly are, looked upon as such.

**Internal Structure.**—With regard to internal structure no line of demarkation can be laid down, all plants and animals being, in this respect, fundamentally similar; that is, alike composed of molecular, cellular, and fibrous tissues. Neither are the chemical characters of animal and vegetable substances more distinct. Animals contain in their tissues and fluids a larger proportion of nitrogen than plants, while plants are richer in carbonaceous



## Animal

compounds than the former. In some animals, moreover, substances almost exclusively confined to plants are found. Thus the outer wall of sea-squirts contains cellulose, a substance largely found in plant-tissues; whilst chlorophyll, the coloring-matter of plants, occurs in hydra and many other lower animals. Power of motion, again, though broadly distinctive of animals, cannot be said to be absolutely characteristic of them. Thus many animals, as oysters, sponges, corals, etc., in their mature condition are rooted or fixed, while the embryos of many plants, together with numerous fully developed forms, are endowed with locomotive power by means of vibratile, hair-like processes called cilia.

*Animals vs. Plants.*—The distinctive points between animals and plants which are most to be relied on are those derived from the nature and mode of assimilation of the food. Plants feed on inorganic matters, consisting of water, ammonia, carbonic acid, and mineral matters. They can only take in food which is presented to them in a liquid or gaseous state. The exceptions to these rules are found chiefly in the case of plants which live parasitically on other plants or on animals, in which cases the plant may be said to feed on organic matters, represented by the juices of their hosts. Animals, on the contrary, require organized matters for food. They feed either upon plants or upon other animals. But even carnivorous animals can be shown to be dependent upon plants for subsistence. Animals, further, can subsist on solid food in addition to liquids and gases; but many animals (such as the tapeworms) live by the mere imbibition of fluids which are absorbed by their tissues, such forms possessing no distinctive digestive system. Animals require a due supply of oxygen gas for their sustenance, this gas being used in respiration. Plants, on the contrary, require carbonic acid. The animal exhales or gives out carbonic acid as the part result of its tissue waste, while the plant taking in this gas is enabled to decompose it into its constituent carbon and oxygen. The plant retains the former for the uses of its economy, and liberates the oxygen, which is thus restored to the atmosphere for the use of the animal. Animals receive their food into the interior of their bodies, and assimilation takes place in their internal surfaces. Plants, on the other hand, receive their food into their external surfaces, and assimilation is effected in the external parts, as are exemplified in the leaf surfaces under the influence of sunlight. All animals possess a certain amount of heat or temperature which is necessary for the performance of vital action. The only classes of animals in which a constantly elevated temperature is kept up are birds and mammals. Below

## Animalcule

birds animals are named “cold-blooded,” this term meaning in its strictly physiological sense that their temperature is usually that of the medium in which they live, and that it varies with that of the surrounding medium. “Warm blooded” animals, on the contrary, do not exhibit such variations, but mostly retain their normal temperature in any atmosphere. The cause of the evolution of heat in the animal body is referred to the union (by a process resembling ordinary combustion) of the carbon and hydrogen of the system with the oxygen taken in from the air in the process of respiration.

**Animal Chemistry**, the department of organic chemistry which investigates the composition of the fluids and the solids of animals, and the chemical action that takes place in animal bodies. There are four elements, sometimes distinctively named organic elements, which are invariably found in living bodies, viz.: carbon, hydrogen, oxygen, and nitrogen. To these may be added, as frequent constituents of the human body, sulphur, phosphorus, lime, sodium, potassium, chlorine, and iron. The four organic elements are found in all the fluids and solids of the body. Sulphur occurs in blood and in many of the secretions. Phosphorus is also common, being found in nerves, in the teeth, and in fluids. Chlorine occurs almost universally throughout the body; lime is found in bone, in the teeth, and in the secretions; iron occurs in the blood, in urine, and in bile; and sodium, like chlorine, is of almost universal occurrence. Potassium occurs in muscles, in nerves, and in the blood corpuscles. Minute quantities of copper, silicon, manganese, lead, and lithium are also found in the human body. The compounds formed in the human organism are divisible into the organic and inorganic. The most frequent of the latter is water, of which two-thirds (by weight) of the body are composed. The organic compounds may, like the foods from which they are formed, be divided into the nitrogenous and non-nitrogenous. Of the former the chief are albumen (found in blood, lymph, and chyle), casein (found in milk), myosin (in muscle), gelatin (obtained from bone), and others. The non-nitrogenous compounds are represented by organic acids, such as formic, acetic, butyric, stearic, etc.; by animal starches, sugars; and by fats and oils, as stearin and olein.

**Animalcule**, a general name given to many forms of animal life from their minute size. We thus speak of the “infusorian” animalcules among the protozoa, of the rotifera or “wheel animalcules,” etc., but the term is not now used in zoölogy in any strict significance, nor is it employed in classification.



**Animal Electricity.** See ELECTRICITY, ANIMAL.

**Animal Kingdom**, one of the three great kingdoms of visible nature, the two other being the vegetable and the mineral kingdoms. Cuvier divided the animal kingdom into four great sub-kingdoms: (1) Vertebrata; (2) mollusca; (3) articulata; (4) radiata. Prof. Owen, in his "Paleontology," adopts the following classification: Kingdom I., protozoa. Kingdom II., animalia. Sub-kingdom I., invertebrata: Province 1, radiata; 2, articulata; 3, mollusca. Sub-kingdom II., vertebrata. Prof. Huxley, writing, in 1869, said that in the then existing state of knowledge, the animal kingdom required to be divided into no fewer than eight distinct groups, which he arranged thus:

|               |             |            |
|---------------|-------------|------------|
|               | VERTEBRATA. |            |
| MOLLUSCA.     |             | ANNULOSA.  |
| MOLLUSCOIDA.  |             | ANNULOIDA. |
| CÆLEENTERATA. |             | INFUSORIA. |
|               | PROTOZOA.   |            |

He could not, however, assert that all the eight groups were of equal value, or that the infusoria, the molluscoida, and the annuloida would ultimately stand.

**Animal Magnetism**, a science, or art, so called because it was believed that it taught the method of producing on persons of susceptible organization effects somewhat similar to those which a magnet exerts upon iron.

**Animal Worship**, a practice found to prevail, or to have prevailed, in the most widely distant parts of the world, both the Old and the New, but nowhere to such an extent as in ancient Egypt. Nearly all the more important animals found in the country were regarded as sacred in some part of Egypt, and the degree of reverence paid to them was such that throughout Egypt the killing of a hawk or an ibis, whether voluntary or not, was punished with death. The worship, however, was not, except in a few instances, paid to them as actual deities. The animals were merely regarded as sacred to the deities, and the worship paid to them was symbolical.

**Anima Mundi**, a term applied by some of the older philosophers to the ethereal essence or spirit supposed to be diffused through the universe, organizing and acting throughout the whole and in all its different parts; a theory closely allied to pantheism.

**Anime** (an'i-me), a resin supposed to be obtained from the trunk of an American tree (*hymenæa courbaril*). It is of a transparent amber color, has a light, agreeable smell, and is soluble in alcohol. It strongly resembles copal, and, like it, is used in making varnishes.

**Animism**, the system of medicine propounded by Stahl, and based on the idea that the soul (*anima*) is the seat of life. In modern usage the term is applied to express the general doctrine of souls and other spiritual beings, and especially to the tendency, common among savage races, to explain all the phenomena in nature not due to obvious natural causes by attributing them to spiritual agency. Among the beliefs most characteristic of animism is that of a human apparitional soul, bearing the form and appearance of the body, and living after death a sort of semi-human life.

**Anio**, now **Aniēne** or **Teverōne**, a river in Italy, a tributary of the Tiber, which it enters from the E. a short distance above Rome, renowned for the natural beauties of the valley through which it flows, and for the remains of ancient buildings there situated, as the villas of Mæcenas and the Emperor Hadrian.

**Anise**, an umbelliferous plant, the *pimpinella anisum*. It is cultivated in Malta and Spain for the sake of the seeds, which are imported into this and other countries. They are aromatic and carminative. Its scent tends to neutralize other smells. It is sometimes sown here for its leaves, which are used like fennel as a seasoning or garnish.

Oil of anise is a solution of anise camphor, or anethol,  $C_{10}H_{12}O$ , in an oil like turpentine; it solidifies at  $10^{\circ}$ . It is the essential oil of *pimpinella anisum*. The camphor is obtained pure from alcohol by pressure and crystallization. In pharmacy it is used as a stimulant, aromatic, and carminative; it relieves flatulency, and diminishes the griping of purgative medicines.

**Anjou** (än-zhö'), an ancient province of France, now forming the Department of Maine-et-Loire, and parts of the Departments of Indre-et-Loire, Mayenne, and Sarthe; area, about 3,000 square miles. In 1860 the province passed into the hands of the house of Gatinais, of which sprang Count Godfrey V., who, in 1127, married Matilda, daughter of Henry I. of England, and so became the ancestor of the Plantagenet kings. Anjou remained in the possession of the English kings up to 1204, when John lost it to the French King, Philip Augustus. In 1226 Louis VIII. bestowed the province on his brother Charles; but in 1328 it was reunited to the French crown. John I. raised it to the rank of a ducal peerage, and gave it to his son Louis. Henceforth, it remained separate from the French crown till 1480, when it fell to Louis XI.

**Anjou, or Beague, Battle of**, between the English and French: the latter commanded by the Dauphin of France, March 22, 1421. The English were defeated; the Duke of Clarence was slain by Sir Allan Swinton, a



## Anklam

Scotch knight, and 1,500 men perished on the field; the Earls of Somerset, Dorset and Huntingdon were taken prisoners. This was the first battle that turned the tide of success against the English.

**Anklam**, a town of Prussia, province of Pomerania, on the Peene river, 4 miles from its mouth and 41 miles S. E. of Stralsund. It has long been a place of commercial importance, having been a member of the Hanseatic League from the 14th to the 16th century. It has manufactures of iron, sugar, and soap. During the Middle Ages, Anklam suffered sorely from fire and pestilence; and in the wars of the 17th and 18th centuries it was again and again besieged and sacked. On the close of the Seven Years' war in 1762, its fortifications were dismantled. There is a military school here. The town contains many interesting specimens of the Hanseatic architecture, very like the Flemish. Pop. (1900) 14,602.

**Ankobbar**, a former capital, kingdom of Shoa, in Abyssinia; is built 8,200 feet above sea level, and consists of 3,000 huts scattered over the summit and western slopes of a mountain. When the king was in residence the population increased from 6,000 to near 15,000. Present capital, Adis Ababa.

**Ann, St.**, a name applied to a number of places in various parts of the world. The best known and most worthy of notice are (1) St. Ann Shoals, off the S. part of the coast of Sierra Leone, extending from Cape Shilling to Sherboro Island, a distance of between 30 and 40 miles. (2) St. Ann (Cape), the extreme N. W. point of Sherboro Island, coast of Sierra Leone; lat. 7° 34' N.; long., 12° 57' W.; having close by a group of islands called Turtle Islands. (3) St. Ann's, a town, river, and bay, Jamaica, on the N. coast; the latter in lat. 18° 26' N.; long. 77° 13' W. (4) A cape or headland on the N. W. coast of Africa, about 35 miles S. S. E. of South Cape Blanco, near Arguin, and within the bank of that name; lat. 20° 30' N.; long. 17° 0' W. (5) A lake, Upper Canada, 20 miles long, and 20 broad, about 45 miles N. of Lake Superior, with which it has communication by the Nipigon river. (6) A harbor on the E. side of Cape Breton, British America; lat. 46° 21' N.; long. 60° 27' W.

**Anna**, sister of Dido of Carthage; took refuge with Æneas in Italy, according to Vergil, after the self-immolation of her sister. But Lavinia being jealous of her, she drowned herself in the Numicius. There was an old Latin naiad, called Anna Perenna, which Vergil thus identified with this legendary sister of the Queen of Carthage.

**Anna Comnena**, daughter of Alexius Comnenus I., Byzantine emperor. She was born in 1083, and died in 1148. After her

## Annapolis

father's death she endeavored to secure the succession to her husband, Nicephorus Briennius, but was baffled by his want of energy and ambition. She wrote (in Greek) a life of her father, Alexius, which, in the midst of much fulsome panegyric, contains some valuable and interesting information. She forms a character in Sir Walter Scott's "Count Robert of Paris."

**Anna Ivanovna** (-wan-ö'na), Empress of Russia, born in 1693; the daughter of Ivan, the elder half-brother of Peter the Great. She was married in 1710 to the Duke of Courland, in the following year was left a widow, and, in 1730, ascended the throne of the Czars on the condition, proposed by the Senate, that she would limit the absolute power of the czars, and do nothing without the advice of the Council, composed of the leading members of the Russian aristocracy. No sooner, however, had she ascended the throne than she declared her promise null, and proclaimed herself autocrat of all the Russias. She chose as her favorite, Ernest John von Biren or Biron, who was soon all-powerful in Russia, and ruled with great severity. Several of the leading nobles were executed, and many thousand men exiled to Siberia. In 1737 Anna forced the Courlanders to choose Biren as their duke, and nominated him at her death Regent of the Empire during the minority of Prince Ivan of Brunswick. Anna died in 1740.

**Annal**, in the Roman Catholic Church, a mass said for an individual every day in the year, or annually on a particular day of each year.

An annal is properly the record of historical events arranged chronologically, and divided into yearly portions. In this sense the record of the important events in the Roman State, said to have been made annually for the first six centuries of its existence by those who successively filled the high office of Pontifex Maximus, were annals.

In more common usage, annals are records of historical events, or even of less important incidents, although they may not be formally divided into yearly portions. There has been considerable dispute regarding the precise difference between annals and history. Broadly speaking, annals are simple records or chronicles of events, in yearly portions or otherwise, without any effort to trace occurrences to their causes, to investigate the characters and motives of the chief actors, or to intercalate philosophical generalizations. When these elements are superadded to the bare chronicle of incidents then annals become history.

**Annam**. See ANAM.

**Annapolis**, city, port of entry, capital of the State of Maryland, and county-seat of Anne Arundel co.; on the Severn river,



## Annapolis

near Chesapeake Bay, and several railroads; 40 miles E. of Washington, D. C. It is in a fruit and berry-growing region; has oyster-packing plants, marine railway, glass factory, a national bank, daily, weekly, and other periodicals, and a property valuation of \$3,000,000; and is widely known as the seat of the United States Naval Academy. The city also contains St. John's College, several State buildings, convent, a house of Redemptorist Fathers, residences of many naval officers and of families of officers on sea duty, and bronze statues of General John de Kalb and Chief Justice Roger B. Taney. The city was founded in 1649; was first named Providence; and received a city charter and its present name, in honor of Queen Anne, in 1708. The first Federal Constitutional Convention was held here in 1786, and Washington surrendered his commission in the army in the Senate room of the State House. Pop. (1910) 8,690.

**Annapolis, The**, a single-screw, composite gunboat of the United States navy; 1,000 tons displacement; length, 168 feet; breadth, 36 feet; mean draft, 12 feet; horse power, 1,227; main battery, six 4-inch rapid-fire guns; secondary battery, four 6-pounder and two 1-pounder rapid-fire guns; speed, 12 knots; crew, 11 officers and 135 men; cost, \$230,000.

**Ann Arbor**, city and county-seat of Washtenaw co., Mich.; on the Huron river and the Michigan Central railroad; 38 miles W. of Detroit. It is in an agricultural region; has a National bank, two home insurance companies, High School, manufactories of farming implements, woolen goods, furniture, carriages, and organs, several breweries, daily, weekly and monthly periodicals, and a property valuation of \$7,000,000; and is the seat of the University of Michigan founded in 1837. Pop. (1900) 14,509; (1910) 14,817.

**Annates**, a year's income claimed for many centuries by the Pope on the death of any bishop, abbot, or parish priest, to be paid by his successor. In England they were at first paid to the Archbishop of Canterbury, but were afterward appropriated by the popes. In 1532 the Parliament gave them to the crown; but Queen Anne restored them to the Church by applying them to the augmentation of poor livings.

**Annato**, or **Arnotto**, an orange-red coloring matter, obtained from the pulp surrounding the seeds of *bixa orellana*, a shrub native to tropical America, and cultivated in Guiana, St. Domingo, and the East Indies. It is sometimes used as a dye for silk and cotton goods, though it does not produce a very durable color, but it is much used in medicine for tinging plasters and ointments, and to a considerable extent by farmers for giving a rich color to cheese.

## Anne

**Anne Boleyn**. See **BOLEYN, ANNE**.

**Anne of Austria**, daughter of Philip III. of Spain, was born at Madrid in 1602, and in 1615 was married to Louis XIII. of France. Richelieu, fearing the influence of her foreign connections, did everything he could to humble her. In 1643 her husband died, and she was left regent, but placed under the control of a council. But the parliament overthrew this arrangement, and intrusted her with full sovereign rights during the minority of her son, Louis XIV. She, however, brought upon herself the hatred of the nobles by her boundless confidence in Cardinal Mazarin, and was forced to flee from Paris during the wars of the Fronde. She ultimately quelled all opposition, and was able, in 1661, to transmit to her son, unimpaired, the royal authority. She spent the remainder of her life in retirement, and died Jan. 20, 1666.

**Anne, Queen of Great Britain and Ireland**, was born at Twickenham, near London, Feb. 6, 1664; the second daughter of James II., then Duke of York, and Anne, his wife, daughter of the Earl of Clarendon. She was educated according to the principles of the English Church. In 1683 she was married to Prince George, brother to King Christian V. of Denmark. On the arrival of the Prince of Orange in 1688, Anne wished to remain with her father; but she was prevailed upon by Lord Churchill (afterward Duke of Marlborough) and his wife to join the triumphant party. After the



ANNE OF ENGLAND.

death of William III., in 1702, she ascended the English throne. Her character was essentially weak, and she was governed first by Marlborough and his wife, and afterward by Mrs. Masham. Most of the principal events of her reign are connected with the War of the Spanish Succession. The only important acquisition that England made by it was Gibraltar, which was captured in 1704. Another very important event of this reign was the union of England and Scotland, under the name of Great Britain,



## Annealing

which was accomplished in 1707. She seems to have long cherished the wish of securing the succession to her brother James, but this was frustrated by the internal dissensions of the cabinet. Grieved at the disappointment of her secret wishes, she fell into a state of weakness and lethargy, and died, July 20, 1714. The reign of Anne was distinguished not only by the brilliant successes of the British arms, but also on account of the number of admirable and excellent writers who flourished at this time, among whom were Pope, Swift, and Addison.

**Annealing**, a process to which many articles of metal and glass are subjected after making, in order to render them more tenacious, and which consists in heating them and allowing them to cool slowly. When the metals are worked by the hammer, or rolled into plates, or drawn into wire, they acquire a certain amount of brittleness, which destroys their usefulness, and has to be remedied by annealing. The tempering of steel is one kind of annealing. Annealing is particularly employed in glass-houses, and consists in putting the glass vessels, as soon as they are formed and while they are yet hot, into a furnace or oven, in which they are suffered to cool gradually. The toughness is greatly increased by cooling the articles in oil.

**Annelida**, a class of animals belonging to the sub-kingdom articulata, the annulosa of some naturalists. They are sometimes called red blooded worms, being the only invertebrated animals possessing this character. They are soft bodied animals, mostly living in the water, sometimes in moist earth, but never parasitically within the bodies of other animals; the higher ones possessing limbs, though of a rudimentary character, which makes them resemble centipedes; while the lower ones, like the leeches, are wholly destitute of these appendages. The respiration is effected by external branchiæ, by internal vesicles, or by the skin itself. Contractile vessels supply the place of a heart. The nervous system consists of a single or double ventral cord, furnished with ganglia at intervals, and surrounding the œsophagus above. Cuvier divided them into three orders — *tubicola*, *dorsibranchia*, and *abbranchia*; Milne-Edwards into *suctoria*, *terricola*, *tubicola*, and *errantes*; Prof. Huxley into *chætophora* and *discophora*; and Griffith and Henfrey into *turbellaria*, *suctoria* (*apoda*), and *chætopoda* (*setigera*).

**Annenkoff, Michel** (an'en-kof), a distinguished Russian military engineer and son of the famous general of the same name, born in St. Petersburg, in 1838; became colonel for services in the Polish insurrection in 1866; was four years in the immediate service of the imperial administration; took part in the Merv campaign under Gen. Skobelev; was assigned to the construc-

## Annexation

tion of strategic railways; and completed the great Trans-Caspian line. He died in St. Petersburg, Jan. 22, 1899.

**Annesley, Arthur, Earl of Anglesea**, an English statesman, born in 1614; succeeded to his father's title of Lord Montmorris and Viscount Valentia in 1660; created Earl of Anglesea in 1661. He was a member of Cromwell's Parliament in 1658, and President of the State Council in 1660; but aided the restoration of King Charles. He died in 1686.

**Annesley Bay, Ghubbet Daknu**, or **Zulu Bay**, a bay running 30 miles S. on the W. side of the Red Sea, a little to the S. of Massaua. Several easy passes lead up from its shores to the Abyssinian tableland, and in ancient times under the Ptolemies, the Bay was the starting point of a brisk trade carried on by Greeks with Axum.

**Annexation**, a national acquisition of territory. When the United States began its existence as a nation, its territory comprised all its present possessions between the Atlantic on the E., the Mississippi on the W., British America on the N., and latitude 31° N., on the S., with a few slight differences owing to subsequent rearrangements of boundary lines. From that time till 1867 six additions were made to its territory. The first was what then bore the name of the Province of Louisiana, owned by France, and comprising, E. of the Mississippi, the territory S. of latitude 31° N., and as far E. as the Perdido river, and, W. of the Mississippi, the whole of the present Louisiana, Arkansas, Missouri, Iowa, Nebraska, Dakotas, Montana, Idaho, Oregon, and Washington, that part of Minnesota W. of the Mississippi, Wyoming and Colorado E. of the Rocky Mountains and N. of the Arkansas river, and all but a small southwestern section of Kansas, and the narrow northwestern strip of Indian Territory. By the Treaty of Paris of 1763, which closed the French and Indian War, the French territory E. of the Mississippi passed to England, and that W. of the Mississippi to Spain. By the Treaty of Paris of 1783, England gave Florida back to Spain. Trouble arose between the United States and Spain because the latter would not allow free navigation of the Mississippi, and in 1795 a treaty was negotiated with Spain by which this desire was granted, and the right to use New Orleans as a place of deposit. In 1803 a treaty was made, by which the United States became possessed of the whole of the Province of Louisiana on the payment to France of \$15,000,000. This purchase increased the territory of the United States by 1,186,752 square miles. The next acquisition was that of Florida, purchased from Spain in 1819 for \$5,000,000, which added to the public domain 59,267 square miles. In 1836



## Anniston

the region known as Texas, and under the Mexican Government, declared its independence and a short war followed, Santa Ana, the Mexican president, being the commander on the one side, and Gen. Sam. Houston, leader of the Texan forces, on the other. Santa Ana was defeated at the battle of San Jacinto and agreed to a treaty which recognized the independence of Texas. This was not ratified by Mexico, but in 1837 the independence of the Republic of Texas was recognized by the United States and soon after by England, France and Belgium. Texas applied for admission to the Union and on Dec. 29, 1845, became one of the States. In the same year a dispute arose between Texas and Mexico in regard to a boundary line, and in the spring of 1846 a war was begun between Mexico and the United State. This was brought to a close by the capture, on Sept. 14, 1846, of the City of Mexico, by the United States troops under Gen. Winfield Scott. By the annexation of Texas 167,865.600 acres were acquired.

The next acquisition was by cession from Mexico, in 1848, of the States of California and Nevada, a part of Colorado, and the Territories of Utah, Arizona, and New Mexico. By this transaction there was added to the public domain 522,568 square miles, at a cost of \$15,000,000. Disputes still remained with reference to those portions of Arizona and New Mexico S. of the Gila river, and Mexican troops were sent thither. Trouble was averted, however, by the Gadsden treaty, Dec. 30, 1853, by which the United States obtained the disputed territory, paying therefor \$10,000,000.

The next addition was that of Alaska, containing 572,500 square miles, purchased from Russia for \$7,200,000 in 1867. Then came the annexation of the Hawaiian Islands in 1898, by which 7,629 square miles were added. By the peace protocol between the United States and Spain, Aug. 12, 1898, it was provided that Porto Rico and other Spanish islands in the West Indies, and an island in the Ladrones should be ceded to the United States, and that a treaty of peace should determine the future control of the Philippines. The peace treaty, signed at Paris, Dec. 10, 1898, provided for the cession to the United States of the Philippine Islands in addition to those named in the protocol. The area of the Philippines is 150,000 square miles and that of Porto Rico, 3,520 square miles. The island (Guam) in the Ladrones, and the small Spanish islands in the West Indies, contain about 8,100 square miles, making about 162,000 square miles of territory acquired by the United States as a result of the war of 1898.

**Anniston**, a city in Calhoun co., Ala.; on the Louisville and Nashville, and Southern

## Anniversaries

railroads, and trolley connecting with suburbs; 12 miles S. of Gadsden. It is in one of the most important coal and iron mining regions of the country; is a trade center for cotton and agricultural products; and is noted for its manufactures of iron and steel, cotton goods, bricks, cordage, and other articles. Anniston is the seat of the Southern Female College and the Noble Female Institute; is a popular summer and winter resort; and has two national banks, more than 20 churches, daily and weekly periodicals, and a property valuation of \$5,500,000. Pop. (1900) 9,695; (1910) 12,794.

**Annius of Viterbo, Nannius, or Giovanni Nanni**, a Dominican (1432-1502), a literary impostor. His work, entitled "*Antiquitates Variæ*," professes to contain selections from Berosus, Manetho, Megasthenes, Archilocus, Myrsiles, Fabius Pictor, Sempronius, Cato, etc., but are, for the most part, mere fabrications.

**Anniversaries**, the yearly recurrence of the date upon which any past event, of historical or personal interest, has taken place.

Jan. 1, 1863, Emancipation Proclamation, by Lincoln.

Jan. 8, 1815, Battle of New Orleans.

Jan. 17, 1706, Franklin born.

Jan. 17, 1781, Battle of the Cowpens, S. C.

Jan. 19, 1807, Robert E. Lee born.

Jan. 27, 1859, German Emperor born.

Feb. 12, 1809, Abraham Lincoln born.

Feb. 15, 1898, battleship "Maine" blown up.

Feb. 22, 1732, George Washington born.

Feb. 22-23, 1847, Battle of Buena Vista.

March 5, 1770, Boston massacre.

March 15, 1767, Andrew Jackson born.

April 9, 1865, Lee surrendered at Appomatox.

April 12, 1861, Fort Sumter fired upon.

April 12, 1777, Henry Clay born.

April 13, 1743, Thomas Jefferson born.

April 14, 1865, Lincoln assassinated.

April 19, 1881, Primrose Day in England, Lord Beaconsfield died.

April 19, 1775, Battle of Lexington and Concord.

April 30, 1789, Washington was inaugurated first President.

May 1, 1898, Dewey destroyed the Spanish fleet at Manila.

May 13, 1607, first English settlement in America, at Jamestown.

May 13, 1783, the Society of the Cincinnati was organized by officers of the Revolutionary army.

May 20, 1775, Mecklenburg, N. C., Declaration of Independence.

May 24, 1819, Queen Victoria born.

June 14, 1777, American flag adopted by Congress.

June 15, 1215, King John granted Magna Charta at Runnymede.



## Anno Domini

June 17, 1775, Battle of Bunker Hill.  
 June 18, 1815, Battle of Waterloo.  
 June 28, 1776, Battle of Fort Moultrie, Charleston, S. C.  
 July 1, Dominion Day in Canada.  
 July 1-2, 1898, general assault on Santiago de Cuba.  
 July 1-3, 1863, Battle of Gettysburg.  
 July 3, 1898, Cervera's fleet destroyed off Santiago.  
 July 4, 1776, Declaration of Independence.  
 July 14, 1789, the Bastille was destroyed.  
 July 16, 1898, Santiago surrendered.  
 July 21, 1861, Battle of Bull Run.  
 Aug. 13, 1898, Manila surrendered to the Americans.  
 Aug. 16, 1777, Battle of Bennington, Vt.  
 Sept. 1, 1870, capitulation of Sedan.  
 Sept. 8, 1781, Battle of Eutaw Springs, S. C.  
 Sept. 10, 1813, Battle of Lake Erie, Perry's victory.  
 Sept. 11, 1814, Battle of Lake Champlain, McDonough's victory.  
 Sept. 12, 1814, Battle of North Point, near Baltimore.  
 Sept. 13, 1847, Battle of Chapultepec.  
 Sept. 14, 1847, City of Mexico taken by United States troops.  
 Sept. 17, 1862, Battle of Antietam.  
 Sept. 19-20, 1863, Battle of Chickamauga.  
 Sept. 20, 1870, Italians occupied Rome.  
 Oct. 7, 1780, Battle of King's Mountain, N. C.  
 Oct. 8-11, 1871, great fire of Chicago.  
 Oct. 12, 1492, Columbus discovered America.  
 Oct. 17, 1777, Burgoyne surrendered at Saratoga.  
 Oct. 19, 1781, Cornwallis surrendered at Yorktown.  
 Nov. 5, 1604, Guy Fawkes Day in England, the gunpowder plot discovered.  
 Nov. 9, 1872, great fire of Boston.  
 Nov. 10, 1483, Martin Luther born.  
 Nov. 25, 1783, British evacuated New York.  
 Dec. 2, 1805, Battle of Austerlitz.  
 Dec. 14, 1799, Washington died.  
 Dec. 16, 1773, Boston "Tea Party."  
 Dec. 16, 1835, the great fire in New York.  
 Dec. 22, 1620, Mayflower pilgrims landed at Plymouth Rock.  
 Dec. 25-26, 1776, Battle of Trenton, N. J.

**Anno Domini, A. D.**, the year of Our Lord, of grace, of the incarnation, of the circumcision, and of the Saviour's crucifixion. The Christian era began Jan. 1, in the middle of the fourth year of the 194th Olympiad, the 753rd year of the building of Rome, and in 4714 of the Julian period. This era was invented by a monk, Dionysius Exiguus, about 532. It was introduced into Italy in the 6th century, and ordered to be used by bishops by the Council of Chelsea, in 816, but was not generally employed for several centuries. Charles III.

## Annuity

of Germany was the first who added "in the year of our Lord" to his reign, in 879.

**Annonay** (an-o-nā), a town in Southern France, department of Ardèche, 37 miles S. S. W. of Lyons, in a picturesque situation. It is the most important town of Ardèche, manufacturing paper and glove leather to a large extent, also cloth, felt, silk stuffs, gloves, hosiery, etc. There is an obelisk in memory of Joseph Montgolfier of balloon fame, a native of the town. Pop. (1901) 17,490.

**Annual**, in botany, a plant that springs from seed, grows up, produces seed, and then dies, all within a single year or season.

**Annual**, in literature, the name given to a class of publications which at one time enjoyed an immense yearly circulation, and were distinguished by great magnificence both of binding and illustration, which rendered them much sought after as Christmas and New Year presents. Their contents were chiefly prose tales and ballads, lyrics, and other poetry. The earliest was the "Forget-me-not," started in 1822, and followed next year by the "Friendship's Offering." The "Literary Souvenir" was commenced in 1824, and the "Keepsake" in 1827. Among the names of the editors occur those of Alaric A. Watts, Mrs. S. C. Hall, Harrison Ainsworth, Lady Blessington, Mary Howitt, etc. The popularity of the annuals reached its zenith about 1829, when no less than 17 made their appearance; in 1856 the "Keepsake," the last of the series, ceased to exist. In the United States several large publishing houses issue annual reviews of the year, distinct from the almanacs. Of these the "Annual Cyclopædia" is the oldest, the first issue being for the year 1861. The "International Year Book" was started in 1898. Of English annuals the best known are the "Statesman's Year-Book" and "Hazell's Annual." The "Almanach de Gotha" is more of an annual review than an almanac.

**Annuity**, a fixed sum of money paid yearly. In the United States the granting of annuities is conducted by private companies or corporations. The following are the approved rates of the best managed companies: In consideration of \$1,000 paid to a company the annuity granted to a person aged 40 would be \$52.75; aged 45, \$58.10; aged 50, \$64.70; aged 55, \$73.50; aged 60, \$86.20; aged 65, \$100; aged 70, \$123.45; aged 75, \$145.95; aged 80, \$180.15. The purchase of annuities, as a system, has never gained much foothold—the endowment plan of life insurance, by which, after the lapse of a term of years, the insured receives a sum in bulk, being preferred.

Under the Roman law annuities were sometimes granted by will, the obligation of



## Annuloida

paying them being imposed upon the heir. Borrowers in the Middle Ages were frequently obliged to grant annuities in lieu of interest, the exaction of which by creditors was forbidden as usury; and the practice received the papal sanction in the 15th century.

**Annuloida**, in Huxley's classification, one of the eight primary groups into which he divides the animal kingdom. He places it between the annulosa and the infusoria. He includes under it (1) the *trematoda*, or flukes; (2) the *tæniada*, or tape-worms and bladder-worms; (3) the *turbellaria*; (4) the *acanthocephala*; (5) the *nematoidea*, or thread-worms; and (6) the *rotifera*, or wheel animalcules. But he thinks it not improbable that the *annuloida* will require ultimately to be merged in the *molusca*.

**Annulosa**, a sub-kingdom of the animal kingdom, corresponding with Cuvier's *articulata*. The word *articulata*, signifying jointed, is not a sufficiently distinctive term, for the vertebrated animals are also jointed. *Annulosa*, signifying ringed, is decidedly better, for the animals ranked under this sub-kingdom have their skeleton, which is external, composed of a series of rings. They are divided into *chaetognatha*, *annelida*, *crustacea*, *arachnida*, *myriapoda*, and *insecta*, these classes being ranged in an ascending order. The last four are further grouped together under the designation *arthropoda*.

**Annunciation**, the declaration of the angel Gabriel to the Virgin Mary informing her that she was to become the mother of our Lord. Annunciation or Lady Day is a feast of the Church in honor of the Annunciation, celebrated on the 25th of March. The Italian order of Knights of the Annunciation was instituted by Amadeus VI., Duke of Savoy, in 1360. The king is always Grand Master. The knights must be of high rank, and must already be members of the Order of St. Mauritius and St. Lazarus. The decoration of the Order consists of a golden shield suspended to a chain or collar of roses and knots, the letters F. E. R. T. being inscribed on the roses, and standing for *fortitudo ejus Rhodum tenuit* (its bravery held Rhodes). There are two orders of nuns of the Annunciation, one originally French, founded in 1501 by Joanna of Valois; the other Italian, founded in 1604 by Maria Vittoria Fornari of Genoa.

**Annunzio, Gabriele d'**. See D' ANNUNZIO.

**Annus Mirabilis** (-mē-rab'īl-is), the year of wonders, 1666, memorable for the great fire of London and the successes of British arms over the Dutch. Dryden has written a poem with this title, in which he describes both these events.

## Anointing

**Anoa**, a sub-genus of ruminating animals provisionally placed by Hamilton Smith under antelope. The typical species is the *A. depressicornis*, a quadruped resembling a small buffalo, found gregarious in the mountains of the Island of Celebes.

**Anobium**, a genus of beetles belonging to the family *Ptinidæ*. It contains the well known death watch insects, *A. striatum*, *A. tessclatum*, etc.

**Anode**, the name given by Faraday to what is called by Daniell the zincode, and by various other writers the positive pole of an electric battery; or, more precisely, the "way" or path by which the electric current passes out and enters the electrolyte on its way to the other pole. It is a platinum plate occupying the same place in the decomposing cell that a zinc plate does in an ordinary cell of a battery. The other plate corresponding to the second platinum one in an ordinary cell is called by Faraday the cathode or kathode, by Daniell the platinode, and by many other writers the negative pole. At the positive pole appears one element of the decomposed body, called anione, and at the negative the other element, termed katione.

**Anodyne**, a medicine which alleviates pain, though, if given in too large doses, it induces stupor. Garrod arranges anodynes with narcotics and soporifics together, thus: Class II. Medicines whose principal effects are upon the nervous system. Subclass I. Medicines acting especially upon the brain proper; but probably also upon other portions of the central nervous system. Order 1. Exhilarants. Order 2. Narcotics, anodynes, and soporifics. Order 3. Anæsthetics. Opium is soporific and anodyne; while belladonna is anodyne and antispasmodic.

**Anointing**, rubbing the body or some part of it with oil, often perfumed. From time immemorial the nations of the East have been in the habit of anointing themselves for the sake of health and beauty. The Greeks and Romans anointed themselves after the bath. Wrestlers anointed themselves in order to render it more difficult for their antagonists to get hold of them. In Egypt it seems to have been common to anoint the head of guests when they entered the house where they were to be entertained. In the Mosaic law a sacred character was attached to the anointing of the garments of the priests and things belonging to the ceremonial of worship. The Jewish priests and kings were anointed when inducted into office, and were called the anointed of the Lord, to show that their persons were sacred and their office from God. In the Old Testament also the prophecies respecting the Redeemer style him Messiah, that is, the Anointed, which is also



## Anomalure

the meaning of his Greek name Christ. The custom of anointing still exists in the Roman Catholic Church in the ordination of priests and the confirmation of believers and the sacrament of extreme unction. The ceremony is also frequently a part of the coronation of kings.

**Anomalure**, a genus of rodent animals inhabiting the W. coast of Africa, resembling the flying-squirrels, but having the under surface of the tail "furnished for some distance from the roots with a series of large horny scales, which, when pressed against the trunk of a tree, may subserve the same purpose as those instruments with which a man climbs up a telegraph pole to set the wires." They are called also scale tails, or scale tailed squirrels, but some authorities class them with the porcupines rather than the squirrels. There are several species of them, but little is known of their habits.

**Anomaly**, in astronomy, the angle which a line drawn from a planet to the sun has passed through since the planet was last at its perihelion or nearest distance to the sun. The anomalistic year is the interval between two successive times at which the earth is in perihelion, or 365 days 6 hours 13 minutes 45 seconds. In consequence of the advance of the earth's perihelion among the stars in the same direction as the earth's motion and of the precession of the equinoxes, which carries the equinoxes back in the opposite direction to the earth's motion, the anomalistic year is longer than the sidereal year, and still longer than the tropical or common year.

**Anomura**, a sub-order of decapod crustaceans, intermediate between *macrura* and *brachyura*, differing from the former in the absence of an abdominal fan-shaped fin, as also of natatory feet; and from the latter in generally possessing appendages attached to the penultimate segment of their abdomen. The sub-order is divided into the families *paguridæ*, *hippidæ*, *raninidæ*, *homolidæ*, and *dromiidæ*. Its best known representatives are the hermit crabs (*paguridæ*).

**Anona**, a genus of plants, the type of the natural order *anonaceæ*. *A. squamosa* (sweet sop) grows in the West Indian islands, and yields an edible fruit having a thick, sweet, luscious pulp. *A. muricata* (sour sop) is cultivated in the West and East Indies; it produces a large pear-shaped fruit, of a greenish color, containing an agreeable, slightly acid pulp. The genus produces other edible fruits, as the common custard apple or bullock's heart, from *A. reticulata*, and the cherimoyer of Peru, *A. cherimolia*.

**Anonaceæ**, an order of exogenous plants classed by Lindley under his ranales, or ranal alliance. They have six petals, hypo-

## Anquetil-Duperron

gynous stamina generally indefinite in number, numerous ovaries, and a many carpeled, succulent, or dry fruit, and alternate simple leaves without stipules. They are trees or shrubs occurring in the tropics of both hemispheres. In 1846 Lindley estimated the known species at 300. Most have a powerful aromatic taste and smell, and the flowers of some are highly fragrant. Some have a succulent and eatable fruit.

**Anonymous**, literally "without name," applied to anything which is the work of a person whose name is unknown or who keeps his name secret. Pseudonym is a term used for an assumed name. The knowledge of the anonymous and pseudonymous literature is indispensable to the bibliographer, and large dictionaries giving the titles and writers of such works have been published.

**Anoplotherium**, an extinct genus of the ungulata or hoofed quadrupeds, forming the type of a distinct family, which were in many respects intermediate between the swine and the true ruminants. These animals were pig-like in form, but possessed long tails, and had a cleft hoof, with two rudimentary toes. Some of them were as small as a guinea-pig, others as large as an ass. Six incisors, two canines, eight premolars, and six molars existed in each jaw, the series being continuous, no interval existing in the jaw. *A. commune*, from the eocene rocks, is a familiar species.

**Anoplura**, an aberrant order of insects, sometimes termed, from their parasitic habits, *parasitica* or *epizoa*. They have six legs, no wings, and either two simple eyes or none. They undergo no proper metamorphosis, though there is a certain semi-transformation when they shed their skins. They are parasitic upon mammals and birds, and are generally termed lice. There are two sub-orders: (1) *Haustellata*, or *rhyncota*, having a mouth with a tubular, very short, fleshy haustellum, and (2) *mandibulata*, or *mallophaga*, in which the mouth is provided with two horny mandibles.

**Anosmia**, a disease consisting in a diminution or destruction of the power of smelling, sometimes constitutional, but most frequently caused by strong and repeated stimulants, as snuff, applied to the olfactory nerves.

**Anquetil-Duperron, Abraham Hyacinthe** (änk-têl-dü-pâr-ôn'), a French orientalist, born in 1731. He studied theology for some time, but soon devoted himself to the study of Hebrew, Arabic, and Persian. His zeal for the oriental languages induced him to set out for India, where he prevailed on some of the Parsee priests to instruct him in the Zend and Pehlevi and to give him some of the Zoroastrian books. In 1762 he returned to France with a valuable collec-



tion of MSS. In 1771 he published his "Zend-Avesta," a translation of the "Vendidad," and other sacred books, which excited great sensation. Among his other works are "L'Inde en Rapport avec l'Europe" (1790), and a selection from the "Vedas." He died in 1805.

**Anselm of Canterbury**, a Christian philosopher and theologian; regarded by some as the founder of scholasticism; born in Aosta, Piedmont, between April 21, 1033, and April 21, 1034. He belonged by birth to the Teutonic, or ruling class of society, his father being a Lombard, and his mother, a Burgundian. Two of his mother's brothers were canons, and it was doubtless through them that the boy received the best mental training which the time and place could give. After his mother's death he quarreled with his father, who had refused to permit him to become a monk, and, leaving Aosta in 1057, crossed Mont Cenis, to disappear for nearly three years in Burgundy and France. In the autumn of 1059, while still a layman, he arrived at Le Bec in Normandy, attracted by the fame of Lanfranc's scholarship. In 1060, he entered the Benedictine order, and became a monk in the monastery of Le Bec, where, three years later, he was promoted to the office of friar, and in 1079 was consecrated abbot. It was while he was prior and abbot at Le Bec that Anselm produced the writings—the "Monologium" and the "Proslogium"—which caused him to be recognized as the leader of a new movement in thought. Hitherto Augustine had dominated all the theology of the Western Church, and a citation from him had sufficed to close discussion. In the latter half of the 11th century, however, Europe was beginning to awake from its intellectual sleep, and men were beginning to inquire into the dogmas they had long been content to accept. Anselm, for his part, showed himself impatient of the dualism which Augustine had never overcome. He was not content till he had erased every trace of dualism from his doctrine.

Anselm remained at Le Bec till 1092, when he went to England on business connected with his convent. In the following year he was nominated by William Rufus Archbishop of Canterbury, and was consecrated on Dec. 4, 1093. He died in Canterbury, April 21, 1109; was canonized in 1494; and his name was placed on the list of church authorities by Clement XI. in 1720. The most important work performed by this Italian primate of all England was the compromise of the investiture question, which resulted in the concordat with the papacy. Under this compromise the King of England retained the power of nominating or presenting to a bishopric, but his candidate had to obtain from the Pope the staff and ring which were the symbols of

spiritual authority. It may be thought that, by this compromise, the English sovereign got the substance and the papacy the shadow. But it is one thing to present a candidate where his election must be ratified and quite another to present him where the body which confers upon him final authority has the power to refuse that authority. The indebtedness of Englishmen to Anselm will be evident if we recall the fact that he secured the agreement between the papacy and the civil power without bloodshed, whereas Germany had to pass through a hideous war before the question between Church and State could be determined by a similar compromise.

**Ansgar**, or **Anskar**, called the Apostle of the North, was born in 801 in Picardy, and he took the monastic vows in boyhood. In the midst of many difficulties he labored as a missionary in Denmark and Sweden; dying in 864 or 865, with the reputation of having undertaken, not the first, the most successful, attempts for the propagation of Christianity in the North.

**Anson, George, Lord**, a celebrated English navigator, born in 1697; entered the navy at an early age and became a commander in 1722, and captain in 1724. He was for a long time on the South Carolina station. In 1740 he was made commander of a fleet sent to the South sea, directed against the trade and colonies of Spain. The expedition consisted of five men-of-war and three smaller vessels, which carried 1,400 men. After much suffering and many stirring adventures he reached the coast of Peru, made several prizes, and captured and burned the city of Paita. His squadron was now reduced to one ship, the "Centurion," but with it he took the Spanish treasure galleon from Acapulco, and arrived in England in 1744, with treasure to the amount of £500,000, having circumnavigated the globe. His adventures and discoveries are described in the well known "Anson's Voyage," compiled from materials furnished by Anson. A few days after his return he was made rear-admiral of the blue, and not long after rear-admiral of the white. His victory over the French admiral, Jonquière, near Cape Finisterre in 1747, raised him to the peerage, with the title of Lord Anson, Baron of Soberton. Four years afterward he was made first lord of the admiralty. In 1758 he commanded the fleet before Brest, protected the landing of the British at St. Malo, Cherbourg, etc., and received the repulsed troops into his vessels. Finally, in 1761, he was appointed to convey the Queen of George III. to England. He died in 1762.

**Ansonia**, a city in New Haven co., Conn.; on the Naugatuck river and the New York, New Haven and Hartford railroad; 10 miles W. of New Haven. It is widely noted for its extensive manufactures of



## Ansted

clocks, and brass, copper, and woolen goods; and has a national and a savings bank, Young Men's Christian Association and memorial libraries, daily and weekly newspapers and a property valuation of nearly \$5,000,000. Pop. (1910) 15,152.

**Ansted, David Thomas**, an English geologist, born 1814; became Professor of Geology at King's College, London, and Assistant Secretary to the Geological Society, whose "Quarterly Journal" he edited for many years. His writings on geology were standard authorities. He died in 1880.

**Anster, John**, Professor of Civil Law in the University of Dublin, born in County Cork, 1793; published a volume of poems, and was a frequent contributor to "Blackwood's Magazine," the "Dublin University Magazine," the "North British Review," etc., but is chiefly known by his fine translation of Goethe's "Faust" (1835-1864). He died in 1867.

**Anstett, Johann Protasius von**, a Russian diplomatist, born in 1766; signed the treaty with Prussia at Kalish, assisted in arranging the subsidy treaty between Russia, Prussia, and England at Reichenbach, and represented Russia in the Congress of

Prague, all in 1813; and was Ambassador to the German Confederation in 1815-1835. He died in 1835.



CHRISTOPHER ANSTEY.

**Anstey, Christopher**, an English poet, born 1724; was author of "The New Bath Guide," a humorous and satirical production describing fashionable life at Bath in the

form of a series of letters in different varieties of meter, which had a great reputation in its day, but is now almost forgotten. He died in 1805.

**Anstey, F.**, pseudonym of THOMAS ANSTEY GUTHRIE, an English humorist, born in Kensington in 1856; graduated from Cambridge in 1875, was called to the bar in 1880, and joined "Punch" staff in 1887. He is the author of "Vice Versâ" (1882); "The Giant's Robe" (1883); "The Black Poodle" (1884); "The Tinted Venus" (1885); "The Pariah" (1889); "Voces Populi" (1890); "Mr. Punch's Pocket Ibsen" (1893); "Puppets at Large" (1897), and "The Brass Bottle" (1900).

**Ant**, the name applied to various genera of hymenopterous or membranous-winged

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insects, belonging to the section *Aculeata*, family *Formicidæ*. This race of insects, celebrated from all antiquity for singular instincts, industry, and foresight, would require a volume for the enumeration of all the curious and interesting circumstances observed by various naturalists in connection with them. To the works of Swammerdam, Réaumur, Kirby and Spence, Huber, Sir John Lubbock, etc., we must refer those who desire to be particularly informed on the subject. The observant Huber has in his work on ants rivalled his father's justly celebrated treatise on bees; while more recent works, such as Belt's "Naturalist in Nicaragua," and Bates's "Naturalist on the Amazons," give many interesting details regarding the life and habits of tropical species. Most of the species live in large companies or societies, composed of three sorts of individuals—males, females, and neuters. The males and females have long wings, which are not so much veined as in other insects of the same section, and are only temporary; the neuters, which are simply females with imperfectly developed reproductive organs, are smaller than the males and females, and are destitute of wings. The males and females are found in the vicinity of their habitation for a short time only, as they speedily mount into the air, where their sexual connection is consummated, after which the males perish, while the impregnated females, alighting on the ground, detach their wings by the aid of their feet, and commence the great work of their existence—the deposition of their eggs for the continuance of the species. The males are much smaller than the females, and have larger eyes, though the head and mandibles are proportionally smaller. The neuters have neither wings nor smooth eyes; their heads are large, their jaws strong, and their thorax compressed.

In some ant colonies, and particularly in the case of the white ants or termites (which, however, belong to a different order of insects from the common ants), the neuters exhibit a division into common or ordinary neuters, and soldiers—the latter provided with strong jaws, adapting them for protecting the community against the attacks of enemies. The neuters perform all the labors of the ant-hill; they excavate the galleries, procure food, and wait upon the larvæ till they are fit to leave their cells, appearing always industrious and solicitous. They are apparently endowed with the power of communicating to each other, probably through the antennæ or feelers, the result of their searches after food, and thus obtain the coöperation of several where the strength of an individual would be insufficient. They feed the larvæ or young ants, which are destitute of organs of motion, with materials which they disgorge



from their own mouths, and which seem to have undergone some preparation in their stomachs. In fine weather they carefully convey them to the surface for the benefit of the sun's heat, and as attentively carry them to a place of safety either when bad weather is threatened or the ant-hill is disturbed. In like manner they watch over the safety of the nymphs or pupæ about to acquire their perfect growth, some of which are in cocoons and some uncovered. When the time arrives at which the former are to undergo the final change they tear open the cocoons to permit them to escape. If the weather be unfavorable they detain those which have acquired their wings till a suitable opportunity offers, and then aid them to gain their liberty by the easiest route.

There is a very considerable variety in the size and form of ant-hills or nests, according to the peculiar nature or instinct of the species. The greater number make their nests in the earth, under buildings, etc., where they excavate extensive galleries for the reception of their young, such dwellings being almost entirely concealed. But others (as in the case of the termites) build their hills or nests of various substances, and form cones or domes of considerable size above ground. Some, again, prefer the trunks of old trees, in which they form the most singular labyrinths leading to the cells where the progeny are to be reared. These nests, whether above or under ground, have commonly a strong and acrid odor, which arises from the acid secreted by some of them from glands placed near the anal opening. This acid is known by the name of formic acid. It is not confined to the ant, but is found also in the poison of bees and wasps, in nettles, and may also be produced artificially. One among the most curious circumstances connected with the general history of ants is the exception to the general rule relative to the occupants of nests being individuals of the same species. Huber first observed, and his observations have since been amply confirmed, that the European red ant (*Formica sanguinea*) resorts to violence to obtain working ants of other species for their own use, thus actually making slaves of those they carry off to their nests. The neuters of these amazons regularly about the same hour, when the heat of the day begins to diminish, and for several successive days, advance in a dense mass toward the ant-hill they design to plunder; there, in spite of all the opposition made, they enter, seize on the larvæ and nymphs peculiar to this species, and carry them off to their own nest, where other neuters of the same species, but of full growth, take care of these kidnaped individuals as well as of the offspring of their vanquishers. *Polyergus rufescens* is also a slave-making species, and

Latreille observes of this species that from the form of the jaws these ants are unable to procure food or to build habitations for themselves.

Another exceedingly curious fact in relation to ants is the subserviency of the little insects called aphides or plant lice to their necessities. The aphides are remarkable for ejecting from little prominences on the posterior part of their bodies drops of limpid and sweet-tasting fluid. Not only do the ants profit by this when it is found on the leaves, but they know how to obtain it from the aphides at will. An ant approaches the aphid and begins very gently to touch it with his antenna over the sides and back as if caressing it. In a very short time the aphid raises its hinder limbs slightly, and from the orifices on its back a small clear drop exudes, which is speedily drunk up by the ant, which repeats the same treatment to several plant lice till his hunger is entirely sated. These aphides have been appropriately called the cows of the ants, which in fact seem to regard them as their peculiar property, not only taking great care of them, but fighting for their possession. So fully sensible are they of their great value that some ants are said to carry the eggs of the aphides into their nests, where they take care of them till they are hatched. Some species of ants keep their aphides altogether underground, or at least during bad seasons, where they feed on the roots of plants; others build with clay small galleries from the ant-hills up trees, and even to the branches, upon which the aphides abound. Mr. Darwin has noted the interesting fact that when the plant lice were stroked by any filament such as a hair they did not emit the sweet liquid, but on being stroked afterward by the antennæ of ants they emitted the secretion.

"When we see an ant-hill, tenanted by thousands of industrious inhabitants, excavating chambers, forming tunnels, making roads, guarding their homes, gathering food, feeding the young, tending their domestic animals, each one fulfilling its duties industriously and without confusion, it is difficult altogether to deny them the gift of reason," or escape the conviction "that their mental powers differ from that of men, not so much in kind as in degree." (Lubbock.)

Male and female ants survive, at most, till autumn, or to the commencement of cool weather, though a very large proportion of them cease to exist long previous to that time. The neuters pass the winter in a state of torpor, and of course require no food. This well-ascertained fact proves that their remarkable foresight has no other object than the continuance of the species by perfecting and securing their habitations. The only time when they require food is during the season of activity, when they



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have a vast number of young to feed. It would be well for mankind if ants derived all their nourishment from the aphides or from the dead bodies of other insects, small birds, etc. Unfortunately they are but too celebrated in most countries for their destructive operations among the grain, in gardens, pantries, and conservatories. Their larvæ and nymphs are in some parts of the world collected for the purpose of feeding pheasants and young turkeys. The bodies of small animals, skinned, and secured near an ant-hill, are soon converted by the ants into very neatly-cleaned skeletons. The pupæ of many species resemble grains of corn in appearance, and these pupæ, which are tended with great care by the ants, have undoubtedly in many cases been mistaken for grain carefully husbanded by the insects. The zoölogical characters of the ant family, which includes the familiar ants, are found in the females being of larger size than the males; in the sexes being winged, while the neuters are wingless; and in the antennæ possessing a long basal joint. The genus *Formica* possesses no sting and distinctly developed eyes. The red ant (*F. sanguinea*) is a good example of this genus, as also are the *F. rufa*, or wood ant, and the brown ant (*F. fusca*). The genus *Myrmecia* (which are typically represented by the *M. fortificata*, etc.) possesses a sting, and the footstalk of the abdomen is double jointed. The giant ant (*Ponera grandis*) also possesses a sting, but the neuters of this species have no eyes.

In the little cemetery at the St. Vincent Monastery, Latrobe, Westmoreland Co., Pa., over the peaceful graves of the departed Benedictine monks, there has for more than 15 years waged a curious war, the outcome of which is watched with interest by the fathers of the institution, one of whom at least, Father Jerome, is known widely as an entomologist of repute. In the cemetery proper there is a colony of "slave-taking ants," the boundaries of whose home are definitely marked near the borders of the burial ground. Just over the hill from this is a colony of the common red ants that are of larger size, and between these two communities, for more than a decade and a half the battles have been frequent and furious. As a natural consequence the red ants being constantly depleted of their "neuters," or workers, are becoming less and less numerous, while the black ants, living in luxury and ease, are waxing more powerful in numbers each year. The out-

## Antananarivo.

come will probably be that in the end the slave-taking ants will exterminate the red ants, when the former will be compelled to move elsewhere for serfs. Exhaustive study, under the microscope, has been made of the two colonies and their bellicose relations by Father Jerome and other priests at the monastery. The black ants have constructed, with the help of their serfs, immense galleries in the cemetery, which are constantly being enlarged by the addition of new colonies sent out from the mother house, and the extending of these by increased population.

**Antacid**, an alkali, or any remedy for acidity in the stomach. Dyspepsia and diarrhœa are the diseases in which antacids are chiefly employed. The principal antacids in use are magnesia, lime, and their carbonates, and the carbonates of potash and soda.

**Antæus** (an-tē'us), the giant son of Poseidon (Neptune), and Gê (the earth), who were invincible so long as he was in contact with the earth. Heracles (Hercules) grasped him in his arms and stifled him suspended in the air.

**Antalcidas**, a Spartan politician, chiefly known by the celebrated treaty concluded



VIEW OF ANTANANARIVO.

with Persia at the close of the Corinthian war in 387 B. C.

**Antalkali**, a substance which neutralizes an alkali, and is used medicinally to counteract an alkaline tendency in the system. All true acids have this power.

**Antananarivo**, the capital of Madagascar, situated in the central Province of Imérina; of late years almost entirely rebuilt, its old timber houses having been replaced



## Antar

by buildings of sun dried brick on European models. It contains two royal palaces, immense timber structures, one of which is surrounded with a massive stone veranda with lofty corner towers. It has manufactures of metal work, cutlery, silk, etc., and exports sugar, soap, and oil. Pop. about 100,000. (See MADAGASCAR.)

**Antar**, an Arabian warrior and poet of the 6th century, author of one of the seven Moallakas hung up in the Kaaba at Mecca; hero of a romance analogous in Arabic literature to the Arthurian legend of the English. The romance of Antar, which has been called the "Iliad of the Desert," is composed in rhythmic prose interspersed with fragments of verse, many of which are attributed to Antar himself, and has been generally ascribed to Asmai (born 740 A. D.; died about 830 A. D.), preceptor to Harun-al-Raschid.

**Antarctica**, one of the names given to the great continent believed to lie around the South Pole, for which the name Magellanica has also been proposed; while some would extend the name Victorialand, given to a part of it, to the whole. Recent discussions at geographical societies and congresses—notably at the Geographical Congress in London in 1895—have conferred on the world the importance of a regular scientific expedition to solve the innumerable problems, physical, geographical, geological, and biological, hidden under Antarctic snow and ice. Magnetic science might especially be expected to benefit by such a systematic expedition, to which the Australian governments are favorably disposed. Recent voyages have been mainly those of whalers, ill equipped for observations, such as that of the "Antarctic" in 1894-1895, described by Borchgrevink at the Geographical Congress of 1895, when a latitude of 74° S. was reached, landings made, and rocks and vegetation brought back. The rocks dredged at various times in coastal waters seem to prove that the land is continental, not a mere archipelago.

\* **Antarctic Ocean**, the ocean situated about, or within, the Antarctic circle. The great Southern Ocean is that part of the ocean which surrounds the world in one continuous band between the latitude of 40° S. and the Antarctic Circle. This band is only partially interrupted by the southern prolongation of South America. The northern portions of this band are often called the South Atlantic, South Indian, and South Pacific, while the southern portions are usually called the Antarctic Ocean. The average depth of the continuous ocean surrounding the South Polar land is about 2 miles; it gradually shoals toward Antarctic Land, which in some places is met with a short distance within the Antarctic Circle. The "Challenger" found 1,800 fathoms near

## Antarctic Ocean

the Antarctic circle S. of Kerguelen, but Ross records a much greater depth in the same latitude S. of the Sandwich group. Only three navigators, Cook, Weddell, and Ross, have crossed the 70th parallel S. Of several other expeditions that have crossed the Antarctic circle, the most notable was the "Challenger," in 1874, the only steam vessel that had visited these seas. The majority of Antarctic voyagers have discovered land S. of the 60th parallel, Cook in 71° S. and 107° W. Bellinghausen discovered Peter island and Alexander Land; D'Urville discovered Adelie Land. Wilkes found land extending from the 100th to the 160th meridian of E. longitude between the parallels of 65° and 67° S. Ross discovered Victoria Land, and in February, 1841, sailed along its coasts within sight of the high mountain ranges, 7,000 to 10,000 feet above the sea, as far as 78° S. The mountain range here terminated in an active volcano, Mount Erebus, 12,000 feet in height. His farther progress was stopped by an icy barrier 150 to 200 feet in height, along which he sailed to the E. for 300 miles. The depth off this ice-barrier was 260 fathoms, so that it was just in the condition to generate those large, flat topped, tabular icebergs which are the characteristic feature of the Antarctic regions. Where the coast is steep and high, there is no true ice barrier, the ice being only 6 or 10 feet above the sea, extending many miles from the shore. Till 1895, Ross and D'Urville alone succeeded in setting foot on land within the Antarctic Circle. This land was of volcanic origin; but there is no doubt a large extent of continental land around the South Pole, for the "Challenger" dredged up granitites, mica-schists, sandstones, and other continental rocks close to the ice barrier. Dr. Murray estimates the extent of the Antarctic continent at 3,000,000 square miles. Vegetation was found on it in 1895; land animals have not been seen. Whales, grampuses, seals, penguins, petrels, albatrosses, and other oceanic birds abound. Diatoms are very abundant in the surface-waters, and their dead frustules form a pure white deposit called diatom ooze, about the latitude of 60°, outside the blue muds which surround the continent. Life is abundant in the surface-waters, and at the bottom of the ocean. The mean temperature both of the air and sea, S. of 63° S., is even in summer below the freezing point of sea water. Between 60° and 63° S., a sensible rise takes place, temperature as high as 38° F. being recorded both of sea and air in March. The "Challenger" found a cold layer of water sandwiched between a warm one on the surface and a warm one at the bottom; the surface layer was 37.2°; the cold layer at 80 fathoms was 32.5°; the temperature

\* For Map, see NORTH POLAR EXPEDITIONS.



## Ant-eater

of the warm bottom layer was not accurately determined, but it was probably about 33° F. It is remarkable that the bottom temperature at 50° S. (33° 5' F.) is little different from the bottom water all over the Indian and other oceans. The return currents of dense, warm, tropical water from the Indian, Atlantic, and Pacific Oceans, which run southward along the eastern shores of America, Africa, and Australia, sink on reaching a latitude of from 45° to 56° S., and flow N. at the bottom to supply the loss in the tropics by surface currents and evaporation, and S., to supply the place of the ice cold water drifted northward. The barometric pressure within the Antarctic regions appears to be low, considerably under 29.000 inches. The winds blow cyclonically in toward the Pole from the Southern Ocean, carrying with them much moisture. The fall of rain and snow is estimated as about equal to a rainfall of 30 inches annually. All our knowledge of the Antarctic is confined to the summer months of December, January, and February. Of late, geographical societies have insisted on the desirableness of systematic Antarctic exploration.

The first effort in this direction was the expedition of Carsten Egeburg Borchgrevink, the Norwegian explorer, which left Hobart, Tasmania, in the steamer "Southern Cross," Dec. 19, 1898. On Dec. 30, the vessel struck the ice pack; on Jan. 14, 1899, the snow-clad Balleny Island was sighted; on Feb. 17, Robertson Bay was entered; and on March 1, the British Union Jack was hoisted on Victoria Land. A number of expeditions were made on the ice, and for the first time, so far as known, human beings wintered on the Antarctic Continent. The furthest point reached was lat. 78° 50' S.; long. 195° 50' E., the most southerly point ever reached by man; and the lowest temperature recorded was —52° F. The expedition returned in April, 1900. Sufficient scientific information was acquired to whet the appetite for further research in this interesting locality.

**Ant-eater**, a genus of mammalia, belonging to the order *Edentata*. This peculiar group of animals is exclusively found in the S. part of the American continent, where they aid in diminishing the numbers of immense hordes of ants, which desolate the country in the vicinity of their dwellings. The whole head is remarkably elongated. The jaws are destitute of teeth, and the mouth is furnished with a very narrow, long, smooth tongue, by the aid of which they gather their prey. The saliva of the mouth is of a glutinous description, and also assists in the capture of the insects. Their limbs, especially the anterior, are very robust, and furnished with long, com-

## Antelope

pressed, acute nails, admirably adapted for breaking into the hillocks containing their appropriate food. The most remarkable of the species whose habits are best known is the *Myrmecophaga jubata*, or great ant-eater, sometimes called ant-bear. This animal is four or five feet long, exclusive of the tail, which is about three. The head and anterior extremities are covered with a brownish hair, which is mixed with white on the trunk and tail, the predominant color being brown. The hair is flat at the end, and round for the rest of its length, somewhat resembling the hair of the deer. The fore feet have four digits, with very strong claws, and the hind feet five. The great ant-eater leads a harmless and solitary life. In feeding it either thrusts its long narrow tongue, covered with the glutinous saliva, into the ant heap, whence it withdraws it covered with the insects, or else, having partially demolished the hill by means of its fore limbs, it transfers with wonderful celerity the alarmed inhabitants to its stomach by repeated and rapid extensions and retractions of the tongue. Two other species have been long known, both of which have naked, scaly, and prehensile tails. These are the *Tamandua tetradactyla* (about three feet in length, with a tail 16 inches long), and the little ant-eater (*Cyclothurus didactylus*), the latter (which is 15 inches in length) possessing only two toes on the front feet and four on the hinder feet. These latter species are adapted for climbing trees and for preying upon ants which make their nests in such situations. All the ant-eaters are slow in their movements.

**Antediluvian**, before the flood or deluge of Noah's time; relating to what happened before the deluge. In geology the term has been applied to organisms, traces of which are found in a fossil state in formations preceding the diluvial, particularly to extinct animals such as the paleotherium, the mastodon, etc.

**Antelope**, the name given to the members of a large family of ruminant *ungulata* or hoofed *mammalia*, closely resembling the deer in general appearance, but essentially different in nature from the latter animals. They are included with the sheep and oxen in the family of the *cavicornia* or "hollow-horned" ruminants. Their horns, unlike those of the deer, are not deciduous, but are permanent; are never branched, but are often twisted spirally, and may be borne by both sexes. They are found in greatest number and variety in Africa. Well known species are the chamois (European), the gazelle, the addax, the eland, the koodoo, the gnu, the springbok, the sasin or Indian antelope, and the prongbuck of America.



**Antennæ**, the name given to the movable jointed organs of touch and hearing attached to the heads of insects, myriapods, etc., and commonly called horns or feelers. They present a very great variety of forms. The small antennæ of the lobster bear olfactory bristles, and have an ear lodged at the base. And, in short, there are numerous observations to justify the general statement that in many cases the antennæ are sensitive to smell, sound, and probably taste. Deprived of its antennæ, an ant, for instance, is peculiarly helpless.

**Antenor** (an-tē'nor), in Greek legends, a Trojan noted for his wisdom, was the father of Acamas, Agenor, and many other sons. He advised the Trojans to restore Helen to her husband. He has been accused, by writers of little authority, of a design to betray Troy to the Greeks. Vergil says that he removed with his sons from Troy to Thrace, and thence, with the Heceti, to Italy, where he founded Patavium, now Padua. He had entertained Ulysses and Menelaus in Troy, and his house was not disturbed in the sack of the city.

**Antenor**, a Grecian sculptor, who lived at Athens about 500 B. C. He made bronze statues of Harmodius and Aristogiton, which were carried away by Xerxes in 480 B. C.

**Antequera** (an-te-kā'ra), a city of Andalusia in Spain, in the Province of Málaga, a place of some importance under the Romans, with a ruined Moorish castle. Manufacturers of woollens, leather, soap, etc. Pop. 27,070.

**Anteros**, in Greek mythology, the god of mutual love. According to some, however, Anteros is the enemy of love, or the god of antipathy; he was also said to punish those who did not return the love of others.

**Anteversio**, a displacement forward of any organ. The term is particularly applied to a change of position of the uterus, in which the organ is bodily displaced in the pelvic cavity, so that the fundus is directed against the bladder, and the cervix toward the sacrum.

**Anthelion**, a luminous ring, or rings, seen by an observer, especially in Alpine and polar regions, around the shadow of his head projected on a cloud or fog bank, or on grass covered with dew, 50 or 60 yards distant, and opposite the sun when rising or setting. It is due to the refraction of light.

**Anthem**, originally a hymn sung in alternate parts; in modern use, a sacred tune or piece of music set to words taken from the Psalms or other parts of the Scriptures, first introduced into church service in Elizabeth's reign; a developed motet.

The anthem may be for one, two or any number of voices, but seldom exceeds five parts, and may or may not have an organ accompaniment written for it.

**Anthemis**, a genus of plants belonging to the order *asteraceæ*, or composites. It contains the common chamomile (*A. nobilis*). The flower buds constitute the chamomile of the shops. Cattle eat it with avidity. As a medicine it is tonic and stimulating. A warm infusion of it excites vomiting. The true chamomile plant has a fine smell, in this differing from another common species of anthemis, the *anthemis cotula*, or stinking chamomile. The latter plant, moreover, is erect, whereas the former is prostrate.

**Anthemius** (an-them'ē-us), a Roman emperor of the West (467-472); son of Procopius and son-in-law of Marcian, Emperor of the East. He was nominated emperor by Leo, the Emperor of the East, and became the father-in-law of Ricimer. Subsequently Ricimer became his enemy, and, in a war between them, Anthemius was killed.

**Anthemius**, a Greek mathematician and architect of Lydia; designed the Church of St. Sophia at Constantinople, and is credited with the invention of the dome; died A. D. 544.

**Anther**, an organized body constituting part of a stamen, and generally attached to the apex of the filament. As a rule, it is composed of two parallel lobes or cells: sometimes, however, there are four, and sometimes only one. The cells are united by the connective, and contain pollen. When the time for shedding it arrives, the anthers burst generally by a longitudinal fissure from the base to the apex, but in some plants in other ways. The anther is the theca of Grew, the capsula of Malpighi, the apex of Ray, the testiculus or testis of Vaillant, the capitulum of Jungius, and the spermatocystidium of Hedwig.

Anther dust, the pollen from an anther. It constitutes a yellow dust, which, when it falls from the atmosphere, has often been mistaken for a shower of sulphur. It is very copious in the *Coniferæ*.

**Anthesteria**, an annual Greek festival held in honor of all the gods, more particularly of Bacchus or Dionysus, and to celebrate the beginning of spring, and the season when the wine of the previous vintage was considered fit for use.

**Antheunis, Gentil Theodoor** (än'te-nes), a Flemish poet, born at Oudenaarde, Sept. 9, 1840. At first a teacher in his native place and at Dendermonde, he afterward became a justice of the peace in Brussels. His lyrics, excelling in euphony and tender sen-



## Anthocyanin

timent, have frequently been set to music. They appeared in collections: "From the Heart" (1875); "Songs and Poems" (1874); "Life, Love and Song" (1879).

**Anthocyanin**, the blue color of flowers, a pigment obtained from those petals of flowers which are blue by digesting them in spirits of wine.

**Anthology**, the name given to several collections of short poems which have come down from antiquity. The first who compiled a Greek anthology was Meleager, a Syrian, about 60 B. C. He entitled his collection, which contained selections from 46 poets besides many pieces of his own, the "Garland;" a continuation of this work by Philip of Thessalonica in the age of Tiberius was the first entitled "Anthology." Later collections are that of Constantine Cephalas, in the 10th century, who made much use of the earlier ones, and that of Maximus Planudes, in the 14th century, a monk of Constantinople, whose anthology is a tasteless series of extracts from the "Anthology" of Cephalas, with some additions. The treasures contained in both, increased with fragments of the older poets, idyls of the bucolic poets, the hymns of Callimachus, epigrams from monuments and other works, have been published in modern times as the Greek "Anthology." There is no ancient Latin anthology, the oldest being that of Scaliger (1573). There are also Arabic, Persian, Turkish and other anthologies, including several by authors of the United States.

**Anthony, Charles**, an American classical scholar, born in New York city, Nov. 19, 1797. He was for many years Professor of Ancient Languages at Columbia College. A beautiful edition of Horace first made him famous among scholars. His best known work was an edition of Lemprière's "Classical Dictionary" (1841). He was also the editor of over 50 classical textbooks. He died July 29, 1867.

**Anthony, Henry Brown**, an American legislator, born in 1815; was graduated at Brown University in 1833; became editor and publisher of the "Journal" in Providence, R. I.; elected Governor of Rhode Island in 1849 and 1850; United States Senator from 1859 till his death; and was elected President *pro tem.* of the United States Senate in 1863, 1871, and 1884. He died in 1884.

**Anthony, St.**, the founder of monastic institutions, born near Heraclea, in Upper Egypt, A. D. 251. Giving up all his property, he retired to the desert, where he was followed by a number of disciples, who thus formed the first community of monks. He died at the age of 105. As a saint of the Roman Catholic Church, he is much es-

## Anthony

teemed. Prayer for his intercession was intended, particularly, to preserve from ST. ANTHONY'S FIRE, so called from him, a disease of the Middle Ages that dried up and blackened every limb it attacked, as if it were burnt.

**Anthony, St., Falls of**, a noted fall in the Mississippi river, now within the city limits of St. Paul, Minn. The perpendicular fall is 17 feet, with a rapid below of 58 feet. An island divides the river into two parts. The entire descent of the stream for three-quarters of a mile is 65 feet. The falls and surrounding scenery, especially during the spring floods, are exceeding picturesque.

**Anthony, Susan Brownell**, an American reformer, born in South Adams, Mass., Feb. 15, 1820; was of Quaker parentage; educated at a Friends' school in Philadelphia, and taught school in New York in 1835-1850. In 1847 she first spoke in public, taking part in the temperance movement and organizing societies. In 1852, she assisted in organizing the Woman's New York State Temperance Society; in 1854-1855 she held conventions, in each county in New York, in behalf of female suffrage. In 1857 she became a leader in the anti-slavery movement, and in 1858 advocated the coeducation of the sexes. She was influential in securing the passage by the New York Legislature, in 1860, of the act giving married women the possession of their



SUSAN B. ANTHONY.

earnings, and guardianship of their children. In 1868, with Mrs. E. C. Stanton and Parker Pillsbury, she began the publication of the "Revolutionist," a paper devoted to the emancipation of woman. In 1872 she cast ballots at the State and Congressional election in Rochester, N. Y., to test the application of the 14th and 15th Amendments of the United States Constitution. She was indicted for illegal voting, and fined, but the fine was never exacted. Her last public appearance of note was as a delegate to the International Council of Women, in London, England, in 1899. In 1900 her birthday was celebrated by an affecting popular demonstration in Washington, D. C., and she retired from the presidency of the National American Woman Suffrage Association, which she had held for several years. Died March 13, 1906.



## Anthracene

**Anthracene**, a substance obtained in the distillation of coal-tar. Although long known to chemists, it is as the source of artificial alizarin that it has become of commercial value. By a process of oxidation with bichromate of potash, it is changed into anthraquinone, which in turn is treated first with sulphuric acid, and then with potash, the alizarin being separated by the addition of hydrochloric acid. Conversely, anthracene is readily obtained from alizarin by heating that substance with zinc dust—a mixture of metallic zinc with oxide and hydrate of zinc—when, by the absorption of hydrogen, anthracene is formed. When perfectly pure, it forms white pearly scales, melting at about 410° F. (210° C.), and at a higher temperature distilling without decomposition. It is insoluble in water, but readily dissolves in boiling alcohol, ether or turpentine. When viewed by a ray of sunlight, it exhibits a fine blue fluorescence, if pure. The commercial article, dissolved in benzene, gives a green fluorescence. By prolonged exposure to light, it is changed into an isomeric body, paranthracene, which again, on fusion, yields anthracene. Anthracene gives rise to a large number of compounds, formed by replacing part of the hydrogen which it contains with chlorine, alcohol radicals, etc., and accordingly named chloranthracene, methyl-anthracene, and so on.

**Anthracite**, glance, or blind coal, a non-bituminous coal of a shining luster, approaching to metallic, and which burns without smoke, with a weak or no flame, and with intense heat. It consists of, on an average, 90 per cent. carbon, 3 hydrogen and 5 ashes. It has some of the properties of coke or charcoal, and, like that substance, represents an extreme metamorphism of coal under the influence of heat or of volcanic disturbance. It is found in England, Scotland and Ireland, and in large quantities in the United States, chiefly in Pennsylvania. See PENNSYLVANIA, *Mineralogy*.

**Anthrax** (Greek, a carbuncle), the name now generally used of a widely-distributed and very destructive disease, most common among sheep and cattle. Besides its practical importance, it has special theoretical interest, because it was the first infectious disease proved to be due to the presence of microscopic vegetable organisms, and because it has been more fully studied than any other analogous disease. Cattle and sheep are most commonly attacked by anthrax. In the most acute (apoplectic) cases, the animal falls as if it had received a severe blow and goes into convulsions; the pulse is quickened, the breathing becomes rapid and labored, and death follows in a few minutes or hours. In less acute cases, the animal loses its appetite, becomes thirsty and feverish, and often has bloody

## Anthropometry

diarrhœa; may appear to recover, only to have a more severe seizure after a short interval; and in a fatal case dies with great enfeeblement, convulsions, and labored breathing, usually within two days of the first symptoms. Anthrax does not readily attack man, and is very rarely communicated by one human being to another. It occurs in those whose occupations bring them into contact with diseased animals or their hides, wool, etc.

**Anthropoid**, resembling man; a term applied especially to the apes, which approach the human species in the following order: 1st (most remote), the gibbons; 2d, the oranges; 3d, the chimpanzee; and, 4th (nearest), the gorilla.

**Anthropolatry**, the worship of man, a word always employed in reproach; applied by the Apollinarians, who denied Christ's perfect humanity toward the orthodox Christians.

**Anthropology**, the science of man in the widest sense of the term. The word anthropology has been variously defined as "The doctrine of anatomy; the doctrine of the form and structure of the body of man." "A discourse or description of a man or of a man's body." Kant gave a much wider range than this to the subject in his "Anthropologie," published about the year 1798, as he had previously done orally in his university lectures. Finally, its aim is "to study man in all his leading aspects, physical, mental and historical; to investigate the laws of his origin and progress; to ascertain his place in nature, and his relation to the inferior forms of life." In this sense, ethnology is a department of anthropology.

The word is also applied to the science which investigates the relation in which man stands to the inferior animals. In this sense ethnology is a cognate science to anthropology.

**Anthropometry**, the measurement of the human body to discover its exact dimensions and the proportions of its parts, for comparison with its dimensions at different periods, or in different races or classes. Cranial measurements have long been adopted by anthropologists as the basis of their classifications of races; but the conformation of the skull and the relation of its height to its breadth vary so much within the same tribe as not to be, of themselves, sufficient data on which to rest generalizations. M. Quetelet defined the general types of mankind by measuring, with reference to such particular qualities as height, weight, complexion, and the like, a certain number of men, and selecting as the standard the most numerous group on both sides of which the groups decrease in number as they vary in type, he arrives at the typical



mean man of a population. As a basis of comparison, this is infinitely more valuable than an average which may be calculated from a few individuals, and those frequently exceptional rather than normal types. (See Quetelet's "Anthropométrie," Brussels, 1871.) The French anthropologists depend much more on anthropometry than the English, and have adopted a form of schedule containing as many as 102 different observations of a single individual. Dr. René Collignon reduced these for practical use to about 20, and with five simple instruments made a series of anthropometric observations of 280 French recruits from the different provinces of France, which he read before the Society of Anthropology at Paris in June, 1883 — an excellent example of the value of this method. The anthropometric committee of the English Anthropological Society distributed the average stature of British adult males into racial elements as follows: Early British, 66.6 inches; Saxon, 67.2; Scandinavian, 68.3; Anglian, 68.7. Similar detailed anthropometric measurements will be seen in the special anthropological journals, French, English and German, and in the more scientific of recent books of travel. The French police systematically employ anthropometric methods for the identification of criminals, carefully recording for future use the various measurements. See BERTILLON SYSTEM.

**Anthropomorphism**, the attributing of a human form to God. When this is really done it is a gross degradation of the Divinity, and is condemned in Scripture. But when the only anthropomorphism is the use of metaphorical phrases, such as the arm of the Lord (Ps. lxxvii: 15), or His eyes (Ps. xi: 4), or His ears (Ps. xxxiv: 15), to make abstract ideas more readily conceivable, the practice has the countenance of Scripture itself. There are thus in this sense a legitimate and an illegitimate anthropomorphism.

**Antichrist**, a denier or an opponent of Christ; one who refuses to make confession that Jesus Christ is come in the flesh, or who, leaving the Church, pretends to be the Christ (or Messiah), and thus becomes a rival and enemy of Jesus, the true Christ. In a special sense, one who should pre-eminently stand forth as the antagonist of Christ, and should be a sufficiently prominent personage to become the theme of prophecy; or if *anti* be held to mean instead of, then the characteristic of Antichrist will be a supersession of Christ, not an avowed antagonism to Him. If, when St. John says, "Ye have heard that Antichrist shall come," he refers to the rival and opponent of God described by St. Paul in II Thessalonians, ii. then Antichrist is to be identified as the "man of sin," "the son of perdition, and that Wicked," of verses

3, 8. Protestants, from Luther down, have sometimes identified Antichrist with the papacy, while some Catholics have applied the term to Luther himself.

**Anticlinal Line or Axis**, in geology, the ridge of a wavelike curve made by a series of superimposed strata, the strata dipping from it on either side as from the ridge of a house: a synclinal line runs along the trough of such a wave.

**Anticosti**, an island in the Gulf of St. Lawrence, which it divides into two channels, with lighthouses at different parts of the coast, and about 140 miles long, and 30 miles broad in the center. The hills in the interior rise to about 600 feet. Anticosti has two good havens, one at Ellice bay, near the W. end, and the other at Fox bay, in the N. W. The climate is severe; while the surface is an alternation of rocks and swamps. It is visited by fishermen in the summer, but there are hardly any inhabitants save lighthouse keepers and a few officials. The island, which is attached to the Canadian province of Quebec, has considerable salmon, trout, cod and herring fisheries, and is a resort for seal and bear hunting. Extensive peat deposits are found in Anticosti. Marl also occurs. In 1882 Anticosti was in the market for sale, and, in 1886, attempts were made by an English company at its colonization and settlement. In 1895, the island was purchased by M. Henri Menier, of France, who had much litigation over the rights of some settlers. A decision in his favor was made in 1900.

**Anti-cyclone**, a phenomenon presenting some features opposite to those of a cyclone. It consists of a region of high barometric pressure, the pressure being greatest in the center, with light winds flowing outwards from the center, and not inwards as in the cyclone, accompanied with great cold in winter and with great heat in summer.

**Anticyra** (an-tē-sī'ra), the name of two towns of Greece, the one in Thessaly, the other in Phocis, famous for hellebore, which, in ancient times, was regarded as a specific against insanity and melancholy. Hence various jocular allusions in ancient writers.

**Antietam**, a small river in Pennsylvania and Maryland which empties into the Potomac six miles N. of Harper's Ferry. On Sept. 17, 1862, a battle was fought on its banks near Sharpsburg, between a Federal army of 87,164 men, under General McClellan, and a Confederate army variously reported at from 40,000 to 97,000 men, under General Lee. The Federal casualties aggregated 12,469, and the Confederate, from 12,000 to 25,000. General Lee recrossed the Potomac on the following day, and the general consensus is that the battle was otherwise indecisive.



**Antifebrin**, a neutral chemical product derived from acetate of aniline at an elevated temperature by a dialytic action in which water is set free. It is readily soluble in alcohol, ether, brandy and strong wines, in 160 parts of cold, and in 25 parts of boiling water. It has been employed with excellent results as a pain-reliever in neuralgic and rheumatic affections, as a sedative febrifuge and antipyretic. It is given in doses of 2 to 8 grains, in powder, tablet or capsule form, or in wine. It is four times as strong as antipyrine, the effects of which medicine are very similar.

**Anti-Federalists**, members of a political party, in the United States, which opposed the adoption and ratification of the constitution, and failing in this, strongly favored the strict construction of it. The strengthening of the National government at the expense of the States was also opposed. Soon after the close of Washington's first administration (1793) the name Anti-Federal went out of use, the term Republican, and afterward Democratic-Republican and Non-Democratic, alone taking its place.

**Antifriction Metal**, a name given to various alloys of tin, zinc, copper, antimony, lead, etc., which oppose little resistance to motion, with great resistance to the effects of friction, so far as concerns the wearing away of the surfaces of contact. Babbitt's metal (50 parts tin, 5 antimony, 1 copper) is one of them.

**Antigone** (an-tig'o-nē), in Greek mythology, the daughter of Œdipus and Jocasta, celebrated for her devotion to her father and to her brother Polynices, for burying whom against the decree of King Creon she suffered death. She is heroine of Sophocles' "Œdipus at Colonus" and his "Antigone;" also of Racine's tragedy, "The Hostile Brothers."

**Antigonous** (an-tig'ō-nus), one of the generals of Alexander the Great, born about 382 B. C. After the death of Alexander, Antigonous obtained Greater Phrygia, Lycia, and Pamphylia as his dominion. Ptolemy, Cassander and Lysimachus, alarmed by his ambition, united themselves against him; and a long series of contests ensued in Syria, Phœnicia, Asia Minor, and Greece, ending in 301 B. C. with the battle of Ipsus in Phrygia, in which Antigonous was defeated and slain.

**Antigua** (an-tē'ga), one of the British West Indies, the most important of the Leeward group; 28 miles long, 20 broad; area, 108 square miles; discovered by Columbus, 1493. Its shores are high and rocky; the surface is varied and fertile. The capital, St. John, the residence of the governor of the Leeward Islands, stands on the shore of a well sheltered harbor in the N. W. part of the island. The staple articles of export

are sugar, molasses, rum. Pop., including Barbuda, (1901) 34,971.

**Antilegomena**, a term borrowed from Eusebius, and still in use for those books of Scripture which were not at first universally received throughout the Churches. The Antilegomena were the Epistle to the Hebrews, James, II Peter, 2 and 3, John, Jude and Revelation. The term is opposed to Homologoumena.

**Antilles** (an-til'ez), another name for the West Indian Islands. Subdivided into Greater Antilles and Lesser Antilles.

**Antilochus**, in Greek legend, the son of Nestor, who fell at the siege of Troy by the hand of Memnon.

**Antimachus** (an-tim'a-kus), a Greek epic and elegiac poet; flourished about 400 B. C. He was called "The Colophonian," from Colophon, his native place. His chief works were the epic "Thebais," and an elegy on his dead love Lyde. The Alexandrian critics greatly admired him, esteeming him next to Homer.

**Anti-Masonic Party**, a political organization in opposition to Freemasonry. In 1826 William Morgan, a Freemason, living in Batavia, N. Y., was suspected of being in league with other Masons in preparing a revelation of Masonic secrets. The report that Morgan, who had disappeared suddenly, had been abducted and drowned caused much excitement, which finally gave rise to a political party. In 1828 this party polled 33,000 in New York State; in 1829, about 70,000; and in 1830, about 128,000. By 1832 the party had spread to other states and William Wirt was nominated for President, and Amos Ellmaker for Vice-President. This ticket was carried in Vermont only. In 1832 the party nearly elected Joseph Ritner Governor of Pennsylvania, and, in 1835, through a split in the Democratic Party, did elect him.

**Anti-Mission Baptists**, a sect of hyper-Calvinistic Baptists in the United States who also called themselves "Old School Baptists," founded about 1835. They do not believe in Sunday schools, colleges or theological seminaries, holding that the salvation of men does not depend upon human instrumentalities, but upon divine grace only.

**Antimony**, in chemistry, a triad metallic element, but in some less staple compounds it appears to be pentad. Symbol, Sb.; atomic weight, 122; sp. gr., 6.8; melting point, 450°. It can be distilled, but takes fire when strongly heated in the air, forming Sb<sub>2</sub>O<sub>3</sub>. Antimony is a bright bluish-white, brittle, easily pulverized metal, which occurs as Sb<sub>2</sub>S<sub>3</sub>, and as cervantite, Sb<sub>2</sub>O<sub>4</sub>; also as valentinite and senarmonite, Sb<sub>2</sub>O<sub>3</sub>. The metal is obtained by heating the sulphide with half its weight of metal-



## Antimony

lic iron, or with potassium carbonate. It is oxidized by nitric acid, forming  $\text{Sb}_2\text{O}_5$ . Type metal is an alloy of lead with 20 per cent. of antimony. Finely powdered antimony takes fire when thrown into chlorine gas. It forms three oxides: (1) Antimony trioxide, or antimonious oxide; (2) antimonie tetroxide, or antimonoso antimonie oxide; and (3) antimonie oxide. Antimony also forms bases with alcohol radicals, as trimethylstibine,  $\text{Sb}(\text{CH}_3)_3$ . Salts of antimony are used in medicine; in large doses they are poisonous. Antimony is detected by the properties of its sulphide, chloride, and of  $\text{SbH}_3$ . It is precipitated by metallic zinc and iron from its solutions as a black powder. Copper is covered by a metallie film. Antimony salts, when fused on charcoal with  $\text{Na}_2\text{CO}_3$ , give a white incrustation and a brittle metallie bead, converted by nitric acid into a white oxide soluble in a boiling solution of cream of tartar. Antimony is precipitated by hydric sulphide,  $\text{H}_2\text{S}$ , as an orange-red powder, sulphide of antimony,  $\text{SbS}_3$ , which is soluble in sulphide of ammonium, again precipitated by hydrochloric acid. With potash the solution of trichloride of antimony gives a white precipitate of the trioxide, soluble in large excess. Ammonia gives the same precipitate, which is insoluble in large excess; but if tartaric acid is present these precipitates dissolve easily. A liquid containing antimony salts, treated by zinc and dilute sulphuric acid, yields antimoniu-retted hydrogen,  $\text{SbH}_3$ , which burns with a bluish tinge. A deposit of antimony takes place on a cold porcelain plate held in the flame. This metallie film may be destroyed from arsenic by dissolving it in aqua regia, and the solution treated with  $\text{H}_2\text{S}$ , which gives the characteristic orange sulphide. Or moisten the metallie film with nitric acid, evaporate the acid without boiling, a white deposit of trioxide of antimony remains, which gives a black spot with ammonio-nitrate of silver. A film of arsenic treated in the same way gives either a yellow precipitate of arsenite or a red-brown precipitate of arseniate of silver.

In mineralogy, antimony occurs native, occasionally alloyed with a minute portion of silver, iron, or arsenic. Its crystals are rhombohedral; hardness, 3-3.5; specific gravity, 6.62 to 6.72; its luster is metallie; its color and streaks tin-white. It is very brittle. It occurs in Sweden, Germany, Austria, France, Borneo, Chile, Mexico, Canada, and New Brunswick.

In pharmacy, black antimony consists of native sulphide of antimony fused and afterward powdered. It is not itself used as a drug, but is employed in preparing tartar emetic, sulphurated antimony, and terchloride of antimony. It is given to horses as an alterative powder: two parts of sulphur,

## Antinomianism

one of saltpeter, and one of black antimony. It is used in the preparation of Bengal signal lights; six parts of saltpeter, two of sulphur, and one of black antimony. Chloride of antimony ( $\text{SbCl}_3$ ), is a solution used as a caustic and escharotic; it is never given internally. Sulphurated antimony consists of a sulphide of antimony with a small admixture of oxide of antimony. It enters into the composition of compound calomel pills.

**Antinomianism** (Greek, *anti*, "against," and *nomos*, "law"), the doctrine or opinion that Christians are freed from obligation to keep the law of God. It is generally regarded, by advocates of the doctrine of justification by faith, as a monstrous abuse and perversion of that doctrine, upon which it usually professes to be based. From several passages of the New Testament, as Romans vi and II Peter, ii: 18, 19, it would seem that a tendency to antinomianism had manifested itself even in the apostolic age; and many of the Gnostic sects were really antinomian, as were probably also some of the heretical sects of the Middle Ages; but the term was first used at the time of the Reformation, when it was applied by Luther to the opinions advocated by Johann Agricola. Agricola had adopted the principles of the Reformation; but in 1527 he found fault with Melancthon for recommending the use of the law, and particularly of the 10 commandments, in order to produce conviction and repentance, which he deemed inconsistent with the Gospel. Ten years after, he maintained in a disputation at Wittenberg that, as men are justified simply by the Gospel, the law is in no way necessary for justification or for sanctification. The Antinomian controversy of this time, in which Luther took a very active part, terminated in 1540, in a retractation by Agricola; but views more extreme than his were afterward advocated by some of the English sectaries of the period of the Commonwealth; and without being formally professed by a distinct sect, antinomianism has been from time to time reproduced with various modifications. It ought, however, to be borne in mind that the term has no reference to the conduct, but only to the opinions, of men; so that men who practically disregard and violate the known law of God are not, therefore, antinomians; and it is certain enough that men really holding opinions more or less antinomian have in many cases been men of moral life. It is also to be observed that the term has been applied to opinions differing very much from each other. In its most extreme sense, it denotes the rejection of the moral law as no longer binding upon Christians; and a power or privilege is asserted for the saints to do what they please without prejudice to their sanc-



## Antinomy

tity; it being maintained that to them nothing is sinful; and this is represented as the perfection of Christian liberty. But besides this extreme antinomianism, than which nothing can be more repugnant to Christianity, there is also sometimes designated by this term the opinion of those who refuse to seek or to see in the Bible any positive laws binding upon Christians, and regard them as left to the guidance of gospel principles and the constraint of Christian love. Antinomianism usually originates in mistaken notions of Christian liberty, or in confusion of views as to the relation between the moral law and the Jewish law of ceremonial ordinances.

**Antinomy**, the opposition of one law or rule to another law or rule; in the Kantian philosophy, that natural contradiction which results from the law of reason, when passing the limits of experience, we seek to conceive the complex of external phenomena, or nature, as a world or cosmos.

**Antinous** (an-tin'ō-us), a young Bithynian whom the extravagant love of Hadrian has immortalized. He drowned himself in the Nile in 122 A. D. Hadrian set no bounds to his grief for his loss. He gave his name to a newly-discovered star, erected temples in his honor, called a city after him, and caused him to be adored as a god throughout the empire. Statues, busts, etc., of him are numerous.

**Antioch** (ancient, Antiochia), a famous city of ancient times; the capital of the Greek kings of Syria; on the Orontes; about 21 miles from the sea. It was founded by Seleucus Nicator, in 300 B. C., and was named after his father Antiochus. The first inhabitants were brought from Antigonía, founded by Antigonus in 307. It was famed for the number and splendor of its public buildings, the Seleucid monarchs having vied with each other in embellishing their metropolis, and the Roman emperors having also done much to adorn it. It was called the "Queen of the East" and "The Beautiful," and it was advantageously situated for trade, being easily approached by the caravans of the East, and through its port Seleucia having maritime communication with the West. Antioch is frequently mentioned in the New Testament, and it was here that the disciples of our Saviour were first called Christians (Acts xi: 26). Few places have undergone so many calamities as Antioch. Earthquakes repeatedly visited it, and on one or two occasions almost destroyed it. In 64 B. C., on the breaking up of the kingdom of Syria, it was captured by Pompey; in 266 it was captured by the Persians under Sapor; and in 538 it was thrown into a heap of ruins by the Persians under Chosroes. It was restored by the Emperor Justinian, but never quite re-

## Antiochus

covered from this last blow. In the first half of the 7th century it was taken by the Saracens, and remained in their possession for upward of 300 years, when it was recovered by the Greek Emperor Nicephorus Phocas. In 1084 it was again taken by the Saracens, and remained with them till 1098, when it was taken by the Crusaders. They established the principality of Antioch, of which the first ruler was Bohemond, and which lasted till 1268, when it was taken by the Mameluke Sultan of Egypt. In 1516 it passed into the hands of the Turks. The modern Antioch or Antakieh occupies but a small portion of the site of the ancient Antioch. It is a poor place, with narrow, dirty streets, and houses mostly of one story. It has some manufactures of silk stuffs, leather, and carpets, and has some trade in these articles and in goats' wool, beeswax, etc. The population is estimated at 10,000.

**Antioch College**, a co-educational (non-sectarian) institution in Yellow Springs, O., organized in 1852; has grounds and buildings valued at over \$300,000; endowment, over \$100,000; income, over \$13,000; volumes in the library, 9,000; professors and instructors, about 20; students, including summer school, about 275.

**Antiochus** (an-ti'ō-kus), a name of several Græco-Syrian kings of the dynasty of the Seleucidæ.

**Antiochus I.**, called Soter (saviour), was a son of Seleucus, general of Alexander the Great, and founder of the dynasty. He was born about B. C. 324, and succeeded his father in B. C. 280. During the greater part of his reign he was engaged in a protracted struggle with the Gauls, who had crossed from Europe, and by whom he was killed in battle B. C. 261.

**Antiochus II.**, surnamed Theos (god), succeeded his father, lost several provinces by revolt, and was murdered in B. C. 246 by Laodice, his wife, whom he had put away to marry Berenice, daughter of Ptolemy.

**Antiochus III.**, surnamed the Great, grandson of the preceding, was born B. C. 242, succeeded in B. C. 223. The early part of his reign embraced a series of wars against revolted provinces and neighboring kingdoms, his expeditions extending to India, over Asia Minor, and latterly into Europe, where he took possession of the Thracian Chersonese. Here he encountered the Romans, who had conquered Philip V. of Macedonia, and were prepared to resist his further progress. Antiochus gained an important adviser in Hannibal, who had fled for



ANTIOCHUS  
THE GREAT.



## Antiochus

refuge to his court; but he lost the opportunity of an invasion of Italy while the Romans were engaged in war with the Gauls, of which the Carthaginian urged him to avail himself. The Romans defeated him by sea and land, and he was finally overthrown by Scipio at Mount Sipylus, in Asia Minor, B. C. 190, and very severe terms were imposed upon him. He was killed while plundering a temple in Elymais to procure money to pay the Romans.

**Antiochus IV.**, called Epiphanes, youngest son of the above, is chiefly remarkable



ANTIOCHUS  
EPIPHANES.

for his attempt to extirpate the Jewish religion, and to establish in its place the polytheism of the Greeks. This led to the insurrection of the Maccabees, by which the Jews ultimately recovered their independence. He died B. C. 164.

**Antioquia** (an-tē-ō-ke'a), a town of South America, in Colombia, on the river Cauca; founded in 1542.

Pop. 10,000. It gives name to a department of the republic; area, 22,316 square miles; pop. (1892) 560,000. Capital, Medellin; pop. 40,000.

**Antipædobaptist**, one who is opposed to the doctrine of infant baptism.

**Antiparos** (an-tip'ar-os), one of the Cyclades (islands), in the Grecian Archipelago, containing a famous stalactitic grotto or cave. It lies S. W. of Paros, from which it is separated by a narrow strait, and has an area of 10 square miles, and about 500 inhabitants. Its grotto is not alluded to by any Greek or Roman writer, but has been well known since 1673. The entrance forms a wide natural portico on the S. W. side of a mountain, from which the visitor reaches the first spacious vault by means of ropes and ladders. To go farther is still more difficult. At a depth of 918 feet under the entrance, the chief chamber is reached. It is 312 feet long, 98 wide, and 82 high, and is covered everywhere with the most wonderful stalactite and stalagmite formations.

**Antipater** (an-tip'a-ter), a general and friend of Philip of Macedon, father of Alexander the Great. On the death of Alexander, in 323 B. C., the regency of Macedonia was assigned to Antipater, who succeeded in establishing the Macedonian rule in Greece on a firm footing. He died in B. C. 317, at an advanced age.

**Antipater**, procurator of Judea for the Romans from 47 to 43 B. C. He received the appointment from Julius Cæsar; and died from poison in the last mentioned year. He was the father of Herod the Great.

## Antipope

**Antipathy**, a special dislike exhibited by individuals to particular objects or persons, usually resulting from physical or nervous organization. An antipathy is often an unaccountable repugnance to what people in general regard with no particular dislike, as certain sounds, smells, articles of food, etc., and it may be manifested by fainting or extreme discomfort.

**Antiperiodics**, medicines which prevent or relieve the paroxysms of certain diseases which exhibit a periodic character. Their mode of action is unknown. The chief ones are cinchona bark and its alkaloids—quinine, cinchonine, quinidine, and cinchonidine; bebecru bark and its active principle, bebeerine; salicine, salicylic acid and its salts; eucalyptus globulus, arsenic, and iodine.

**Antiphlogistic** (an-te-flog-is'tik), a term applied to medicines or methods of treatment that are intended to counteract inflammation, such as blood letting, purgatives, diaphoretics, etc.

**Antiphon** (an'tē-fon), a Greek orator, born near Athens: founder of political oratory in Greece. His orations are the oldest extant, and he is said to have been the first who wrote speeches for hire. He was put to death for taking part in the revolution of B. C. 411, which established the oligarchic government of the Four Hundred.

**Antiphony**, opposition or contrariety of sound; also the alternate chanting or singing in a cathedral, or similar service by the choir, divided into two parts for the purpose, and usually sitting upon opposite sides. It is sometimes used also when the parts are repeated instead of sung. Antiphony differs from symphony, for in the latter case the whole choir sing the same part. It also differs from responsorium, in which the verse is spoken or sung by only one person instead of many.

**Antipodes** (an-tip'o-dēz), the name given relatively to the people or places on opposite sides of the earth, so situated that a line drawn from one to the other passes through the center of the earth and forms a true diameter. The longitudes of two such places differ by 180°. The difference in their time is about 12 hours, and their seasons are reversed.

**Antipodes Islands**, a group of small uninhabited islands in the South Pacific Ocean, about 460 miles S. E. by E. of New Zealand; so called from being nearly antipodal to Greenwich, England.

**Antipope**, a pontiff elected in opposition to one canonically chosen. The first antipopes were Felix, during the pontificate of Liberius (352–366); Ursinus, against Damasus (366–384); and Laurentius, against Symmachus (498–514). During the Middle Ages several emperors of Germany set



up popes against those whom the Romans had elected without consulting them. Otho the Great displaced successively two Bishops of Rome; and when the rival Pope, Sylvester III., had expelled the simoniacal and profligate Benedict IX. (1033-1045), the latter was brought back by the German King, and soon afterward sold his dignity to Gregory VI. There were now, consequently, three popes, but their claims were all set aside at a council convened at Sutri by the Emperor, Henry III., and a new Pope elected as Clement II. in 1046. Shortly after, Pope Alexander II. found a rival in Honorius II., the nominee of the Emperor; but his claim was ratified by a council convened at Mantua. In 1080 the same unseemly spectacle was witnessed, when the Emperor, Henry IV., elevated to the papal chair Guibert of Ravenna, under the title of Clement III., in opposition to his own implacable adversary, Gregory VII. But after the death of Gregory (1085), Clement was himself opposed successively by Victor III. (1086-1088) and Urban II. (1088-1099). Innocent II. (1130-1143) triumphed over the Antipope Anacletus II. by the help of St. Bernard; and Alexander III., during his pontificate (1159-1181), had to contend with no fewer than four successive antipopes, the election of only one of whom, however, Victor V., in 1159, has any canonical validity. After a long contest, Clement V. was elected in 1305, and four years later he transferred his seat to Avignon, where his successors reigned for nearly 70 years, losing the while, by their subjection to French influences, the sympathies of Germany and England. The election of Urban VI. in 1378 occasioned "the great schism of the West," which divided the Church for 50 years. He was elected by the Romans, who demanded an Italian Pope after the death of Gregory XI. The French cardinals, then a majority in the curia, on the plea that they had elected the Pope only under intimidation, withdrew to Provence, and elected a new Pope under the name of Clement VII., who was recognized by France, Spain, Savoy, and Scotland; while Italy, Germany, England, and the whole North of Europe, supported Urban VI. For 38 years Christian Europe was scandalized by the spectacle of two Popes, one at Geneva, another at Rome, in turn hurling the most awful anathemas of the Church at each other, like "two dogs snarling over a bone," in Wyclif's phrase. At the beginning of the 15th century, an attempt was made to prevail on both the rivals, Gregory XII. at Rome, and Benedict XIII. at Avignon, to renounce their claims with a view to promote union, but both evaded this as long as possible. At length, however, the cardinals attached to either court agreed to summon a general council, which met accordingly at Pisa in 1409. The

council deposed both Popes, and constituted the separate bodies of cardinals into one conclave which elected Alexander V. to the papal chair. The Council of Basel (1431-1447), in its struggle with Pope Eugenius IV. (1431-1447) for supremacy, attempted to arrogate to itself the papal functions, and proceeded to elect Amadeus of Savoy Pope, as Felix V. The attempt, however, failed; the Popes Eugenius IV. and Nicholas V. (1447-1455), secured their authority, the ambitious council finally dissolved itself, and Felix V. resigned his empty dignity, and was raised to the rank of cardinal by the magnanimous Pope himself. This was the last occasion on which the faithful were distracted by the sight of a rival pontiff within Christendom.

**Anti-Poverty Society.** See SINGLE TAX.

**Antipyretics**, medicines which reduce the temperature in fever. The principal agents used as antipyretics are cold baths, cold applications, ice, diaphoretics, alcohol, quinine, salicylic acid and its salts, eucalyptol, essential oils, aconite, digitalis, veratrina, antifibrine (acetanilide), antipyrine, benzanilide, thalline, kairine, purgatives, and venesection.

**Antipyrine**, an alkaloid extensively used in medicine as an antipyretic, and possessing the valuable property of materially reducing the temperature of the body without the production of any distressing bodily symptoms. Hence, it is much resorted to in fevers, pneumonia, acute rheumatism, phthisis, and erysipelas. To produce a more rapid action the drug is often injected hypodermically.

**Antiquaries**, those devoted to the study of ancient times through their relics, as old places of sepulcher, remains of ancient habitations; early monuments, implements or weapons, statues, coins, medals, paintings, inscriptions, books, and manuscripts, with the view of arriving at a knowledge of the relations, modes of living, habits, and general condition of the people who created or employed them. Societies or associations of antiquaries have been formed in all civilized countries. In Great Britain, the Society of Antiquaries of London was founded in 1572. The Society of Antiquaries of Scotland was founded in 1780, and has the management of a large national antiquarian museum in Edinburg. The American Antiquarian Society was organized in 1812, and has its headquarters in Worcester, Mass.

**Antiques**, a term specifically applied to the remains of ancient art, as statues, paintings, vases, cameos, and the like, and more especially to the works of Grecian and Roman antiquity.

**Anti-Rent Party**, a party which gained some political influence in New York, and



## Antirrhinum

which had its origin in the refusal of tenants, who were dissatisfied with the patroon system in vogue in 1839, to pay rent. The matter was settled by compromise in 1850.

**Antirrhinum** (an-ti-rī'num), a genus of annual or perennial plants of the natural order *Scrophulariaceæ*, commonly known as snapdragon, on account of the peculiarity of the blossoms, which, by pressing between the finger and thumb, may be made to open and shut like a mouth.

**Antisana**, a volcano in the Andes of Ecuador, 35 miles S. E. by E. of Quito. Whymper, who ascended it in 1880, makes its height 19,260 feet.

**Antiscorbutics.** See SCURVY.

**Anti-Semitism**, a movement against Jews in Russia, Rumania, Austria-Hungary, Germany, France, etc., the countries in which that persecuted race has multiplied, especially in the middle class of the population, and where their wealth and influence have excited alarm, jealousy, and abuse. The movement known as Anti-Semitism may be defined as a religious, political, and social agitation against the Jews on account of the dominant position they achieved among certain peoples after their emancipation in the middle of the nineteenth century. During the last two decades of that century this reaction played an important part in the political struggles of Europe. Even in the enlightened capital of the German empire it raged hotly, and an Anti-Semitic League was formed in 1881 to restrict the liberty of Jews in Germany. Persecution in Russia assumed a more brutal character than elsewhere, and thousands of the oppressed people fled to the United States and other countries to save not only their liberty and property, but even their lives. Violent anti-Jewish riots occurred in various parts of Hungary, which were not quelled till martial law was proclaimed. The case of Alfred Dreyfus (*q. v.*) in France aroused an intense anti-Semitic feeling. Russia and Rumania have within their territory some 6,000,000 Jews who have been systematically degraded and subjected to such outrages as the bloody massacres in Russia in 1905. The periodic persecutions of this race have led many among them to undertake active measures of protection. One is the movement known as Zionism (*q. v.*), which aims at a Jewish nationalism and the restoration of the Holy Land to the Hebrews. It has found numerous supporters in all parts of the world. Many Russian and Rumanian Jews have emigrated to Palestine and have there become husbandmen. The late Baron de Hirsch promoted a colossal scheme for the transplanting of persecuted Jews to new countries where they might be free from molestation.

## Antispasmodics

**Antisepsis**, the exclusion of microbes or bacteria from wounds, etc., by the use of antiseptics or other means in order to prevent putrefaction, infection, or blood-poisoning. The antiseptic treatment usually is as follows: The wound is first cleaned with soap and water, and an antiseptic mixture consisting of bichloride of mercury solution 1-4000, mixed with carbolic acid solution 1-200, is applied. Iodoform gauze is then put on, then plain gauze, cotton, and the bandage.

**Antiseptic**, a substance which has the effect of counteracting the tendency to putrefaction. Garrod makes disinfectants and antiseptics the second order of his "Division III. Chemical agents used for other than their medicinal properties." Antiseptics prevent chemical change by destroying the putrefactive microbes or bacteria, the chemical composition of the body still in many cases remaining the same; while disinfectants decompose and remove the infectious matter itself. Antiseptics are called also colytics. Among them may be named carbolic acid, alcohol, sulphurous acid, chloride of sodium (common salt), etc.

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**Antiseptic Surgery**, treatment to kill germs in accidental wounds and surgical operations. The use of antiseptic dressings in surgery has become universal. The deaths caused by wounds of all kinds have greatly decreased. In wounds received on the battle-field, the treatment has been especially successful. As is known, the danger lies in inflammation and pus formation, which is caused chiefly by two varieties of germs, the *Staphylococcus pyogenes*, so called because it is found in bunches, and the *Streptococcus pyogenes*, so called because it is found in chains. The germ itself does not do the harm, but it secretes a poison which causes inflammation and suppuration. By preventing the entrance of these germs into bullet wounds by the application of first-aid dressings, which soldiers carry with them and use as soon as they are wounded, and by the thorough antiseptic treatment of such wounds by surgeons, the inflammation and suppuration which formerly took so many lives have been most effectively prevented, and, unless the wounded man dies from the immediate effect of his injury—such as a wound in a vital spot, or from hemorrhage—his chances of recovery are very bright.

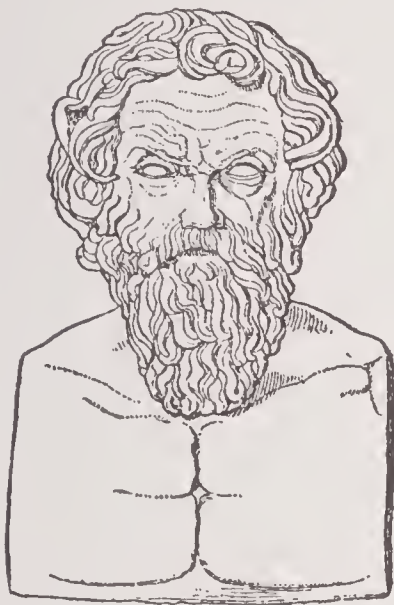
**Antispasmodics**, medicines which prevent or allay spasms. Among them may be mentioned valerian, asafoetida, camphor, ammonia, alcohol, ether, chloroform, amyl nitrate, pyridine, nitro-glycerine, bromides, conium, lobelia, opium, gelsemium, India hemp, belladonna, the essential oils. In such convulsive diseases as epilepsy, laryn-



## Antisthenes

gismus stridulus, and infantile convulsions bromide of potassium is the most powerful of antispasmodics; in hysteria, valerian, asafoetida, and the bromides; in chorea, arsenic, copper, conium, and zinc; in spasmodic asthma, lobelia, stramonium, morphia; in spasm of the blood vessels, amyl nitrite, pyridine, and nitro-glycerine. In all spasmodic diseases, cold baths or sponging, sun-baths, moderate exercise, and a plain but nutritious diet should be employed; late hours, a close atmosphere, exhausting emotions, or excessive mental or bodily work should be avoided.

**Antisthenes** (an-tis'the-nēz), a Greek philosopher and the founder of the school



ANTISTHENES.

of Cynics, born at Athens about B. c. 444. He was first a disciple of Gorgias and then of Socrates, at whose death he was present. His philosophy was a one sided development of the Socratic teaching. He held virtue to consist in complete self denial and disregard of riches, honor, or pleasure of every kind. He himself lived as a beggar.

He died in Athens at an advanced age.

**Antithesis**, a sharp opposition of contrast between word and word, clause and clause, sentence and sentence, or sentiment and sentiment, especially designed to impress the listener or reader. Macaulay's writings are full of antitheses, of which the following may serve as examples: as, "He had *covertly shot at Cromwell*, he now *openly aimed at the Queen*." ("History of England", chap. v.). "But *blood alone did not satisfy Jeffreys*; he filled his coffers by the sale of *pardons*." (Ibid, chap. xvii.). Lessing, in reviewing a book, said, "This book contains much that is good, and much that is new; only it is a pity that the good is now new, and the new is not good," a happy antithesis.

**Antitoxine**, the name given to a new remedy for diphtheria. The diphtheritic toxine produced by cultivating the bacillus of diphtheria in broth, in the presence of air, is injected in increasing amounts into an animal, preferably the horse, until it is immunized, or rendered insusceptible to diphtheria. The serum of the animal thus rendered immune may then be injected into the system of a person suffering from diph-

## Antlers

theria, with generally successful results. The decrease of deaths from this disease since the introduction of this remedy is remarkable, and in most large cities it is provided free to all unable to pay for the medicine. Among the eminent medical men who have spent years of research, resulting in the discovery of this great boon to humanity, are Prof. Emil Behring, M. D., of Berlin; Dr. Carl Frankel, and Dr. E. Roux, of the Pasteur Institute, Paris. Several other antitoxines have been discovered during the past few years, among them the antitoxine of tetanus and the antitoxine of snake poison.

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**Anti-Trade**, a name given to any of the upper tropical winds which move northward or southward in the same manner as the trade-winds which blow beneath them in the opposite direction. These great aërial currents descend to the surface after they have passed the limits of the trade-winds, and form the S. W. or W. S. W. winds of the N. temperate, and the N. W. or W. N. W. winds of the S. temperate zones.

**Antitrinitarians**, all who do not receive the doctrine of the Divine Trinity, or the existence of three persons in the Godhead; especially applied to those who oppose such a doctrine on philosophical grounds, as contrasted with Unitarians, who reject the doctrine as not warranted by Scripture.

**Antitype**, that which is correlative to a type; by theological writers the term is employed to denote the reality of which a type is the prophetic symbol.

**Antium**, a maritime city of Latium, now Porto d'Anzio, near Rome; after a long struggle for independence, became a Roman colony, at the end of the great Latin war, 340-338 B. c. It is mentioned by Horace, and was a favorite retreat of the emperors and wealthy Romans, who erected many villas in its vicinity. The treasures deposited in the Temple of Fortune here were taken by Octavius Cæsar during his war with Antony, 41 B. c.

**Antlers**, bony outgrowths from the frontal bones of almost all the members of the deer family. Except in the reindeer, they are restricted to the males, and are secondary sexual characters used as weapons in fighting for possession of the females. They appear as a pair of knobs covered with dark skin, from which the bony tissue is developed. In the year after that of birth, the antlers remain unbranched conical "beams." In the following spring, the previous growth having been meanwhile shed, the antlers grow to a larger size, and from their first branch or "brow." Year by year the number of branches or tines increases, and more than 60 have been counted on some magnificent heads. The soft, hairy



## Antlia

skin which secures their rapid annual growth is known as the "velvet," and its accidental injury affects the development of the antlers. Growth ceases when the blood-supply is cut off by the development of a tubercled burr at the base, and the deer then rub off the dry skin and leave the bone bare. The antlers are shed, in many cases at least, annually, after the breeding period. The various types of antlers are used as convenient characters in distinguishing the different genera.

**Antlia** or **Antlia Pneumatica**, one of the 14 southern constellations placed in the heavens by Lacaille in connection with his work at the Cape of Good Hope in 1751-1752. It is situated between Vela, Pyxis, Hydra, and Centaurus.

**Ant Lion**, the larva of an insect (*myrmecoleon obsoletus*, etc.), of the order of neuroptera, remarkable for its ingenious methods of capturing ants and other insects, on which it feeds, by making pitfalls in the sand. Some species are common in North America. The perfect insect is about an inch long, and has a general resemblance to a dragon-fly. It feeds upon the juices of insects, especially ants, in order to obtain which it cleverly excavates a funnel-shaped pitfall in sandy ground, and lies in wait at the bottom, often with all but its mandibles buried in the sand. When insects approach too near to the edge of the hole, the loose sand gives way, so that they fall down the steep slope. If they do not fall quite to the bottom, but begin to scramble up again, the ant-lion throws sand upon them by jerking its head, and thus brings them back. It employs its head in the same way to eject their bodies from its pit, after their juices have been sucked, and casts them to a considerable distance; and, by the same means, throws away the sand in excavating its hole, first ploughing it up with its body, and then placing it upon its head by means of one of its forelegs.

**Antofagasta**, a province in Northern Chile, extending the whole width of the country. Next to the sparsely inhabited territory of Magellan in the extreme south, it is the largest province in the country, covering an area of 46,597 square miles. It was ceded by Bolivia to Chile in 1884. Much of its territory lies in the rocky desert of Atacama, a feature which makes it generally unsuitable for agriculture. It is, however, one of the richest sections of the world in the ores of precious metals. Pop. (1907) 113,777. Antofagasta, its capital and principal seaport, is the terminus of a railroad that extends to the rich mining sections in the northeast. It also ships much ore, nitrate of soda, and bullion, and contains silver-smelting works. Pop. (1907) 32,496.

## Antoinette

**Antoinette, Marie** (MARIE ANTOINETTE JOSEPH JEANNE DE LORRAINE), Archduchess of Austria and Queen of France; the youngest daughter of the Emperor Francis I. and of Maria Theresa; born in Vienna, Nov. 2, 1755. Her education appears to have been somewhat narrow. Metastasio and Gluck are mentioned among her teachers, and after her betrothal she was put under the charge of the Abbé de Vermond, who retained his influence till 1789, when he was dismissed. The choice of Marie Antoinette by the Duc de Choiseul as the wife of the dauphin was unpopular in France, where Austria was then regarded with a keen jealousy, increased by the reputation of Maria Theresa. This national prejudice laid the foundation of a popular antipathy to Marie Antoinette, which was significantly conveyed in the epithet "L'Autrichienne." On May 16, 1770, Marie Antoinette, was married to the dauphin Louis. Her progress through France was a continual fête, and splendid fêtes were prepared in her honor at Paris and Versailles. On May 30 these celebrations were attended by an accident to a scaffolding, by which many people were killed. The manners of Marie Antoinette were ill suited to the French court, and she made many enemies among the highest families by her contempt for its ceremonies, which excited her ridicule. The freedom of her own manners, even after she became queen, was also a cause of scandal. She appears at first to have enjoyed little of her husband's confidence; she selected her own society apart, and not very judiciously; so that on the disgrace of Choiseul the anti-Austrian party were not without some grounds, as it is alleged from Louis's papers, for anticipating a divorce. The accession of Louis XVI. (May 10, 1774) did not at first make much change in the position or conduct of the queen. She had two favorites, the Princess de Lamballe and the Duchess of Polignac, who shared in the scandals attributed to her, and afterward in her unpopularity. About 1777 she began to acquire the confidence and love of the king, and to take an interest in public affairs, and the serious side of her character rapidly developed. In 1778 she gave birth to a daughter, in 1781 to the first dauphin (died 1789), in 1785 to the second dauphin, in 1786 to another daughter, who died the following year. Her interference in public affairs, almost necessitated by the king's weakness of character, produced violent jealousies. It was in vain that she strove by private charity to remove the prejudices against her conduct. When the Revolution had begun its course she became the center of all reactionary influences. Her advice was followed so far as to prevent Louis from saving himself by implicit submission, but not far enough to give him any chance of saving himself by resolute resistance. On



## Antommarchi

Oct. 5 and 6, 1789, after the celebrated supper to the guards, the mob assailed the palace with the express design of assassinating the queen. Her courage in showing herself alone at the window when called for saved her. The assembly having ordered the royal family to be brought to Paris, they were conducted thither by the mob amid frightful insults, the heads of two guards killed in their defense being carried on poles beside the royal carriage. Treated as prisoners at the Tuileries the royal family could not take cordially to the Revolution, and the queen's relations with foreign courts and with the emigrants were the subject of just suspicion to her keepers. The king used his constitutional veto against the law of the civil constitution of the clergy. This earned the queen, to whom every resolute action was attributed, the soubriquet of *Madame Veto*. After the abortive flight of June 20-21, 1792, the details of which were organized by the queen, the royal family were kept under stricter surveillance. After swearing to the constitution of Sept. 14, 1791, the king was reinstated in his functions. Marie Antoinette appears, notwithstanding, to have kept up an incessant correspondence with the powers in hostility with France, and the rapid course of events and the constraint to which all her actions were subjected may form some apology for any duplicity with which her conduct may be charged. On June 20, the Tuileries were invaded by the mob, and the queen subjected to new insults. On Aug. 10, the last day of royalty, she strenuously resisted the resolution of the king to take refuge in the assembly. The king and queen were now separated, and Louis was executed on Jan. 21, 1793. The dauphin, who afterward perished miserably in confinement, was next separated from the queen, and on Aug. 2, 1793, Marie Antoinette was transferred to the Conciergerie to be brought before the Revolutionary tribunal. The act of accusation was completed on Oct. 14. She was condemned at 4 A. M. on Oct. 16, 1793, and at 11 A. M. was led from the Conciergerie to the place of execution. The procession was circuitous, passing through the most populous parts of the town and lasting several hours. She died with the firmness that became her character.

**Antommarchi, Carlo Francesco** (-mar'kē), an Italian physician, born in Corsica in 1780; was Professor of Anatomy at Florence when he offered himself as physician of Napoleon at St. Helena. Napoleon at first received him with reserve, but soon admitted him to his confidence, and testified his satisfaction with him by leaving him a legacy of 100,000 francs. On his return to Europe he published the "*Derniers Moments de Napoléon*" (2 vols., 1823). He died in 1838.

## Antoninus Pius

**Antonelli, Giacomo, Cardinal**, born 1806; was educated at the Grand Seminary of Rome, where he attracted the attention of Pope Gregory XVI., who appointed him to several important offices. On the accession of Pius IX., in 1846, Antonelli was raised to the dignity of cardinal-deacon; two years later he became president and minister of foreign affairs, and, in 1850, was appointed Secretary of State. During the sitting of the Œcumenical Council (1869-1870) he was a prominent champion of the papal interest. He strongly opposed the assumption of the united Italian crown by Victor Emmanuel. He died in 1876.

**Antonello** (of Messina), an Italian painter who died in the end of the 16th century, and is said to have introduced oil painting into Italy (at Venice), having been instructed in it by John Van Eyck.

**Antoninus** (an-tō-nī'nus), **Wall of**, a barrier erected by the Romans across the isthmus between the Forth and the Clyde, in the reign of Antoninus Pius. Its western extremity was at or near Dunglass Castle, its eastern at Carridon, and the whole length of it exceeded 27 miles. It was constructed A. D. 140 by Lollius Urbicus, the imperial legate, and consisted of a ditch 40 feet wide and 20 feet deep, and a rampart of stone and earth on the S. side 24 feet thick and 20 feet in height. It was strengthened at each end and along its course by a series of forts and watch towers. It may still be traced at various points, and is commonly known as *Graham's Dyke*.

**Antoninus Pius** (TITUS AURELIUS FULVUS), of a family originally from Nemausus (now Nîmes), in Gaul; was born in Lavinium, in the neighborhood of Rome, A. D. 86. His father, Aurclius Fulvus, had enjoyed the consulship, and, A. D. 120, he succeeded to the same dignity. He was one of the four persons of consular rank among whom Hadrian divided the supreme administration of Italy. He then went as pro-consul to Asia, and after his return to Rome became more and more the object of Hadrian's confidence. He had four children. They all died but Faustina, who afterward became the wife of Marcus Aurelius. In A. D. 138 he was adopted by Hadrian, for which reason he in his turn adopted L. Verus and M. Annius Verus (Marcus Aurelius). The same year he ascended the throne, and under him the empire enjoyed tranquillity and happiness. Temperate and simple in his private life, ever ready to assist the necessitous, an admirer of virtue and wisdom, he was truly the father of his people. His wise frugality enabled him to diminish the taxes. The persecutions of the Christians he speedily abolished. He carried on but a few wars, namely, in Britain,



## Antonio

where he extended the Roman dominion, and by raising a new wall put a stop to the desolating invasions of the Piets and Scots. The senate gave him the surname Pius, that is, remarkable for filial affection, because, to keep alive the memory of Hadrian, his second father, he had built a temple in honor of him. Conflagrations, floods, and earthquakes spread desolation in many places during his reign, but his generosity did much to mitigate the consequences of these unhappy events. He died A. D. 161. His remains were deposited in the tomb of Hadrian. His adopted sons built a pillar to his memory, the fragments of which were found at Rome in 1705. The whole kingdom lamented him, and the following emperors assumed his name as an honor to themselves.

**Antonio, Nicolao**, a Spanish bibliographer; born in Seville, Spain, in 1617. He was educated at Salamanca, returning to Seville where he devoted several years to his "*Bibliotheca Hispanica*." The first part of this great work was published in 1696 by Cardinal d'Aguirre; a revised edition was issued in 1783-1788 by Bayer at Madrid. This work is regarded as an authority. He was also well-known as a critic. He died in Madrid, April 13, 1684.

**Antonius, Marcus (Mark Antony)**, Roman triumvir, born 83 B. C., was connected with the family of Cæsar by his mother. Debauchery and prodigality marked his youth. To escape his creditors he went to Greece in 58, and from thence followed the Consul Gabinus on a campaign in Syria as commander of the cavalry. He served in Gaul under Cæsar in 52 and 51. In 50 he returned to Rome to support the interests of Cæsar against the aristocratical party headed by Pompey, and was appointed tribune. When war broke out between Cæsar and Pompey, Antony led reinforcements to Cæsar in Greece, and, in the battle of Pharsalia he commanded the left wing. He afterward returned to Rome with the appointment of master of the horse and governor of Italy (47). In B. C. 44 he became Cæsar's colleague in the consulship. Soon after Cæsar was assassinated, and Antony would have shared the same fate had not Brutus stood up in his behalf. Antony, by the reading of Cæsar's will, and by the oration which he delivered over his body, excited the people to anger and revenge, and the murderers were obliged to flee. After several quarrels and reconciliations with Octavianus, Cæsar's heir (see AUGUSTUS), Antony departed to Cisalpine Gaul, which province had been conferred upon him against the will of the senate. But Cicero thundered against him in his famous Philippics; the senate declared him a public enemy, and intrusted the conduct of the war against him to Octavianus and the consuls

## Antonius

Hirtius and Pansa. After a campaign of varied fortunes Antony fled with his troops over the Alps. Here he was joined by Lepidus, who commanded in Gaul, and through whose mediation Antony and Octavianus were again reconciled. It was agreed that the Roman world should be divided among the three conspirators, who were called triumvirs. Antony was to take Gaul; Lepidus, Spain; and Octavianus, Africa and Sicily. They decided upon the proscription of their mutual enemies, each giving up his friends to the others, the most celebrated of the victims being Cicero the orator. Antony and Octavianus departed in 42 for Macedonia, where the united forces of their enemies, Brutus and Cassius, formed a powerful army, which was, however, speedily defeated at Philippi. Antony next visited Athens, and thence proceeded to Asia. In Cilicia he ordered Cleopatra, Queen of Egypt, to apologize for her insolent behavior to the triumviri. She appeared in person, and her charms fettered him forever. He followed her to Alexandria, where he bestowed not even a thought upon the affairs of the world, till he was aroused by a report that hostilities had commenced in Italy between his own relatives and Octavianus. A short war followed, which was decided in favor of Octavianus before the arrival of Antony in Italy. A reconciliation was effected, which was sealed by the marriage of Antony with Octavia, the sister of Octavianus. A new division of the Roman dominions was now made (in 40), by which Antony obtained the East, Octavianus the West. After his return to Asia Antony gave himself up entirely to Cleopatra, assuming the style of an Eastern despot, and so alienating many of his adherents and embittering public opinion against him at Rome. At length war was declared against the Queen of Egypt, and Antony was deprived of his consulship and government. Each party assembled its forces, and Antony lost, in the naval battle at Actium (B. C. 31), the dominion of the world. He followed Cleopatra to Alexandria, and, on the arrival of Octavianus his fleet and cavalry deserted, and his infantry was defeated. Plutarch says that Antony commanded his slave Eros to slay him, but the slave killed himself instead. Moved by this exhibition of heroic affection and deceived by a false



MARC ANTONY.



## Antony of Padua

report which Cleopatra had disseminated of her death, he fell upon his own sword (B. c. 30). On being told that Cleopatra was still alive, he caused himself to be carried into her presence, that he might die in her arms.

**Antony of Padua, St.**, was born at Lisbon, Aug. 15, 1195, and, on his father's side, was related to Godfrey of Bouillon. He was at first an Augustinian monk; but in 1220 he entered the Franciscan order, and became one of its most active propagators. He preached in the S. of France and

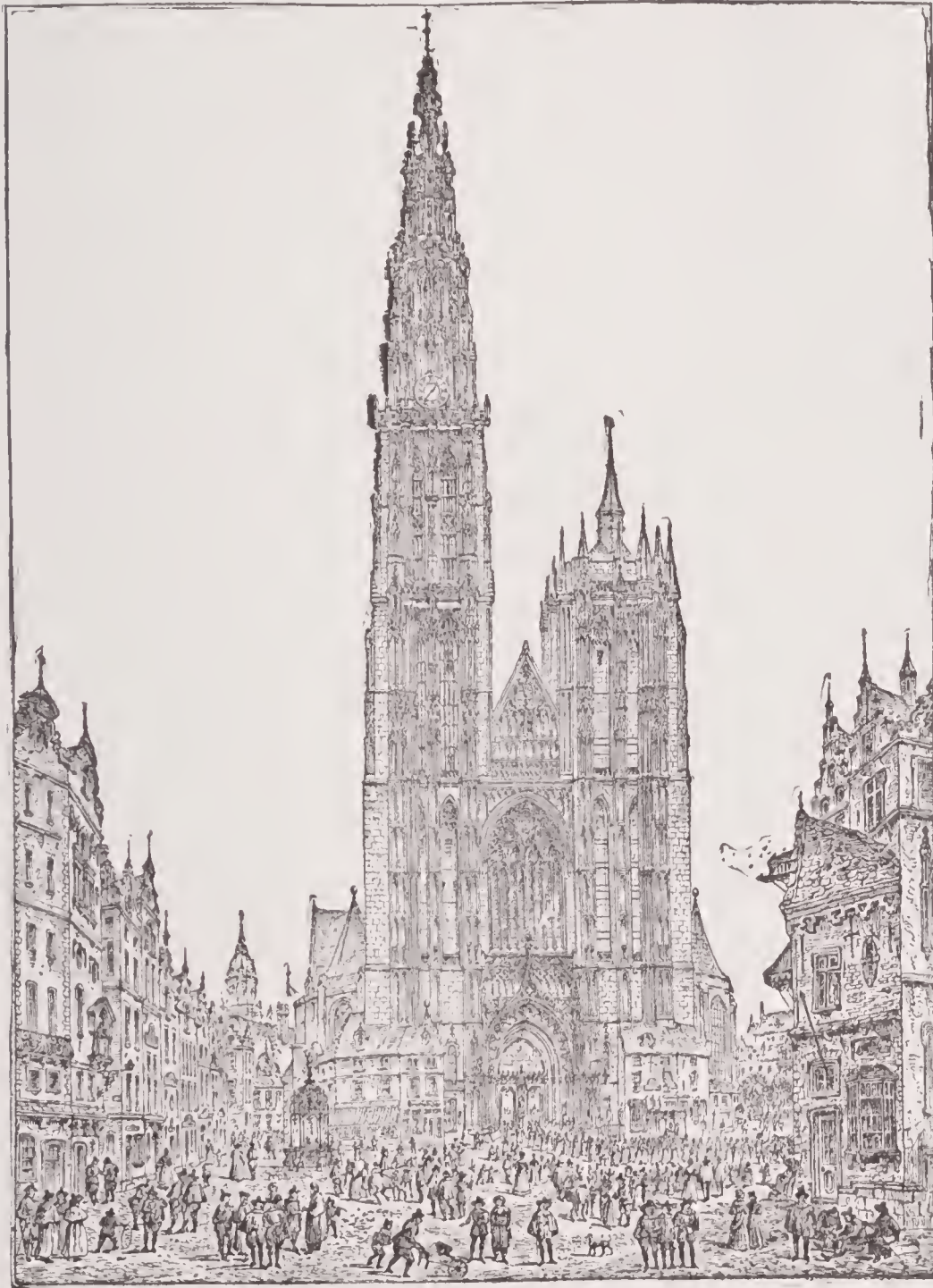
fine work of statutory, is in the church which bears his name at Padua.

**Antraigues, Emanuel Delaunay, Comte d'** (an-träg'), a French politician, born at Villeneuve de Berg, in the Department of Ardèche, in 1755. His talents were first displayed in his "*Mémoires sur les Etats-généraux*" (1788). This book, full of daring assertions of liberty, was one of the first sparks of the fire which afterward rose to such height in the French Revolution. In 1789, when Antraigues was chosen as a deputy, he defended the privileges of the hereditary aristocracy, ranked himself with those who opposed the union of the three estates, and maintained that the royal veto was an indispensable part of good government. After leaving the Assembly in 1790, he was employed in diplomacy at St. Petersburg and Vienna, where he defended the cause of the Bourbons. In 1803 he was employed under Alexander of Russia in an embassy to Dresden, where he wrote against Bonaparte a brochure, entitled "*Fragment du XVIII. Livré de Polybe, trouvé sur le Mont Athos.*" He afterward came to England, and acquired great influence with Canning. On July 22, 1812, he was murdered, with his wife, at his residence near London, by an Italian servant.

**Ant Thrush**, a name given to certain passerine or perching birds having resemblances to the thrushes and supposed to feed largely on ants. They all have longish legs and a short tail. The ant thrushes of the Old World belong to the genus *pitta*. They inhabit Southern and Southeastern Asia and the Eastern Archipelago, and are birds of brilliant plumage. The New World

ant-thrushes belong to South America, and live among close foliage and bushes. Some of them are called ant-shrikes and ant-wrens. They belong to several genera.

**Antwerp**, the chief port of Belgium, and the capital of a province of the same name, on the Scheldt, about 50 miles from the open sea. It is strongly fortified, being completely surrounded on the land side by a semicircular inner line of fortifications, the



CATHEDRAL OF ANTWERP.

Upper Italy, and died at Padua, June 13, 1231. He was canonized by Gregory IX. in the following year. He himself practiced the most severe asceticism, and opposed vigorously the movement for mitigating the severity of the Franciscan rule led by Elias of Cortona. According to legend, he preached to the fishes when men refused to hear him; hence he is the patron of the lower animals, and is often represented as accompanied by a pig. His monument, a



## Antwerp

defenses being completed by an outer line of forts and outworks. The cathedral, with a spire 400 feet high, one of the largest and most beautiful specimens of Gothic architecture in Belgium, contains Rubens' celebrated masterpieces, the "Descent from the



STREET ARCHITECTURE IN ANTWERP.

Cross," the "Elevation of the Cross," and "The Assumption." The other churches of note are St. James', St. Andrew's, and St. Paul's, all enriched with paintings by Rubens, Vandyke, and other masters. Among the other edifices of note are the exchange, the town hall, the palace, theater, academy of the fine arts, picture and sculpture galleries, etc. The harbor accommodation is extensive and excellent, new docks and quays having been completed in 1877 at a cost of of \$20,000,000. The shipping trade has greatly advanced in recent times, and is now very large, the goods being largely in transit. There are numerous and varied industries. Antwerp is mentioned as early as the 8th century, and in the 11th and 12th it had attained a high degree of prosperity. In the 16th century it is said to have had a population of 200,000. The wars between

## Anus

the Netherlands and Spain greatly injured its commerce, which was almost ruined by the closing of the navigation of the Scheldt in accordance with the Peace of Westphalia (1648). It is only in the 19th century that its prosperity has revived. A Universal Ex-

position was held here between May 5 and Oct. 2, 1894, to which the United States, Great Britain, France, Germany, India, and the Kongo Free State sent exhibits. Pop. (1909), 314,135. The province consists of a fertile plain 1,093 square miles in area; pop. (1901), 819,159.

**Anubis** (an-ö-bis), one of the deities of the ancient Egyptians, the son of Osiris by Isis. The Egyptian sculptures represent him with the head, or under the form, of a jackel, with long, pointed ears. His office was to conduct the souls of the dead from this world to the next, and in the lower world he weighed the actions of the deceased previous to their admission to the presence of Osiris.

**Anura**, or **Anoura**, an order of batrachians which lose the tail when they reach maturity, such as the frogs and toads.

**Anus**, the opening at the lower or posterior extremity of the alimentary canal through which the excrement or waste products of digestion are expelled. With regard to its anatomy, it is sufficient to state that it is kept firmly closed on ordinary occasions by the external and internal sphincter muscles, the former of which contracts the integument around the opening, and, by its attachment to the coccyx behind, and to a tendinous center in front, helps the levator ani muscle in supporting the aperture during the expulsive efforts that are made in the passage of the feces or intestinal evacuations; while the latter, or internal sphincter, is an aggregation of the circular muscular fibers of the lowest part of the rectum, and acts in contracting the extremity of the tube. The integument around the anus lies in radiating plaits, which allow of its stretching without pain during the passage of the feces; and the margin is



provided with a number of sebaceous glands, which, in some of the lower animals, secrete strongly odorous matters.

Infants are occasionally born with an imperforate anus, or congenital closure of the rectum. In the simplest and most common form of this affection, the anus is merely closed by thin skin, which soon becomes distended with the meconium and can easily be divided. Spasm of the sphincter ani is characterized by violent pain of the anus, with difficulty in passing the fæces. Ulceration occurring as a breach of surface at one or more points around the anus, but not extending within the orifice, is sometimes met with; but more common and important is fissure of the anus, a term applied to a crack, or superficial ulceration, between the folds of the skin and mucous membrane at the verge of the anus, and extending within the rectum. Pruritus ani, which simply means intense itching and irritation of this part, is usually a symptom of morbid changes rather than a special disorder; but sometimes occurs alone, and is often a very distressing and obstinate affection. The other principal affections of the anus are fistula, piles, and prolapsus.

**Anvil**, an instrument on which pieces of metal are laid for the purpose of being hammered. The common smith's anvil is generally made of seven pieces, namely, the core or body; the four corners for the purpose of enlarging its base; the projecting end which contains a square hole for the reception of a set or chisel to cut off pieces of iron; and the beak or conical end, used for turning pieces of iron into a circular form. Those pieces are each separately welded to the core and hammered so as to form a regular surface with the whole. When the anvil has received its due form, it is faced with steel, and is then tempered in cold water. The smith's anvil is generally placed loose upon a wooden block. The anvil for heavy operations, such as the forging of ordnance and shafting, consists of a huge iron block deeply embedded, and resting on piles of masonry.

**Anville, Jean Baptiste Bourguignon d'** (an-vêl'), a French geographer and map maker, born in Paris July 11, 1697; devoted himself to mathematical and geographical studies with such zeal and success that in 1719 he was appointed geographer to the king. He published in all 211 maps; the most notable collections were the "Atlas Générale" (1737-1780), and the "Atlas Antiquus Major," with its accompanying three volumes of "Geographie Ancienne" (1769). He died Jan. 28, 1782.

**Anwari**, a Persian poet who flourished during the 12th century, was born in Khorassan, and became a favorite of the

Seljukide Sultan, Sanjar. His poems consist chiefly of lengthy panegyrics and shorter lyrical effusions. The latter (ghazels) are characterized by simplicity, ease, and naturalness; but the kasidas, long poems mainly in praise of his patron, are disfigured by extravagant imagery and historical conceits. They abound in keen sarcasm against others. Anwari, who was also one of the most notable astrologers of his time, died between 1191 and 1196.

**Aonia** (ā-ō'nē-a), in ancient geography a name for part of Bœotia in Greece, containing Mount Helicon and the fountain Aganippe, both haunts of the muses.

**Aorist**, the name given to one of the tenses of the verb in some languages (as the Greek) which expresses indefinite past time.

**Aorta**, the largest artery in the human body, and the main trunk of the arterial system itself. It takes its departure from the upper part of the left ventricle of the heart, whence it runs upward and to the right, at that part of its progress being called the ascending aorta; then it turns to the left, passes the spinal column, and bending downward forms the arch of the aorta. Continuing its course along to the left of the spine, it is called the descending aorta. Passing through the aperture in the diaphragm into the abdomen, it becomes the abdominal aorta. Finally, it bifurcates about the fourth pair of lumbar vertebræ, and forms the two primitive iliac arteries. Upward from the heart the ramifications are numerous and exceedingly important. The aorta has three valves called the sigmoid or semi-lunar valves, to prevent the reflux of the blood into the heart.

**Aosta** (a-os'ta), a cathedral city of Italy, on the Dora Baltea, 19 miles from the opening of the great St. Bernard Pass, and 80 miles N. N. W. of Turin by rail. It is surrounded by rich orchards, vineyards, and almond plantations, but the town itself is gloomy and irregular. It is the ancient Augusta Prætoria; and several monuments of the Roman times still remain. St. Bernard was Archdeacon of Aosta; and here Anselm, Archbishop of Canterbury, was born. Near by are the celebrated baths and mines of St. Didier, and the scenery in the neighborhood is remarkably picturesque. The beautiful valley of Aosta, between the Graian and Pennine Alps, is rich in woods, pastures, and minerals, and mineral wells (including Courmayeur). Cretinism prevails to a lamentable extent, and few persons are altogether free from goitre. French is the language generally spoken.

**Aoudad**, the *ammotroqus tragclaphus*, a remarkable species of sheep, with certain affinities to the goats. It is of a reddish-

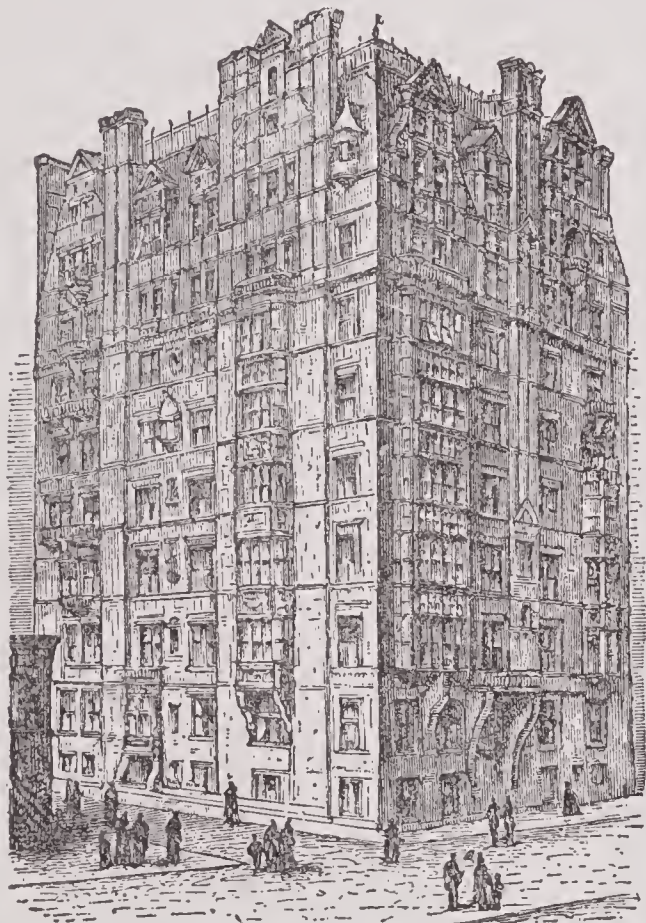


## Apaches

brown color, with much long hair hanging down from the front of the neck and the base of the forelegs. It has long, powerful horns, and is fierce in character. It inhabits mountainous regions in Abyssinia and Barbary.

**Apaches** (ap-ä'chēz), a tribe of North American Indians, formerly very fierce and numerous, living in portions of Texas, New Mexico, and Arizona, and belonging to the Athabaskan family. They were long the scourge of the frontiers, and resisted obstinately every attempt to civilize them. Long after the annexation of their territory by the United States they continued their raids in spite of severe defeats. An attempt made by the United States Government to confine the Apaches within a reserved territory in Arizona led to bloodshed in 1871. The numbers of the Apaches proper within the United States may be put at nearly 7,000.

**Apartment House**, a structure built to accommodate a number of families each in its own set of rooms, which form a separate dwelling with an entrance of its own. The term is chiefly used in the United States, where such dwellings are of comparatively recent introduction; but houses of this kind



AMERICAN APARTMENT HOUSE.

have long been built in Europe. In New York and other American cities there are now great blocks of such houses, which provide excellent and commodious dwellings at a lower rent than if each were a separate building.

**Apatite**, a translucent but seldom transparent mineral, which crystallizes in a regu-

## Ape

lar six-sided prism, usually terminated by a truncated six-sided pyramid. It passes through various shades of color, from white to yellow, green, blue, and occasionally red, scratches fluor-spar but is scratched by feldspar, and has a sp. gr. of about 3.5. It is a compound of phosphate of lime with fluoride and chloride of calcium. It occurs principally in primitive rocks and in veins, extensive deposits being found in all parts of the world. It is now largely utilized as a source of artificial phosphate manures.

**Ape**, a common name of a number of quadrumanous animals inhabiting the Old World (Asia and the Asiatic islands, and Africa), and including a variety of species. The word ape was formerly applied indiscriminately to all quadrumanous mammals; but it is now limited to the anthropoid or man-like monkeys. The family includes the chimpanzee, gorilla, orang-outang, etc., and has been divided into three genera, *troglo-dytes*, *simia*, and *hylobates*.

**Anthropoid Apes**.—The highest and most man-like monkeys, including gorilla, chimpanzee, orang-outang, gibbon, and several other species. They are technically described by the Linnæan title *anthropomorpha*, and readily distinguished, as tailless, semi-erect, and long-armed, from the dog-like apes (*cynomorpha*), which have also a narrow partition between the nostrils (*catarrhini*), and also inhabit the Old World. With the decidedly lower, flat-nosed New World monkeys, or *platyrrhini*, there is no possibility of confusion. The anthropoid apes are all arboreal, and inhabit Africa, Southeastern Asia, and the Malay Archipelago. In all, about a dozen species have been described with more or less definiteness. The family is of special interest and importance in connection with the views held by evolutionists as to the descent of man. It is recognized by anatomists that all the attempts to establish a fundamental distinction, on anatomical grounds, between the physical structure of the higher apes and that of man are futile. Generic differences, indeed, there are in abundance, but these establish only a difference of degree, and not of kind. Thus, in man, the great toe is not opposable to the others for grasping purposes, the angle between the face and the top of the skull does not exceed 120°, the teeth form an uninterrupted series, and so on; while the strong spines on the back of the gorilla's neck, the very marked eye-brow ridges in gorilla and chimpanzee, the especially long arms of the gibbon, and the protruding jaws of all the anthropoids, are equally characteristic adaptations to different ways of life. Even in the minutiae of blood vessels, muscles, nerves, and brain convolutions, impartial observers have demonstrated the closest resemblance. The differences of structure be-



tween the lowest monkeys and the higher are far greater than those between man and any anthropoid ape, the resemblances being especially obvious when young forms are compared. In their expressions of cerebral activity, whether intellectual or emotional, the anthropoids come in some respects very near the lower human tribes.

On the other hand, while it is impossible to establish any fundamental distinction in physical structure between homo and the anthropomorpha, there is among evolutionists an equal consensus of opinion as to the impossibility of regarding an ape of any existing anthropoid species as in the direct line of human ancestry. As regards brain structure, the most man-like ape is the orang, while the chimpanzee has the most closely related skull, the gorilla the most human feet and hands, the gibbon the most similar chest. In 1895 Dr. Eugene Dubois took to Europe the fossil remains of a man-like ape, found in Java, which Professor Hæckel pronounced to be the "missing link" between man and the ape. The subject of the "missing link" was discussed at the congress of anthropologists in Paris, in 1900, but no conclusions were reached.

**Apega** (ap-ā'ga), the wife of Nabis, tyrant of Sparta, who invented an infernal machine which he called after his wife, "Apega." It was a box exactly resembling his wife in her royal apparel, but inside it was full of spikes which wounded the victim inclosed in almost every part of the body. The "Iron Virgin" was a similar instrument of torture employed by the Inquisition. It represented a woman of Bavaria, and the spikes were so arranged as to pierce the least vital parts in order to prolong the sufferings of the victim inclosed.

**Apelles** (a-pel'ēz), the most famous of the painters of ancient Greece and of antiquity, was born in the 4th century B. C., probably at Colophon. Ephorus of Ephesus was his first teacher, but, attracted by the renown of the Sicyonian school, he went and studied at Sicyon. In the time of Philip he went to Macedonia, and there a close friendship between him and Alexander the Great was established. The most admired of his pictures was that of Venus rising from the sea and wringing the water from her dripping locks. His portrait of Alexander with a thunderbolt in his hand was no less celebrated. His renown was at its height about B. C. 330, and he died about the end of the century.

**Apennines** (ap'en-ins), a prolongation of the Alps, forming the "backbone of Italy." Beginning at Savona, on the Gulf of Genoa, the Apennines traverse the whole of the peninsula and also cross over into Sicily, the Strait of Messina being regarded merely as a gap in the chain. The average

height of the mountains composing the range is about 4,000 feet, and nowhere do they reach the limits of perpetual snow, though some summits exceed 9,000 feet in height. Monte Corno, called also Gran Sasso d'Italia (Great Rock of Italy), which rises among the mountains of the Abruzzi, is the loftiest of the chain, rising to the height of 9,541 feet, Monte Majella (9,151) being next. Monte Gargano, which juts out into the Adriatic from the ankle of Italy, is a mountainous mass upward of 5,000 feet high, completely separated from the main chain. On the Adriatic side the mountains descend more abruptly to the sea than on the W. or Mediterranean side, and the streams are comparatively short and rapid. On the W. side are the valleys of the Arno, Tiber, Garigliano, and Volturno, the largest rivers that rise in the Apennines, and the only ones of importance in the peninsular portion of Italy. They consist almost entirely of limestone rocks, and are exceedingly rich in the finest marbles. On the S. slopes volcanic masses are not uncommon. Mount Vesuvius, the only active volcano on the continent of Europe, is an instance. The lower slopes are well clothed with vegetation, the summits are sterile and bare.

**Apepi** (ap-ā'pē), in heathen mythology, the Great Serpent or Typhon, the embodiment of evil.

**Aperient**, a medicine which, in moderate doses, gently but completely opens the bowels; examples, castor-oil, Epsom salts, senna, etc.

**Aperture**, in anatomy, zoology, botany, etc.: (a) The aperture of a univalve shell is the opening or mouth. In mollusks which feed on vegetable matter it is entire; while in those which are animal feeders it has a notch or canal. In some families it has an operculum or cover. The margin of the aperture is called the peristome. (b) Any other opening.

In optics, the diameter of the object-glass of a refracting telescope, or the speculum or mirror of a reflector. The larger the aperture (*i. e.*, the area of the surface through which the light is transmitted, or from which it is reflected), the greater is the power of the telescope to penetrate into space and consequently bear higher magnifying powers. The apertures of Sir W. Herschel's celebrated reflecting telescopes were 7, 12, 18, and 48 inches; while those of the Earl of Rosse are 3 and 6 feet. Very powerful refracting telescopes with large apertures have been recently constructed, the great refractor at the United States Observatory at Washington being 26 inches. Within the last few years silvered-glass parabolic mirrors of the Newtonian form have been constructed with large apertures and short focal length, thus rendering these



instruments exceedingly convenient for use. Sir W. Herschel's 18-inch metallic speculum, used for examining the nebulae and Milky Way, had a focal length of 20 feet; modern telescopes, with silvered-glass mirrors, have been constructed of the same aperture, but with a focal length of not more than seven feet. Thus a larger aperture is now a more valuable feature in a telescope than great focal length, the unwieldy tubes formerly used being entirely dispensed with.

"'Aperture' always means the clear space which receives the light of the object; the diameter of the object-glass in achromatics, or the large speculum in reflectors, exclusive of its setting." (Webb's "Celestial Objects," 3d ed., 1873, p. 1.)

Angular aperture (in microscopes), the amount of light transmitted by the objective, and, consequently, the distinctness of the image afterward magnified by the lenses forming the eye piece. When an objective of the largest angular aperture is employed, the more delicate markings of the object under examination, invisible when objectives of less angular aperture are used, are seen with great distinctness.

**Ape's Hill** (Arabic, *Jebel Zatut*), the ancient Abyla, the extremity of a mountain range in the N. of Morocco, opposite Gibraltar; one of the "Pillars of Hercules."

**Aphaniptera** (af-an-ip'ter-a), an order of wingless insects, called by De Geer *suctoria*, and by Leach *siphonaptera*. They have a sucker of three pieces, and a true metamorphosis. The thorax is distinctly separated from the abdomen, and two horny plates mark the spots where in the higher insects wings would be. It contains the *pulicidae*, or fleas.

**Aphasia**, in pathology, a symptom of certain morbid conditions of the nervous system, in which the patient loses the power of expressing ideas by means of words, or loses the appropriate use of words, the vocal organs the while remaining intact and the intelligence sound. There is sometimes an entire loss of words as connected with ideas, and sometimes only the loss of a few. In one form of the disease, called aphemia, the patient can think and write, but cannot speak; in another, called agraphia, he can think and speak, but cannot express his ideas in writing. In a great majority of cases, where *post mortem* examinations have been made, morbid changes have been found in the left frontal convolution of the brain.

**Aphelion**, that part of the orbit of the earth or any other planet in which it is at the point remotest from the sun.

**Aphis** (ā'fis), a genus of insects, the typical one of the family *aphidae*. It contains those soft pulpy little animals, winged or wingless, and with long antennae, which are seen beneath the leaves, or in curled-up

leaves, or in the axils of many plants, or even on the roots of some. Sometimes, as in the case of the elm, their destructive operations upon a leaf raise a gall of considerable size. The species are very numerous, and are generally called after the plants on which they feed, as *A. rosæ*, the aphid of the rose; *A. fabæ*, the bean aphid; *A. brassicæ*, the cabbage fly; *A. humuli*, the hop fly. They are exceedingly prolific, but are kept within bounds by various insects, especially by the *coccinellidae*, or lady birds, of which they are the appropriate food. They drop a fluid called honey-dew, which is so grateful to the ants that the latter, to receive it, tend them like milch cows. The mode of propagating their race is the abnormal one described as alternation of generations, metagenesis, and parthenogenesis. The winged aphides, confessedly perfect insects, bring forth a wingless race, apparently mere larvae, and which, therefore, it might be thought, would be incapable, while thus immature, of bringing forth young. In certain cases they do it, however, and their offspring are winged, and as perfect as their grandparents. This alternation of generations, or metagenesis, with its attendant parthenogenesis (or birth from virgins) in every second generation, goes on for nine or ten generations, by which time the season is over. The last aphides of the year are fully formed and winged, and deposit eggs, which are hatched in spring.

**Aphonia**, in pathology, the greater or less impairment, or the complete loss of the power of emitting vocal sound. The slightest and less permanent forms often arise from extreme nervousness, fright, and hysteria. Slight forms of structural aphonia are of a catarrhal nature, resulting from more or less congestion and tumefaction of the mucous and sub-mucous tissues of the larynx and adjoining parts. Severe cases are frequently occasioned by serous infiltration into the sub-mucous tissue, with or without inflammation of the mucous membrane of the larynx and of its vicinity. The voice may also be affected in different degrees by inflammatory affections of the fauces and tonsils; by tumors in these situations; by morbid growths pressing on or implicating the larynx or trachea; by aneurisms; and most frequently by chronic laryngitis and its consequences, especially thickening, ulceration, etc.

**Aphrodite** (af-rō-dī'tē), one of the chief divinities of the Greeks, the goddess of love and beauty, so called because she was sprung from the foam (*aphros*) of the sea. She was the wife of Hephestus, but she loved besides, among gods, Ares and Dionysus, and among mortals, Anchises and Adonis. The chief places of her worship in Greece were Cyprus and Cythera. Aphrodite



not only surpassed all other goddesses in beauty, but she had the power of granting irresistible beauty and attractiveness to others, especially to wearers of her magic girdle. The sparrow, the dove, and the swan were sacred to her, as also the myrtle, the rose, and the poppy. In the later poets, Eros is her son and her constant companion. Only such sacrifices as flowers and incense were made to Aphrodite. In earlier times the patroness of marriage and maternity, she became later the ideal of graceful womanhood, and was spiritualized by Plato as Aphrodite Urania. By others she was degraded in Aphrodite Pandemos to be the patroness of mere sensual love. Mysteries of an impure kind formed part of the ceremonial of the aphrodisia, or festivals held in her honor. The worship of Aphrodite was undoubtedly of Eastern origin, and she was originally a symbol of the fructifying powers of nature. Her cult was introduced by the Phoenicians into Cyprus, and soon spread over all Greece. She was originally identical with Astarte, the Ashtoreth of the Hebrews. By the Romans she was identified with Venus, hitherto one of the least important Roman divinities (see VENUS). Aphrodite has had the most important place in the history of art as the Greek ideal of feminine grace and beauty. Her most famous statue in antiquity was that of Praxiteles at Cnidus; her most famous picture, the Aphrodite Anadyomene of Apelles. The finest statues of the goddess that still exist are those of Melos (Milo) at Paris, of Capua at Naples, and of the Medici at Florence.

**Aphtha** (plural **Aphthæ**), one of the numerous white looking specks or vesicles which sometimes appear on the tongue and palate, whence they gradually diffuse themselves over the mouth and fauces. There are three varieties: (1) The *aphtha infantum*, or milk-thrush; (2) the *A. maligna*; and (3) the *A. chronica*. The first variety is an idiopathic disorder, chiefly attacking infants brought up by hand; the second and third are symptomatic of other diseases. The *aphthæ* which frequently appear in the mouth in advanced stages of consumption generally precede dissolution by about a week or a fortnight. The term *aphtha anginosa* is sometimes applied to a variety of sore throat.

**Apia** (ā'pē-a), the principal town and commercial emporium of the Samoan Islands in the South Pacific Ocean; on the N. coast of the island of Upolu, about midway between the E. and W. extremities of the island. It has a small harbor, which is usually a safe one. In March, 1889, a hurricane swept the harbor; wrecked the United States war vessels "Trenton" (flagship) and "Vandalia," and the German men-of-war, "Eber," "Adler," and "Olga;" and drove the United States steamer "Nip-

sic" ashore, greatly injured. The British ship "Calliope" was the only man-of-war in the harbor that succeeded in escaping to sea. The town and its vicinity were again brought to public attention in the early part of 1899 by a series of fatal riots and other illegal proceedings, growing out of the struggle of Mataafa and Malietoa Tanus for the kingship. Several American and British naval officers were killed or wounded, April 1, while trying to subdue the native mob. See SAMOA.

**Apiary and Apiculture.** In the article BEE we give a short sketch of the natural history of the honey or hive bee (*Apis mellifica*); here we intend to treat briefly of the management of bees, the position and arrangement of the apiary, etc. One of the first things which demand the consideration of the bee-keeper is the situation of the apiary. It should be well sheltered from strong winds, either naturally or by the erection of walls or fences; as, if not sufficiently protected, the bees will not readily leave the hive, or when returning heavily laden with pollen and honey they are blown to the ground, or dashed against trees, buildings, etc., and thus many are lost. It should also afford the bees shelter against moisture, sudden changes of temperature, and the extremes of heat and cold. It should not be situated near large sheets of water, lest the bees, overcome by cold or fatigue, should be forced to alight on them, or be carried down on them by the winds, and so perish. The hives should face the S. or S. E. They should be placed in a straight line, on shelves two feet above the ground, and about the same distance from each other; some skillful apiarians, however, raise the platform of the hive only two or three inches from the ground, as fewer of the chilled or tired bees that miss the hive in returning and alight near it are lost, the flight of the issuing swarms is lower, and there is less exposure to strong winds. The apiary should be so situated that it could be conveniently watched during swarming time; and should be at some distance from roads where there is much traffic, and from the grazing places of cattle, so as to prevent all possible means of disturbance and annoyance to its inhabitants. If grass surrounds the hives it should be frequently mowed, and the ground kept clean, to prevent too much dampness, and to destroy the lurking places of noxious insects and vermin. As to the form of the hives, and the materials of which they should be constructed, there are great differences of opinion among apiarians. The old dome-shaped straw skep is still in general use among the cottagers of Great Britain, although almost entirely abandoned by those who practise bee-keeping systematically. Its cheapness and simplicity of construction are in its favor, while it is excellent for warmth and ventilation;



but it has the disadvantage that its interior is closed to inspection, and the fixity of its combs prevents many manipulations which the skillful bee-keeper sees necessary to perform. To remedy this latter defect these hives have been fitted with movable bars from which the bees build their combs, which still, however, adhere to the sides of the hive, and have to be cut away, much to the annoyance of the inmates. In the early autumn it is the custom of many of the bee-keepers of the Lowlands of Scotland to dispatch their hives in spring carts of easy motion, or on hand barrows, to the blooming heather of the moors and mountains, where they are allowed to remain until the heather is out of bloom. The honey is obtained from the bar-frame hives by simply lifting out the frames; it can only be got from the ordinary skep by stupefying the bees with the smoke of the common puff-ball or chloroform, or by fumigating the hive with sulphur, which entails the destruction of the swarm. When their stores of honey are removed the bees must be fed during the winter and part of spring with syrup, or with a solution consisting of two pounds loaf sugar to a pint of water, and it must be borne in mind that to stint the bees in food is very bad economy. In the early spring slow and continuous feeding (a few ounces of syrup each day) will stimulate the queen to deposit her eggs, by which means the colony is rapidly strengthened, and throws off early swarms. New swarms may make their appearance as early as May and as late as August, but swarming usually takes place in the intervening months. The swarms are usually hived, when they alight in any convenient spot, by placing above them a clean hive rubbed inside with honey or sugar and water, or if they alight on a branch that can be cut off they may be gently shaken into the hive. When they collect where they cannot be shaken off, or where the hive cannot be placed near, they may be brushed quickly into a gauze sack, and carried to the hive.

**Apocalypse** (a-pok'a-lips), the name frequently given to the last book of the New Testament, in the English version called the Revelation of St. John the Divine. It is generally believed that the Apocalypse was written by the apostle John in his old age (95–97 A. D.) in the Isle of Patmos, whither he had been banished by the Roman Emperor Domitian. Anciently its genuineness was maintained by Justin Martyr, Irenæus, Clement of Alexandria, Tertullian, and many others; while it was doubted by Dionysius of Alexandria, Cyril of Jerusalem, Chrysostom, and, nearer our own times, by Luther and a majority of the eminent German commentators. The Apocalypse has been explained differently by almost

every writer who has ventured to interpret it, and has furnished all sorts of sects and fanatics with quotations to support their creeds or pretensions. The modern interpreters may be divided into three schools — namely, the historical school, who hold that the prophecy embraces the whole history of the Church and its foes from the time of its writing to the end of the world; the præterists, who hold that the whole or nearly the whole of the prophecy has been already fulfilled, and that it refers chiefly to the triumph of Christianity over paganism and Judaism; and the futurists, who throw the whole prophecy, except the first three chapters, forward upon a time not yet reached by the Church — a period of no very long duration, which is immediately to precede Christ's second coming.

**Apocalyptic Number**, the mystic number 666 found in Rev. xiii: 18. As early as the 2d century ecclesiastical writers found that the name Antichrist was indicated by the Greek characters expressive of this number. By Irenæus the word *lateinos* was found in the letters of the number, and the Roman empire was, therefore, considered to be Antichrist. Protestants generally believe it has reference to the papacy, and, on the other hand, Catholics connect it with Protestantism.

**Apocalyptic Writings**, writings such as, like the prophecies of Daniel, their prototype, set forth in a figurative and pictorial manner the future progress and completion of the world's history, especially in its religious aspects. The two apocalyptic books received into the canon of Scripture are the books of Daniel and the Apocalypse especially so-called, the Revelation of St. John. But Jewish and early Christian literature produced numerous apocalypses from about 170 B. C. to 130 A. D. Most of them were attributed to famous men of old by their authors. They deal largely with the increasing troubles and trials of God's people, and their final redemption and salvation by God's mighty works or Christ's special appearance again. The Book of Enoch is the best known of the non-canonical Jewish apocalypses; it dates from the later Maccabee period; another is the apocalypse of Ezra. The "Shepherd of Hermas" is the most important Christian work of this kind.

**Apocrypha** (a-pok'rif-a), in the early Christian Church, (1) books published anonymously; (2) those suitable for private rather than public reading; (3) those written by an apostle or other inspired author, but not regarded as part of Scripture; (4) the works of heretics.

In English now, the following 14 books: I, 1 Esdras; II, 2 Esdras; III, Tobit;



IV, Judith; V, Additions to Esther; VI, The Wisdom of Solomon; VII, Ecclesiasticus, called also the Wisdom of Jesus, the son of Sirach; VIII, Baruch; IX, The Song of the Three Holy Children; X, The History of Susanna; XI, Bel and the Dragon; XII, The Prayer of Manasseh, King of Judah; XIII, 1 Maccabees; and XIV, 2 Maccabees. Most of the above-mentioned books were composed during the two centuries immediately preceding the birth of Christ, though some were penned, or at least interpolated, at a later period. They were written not in Hebrew or Aramæan, but in Greek; and the Jews never accorded them a place in the Old Testament canon. They were inserted in the Septuagint, and thence passed to the Latin Vulgate. The Christian fathers were divided in sentiment as to their value and the relation they stood to the canonical Old Testament books; Jerome dealing with them in a free, enlightened, and discriminating manner; while Augustine and others were much less independent. The question whether or not they were inspired remained an open one till the Reformation. Wyclif, whose mind was cast in what we should now call a wonderfully Protestant mold, was against them; so was Luther; and yet more strongly, Calvin, with his followers. To uphold their waning authority, the Council of Trent, on April 8, 1546, placed them on an equal level with Scripture, anathematizing all who held the contrary opinion. Portions of them are in the New as well as in the Old Lectionary of the English Church; but the sixth of the 39 Articles explains that "the other books" (the 14 enumerated), "as Hierome saith, the Church doth read for example of life and instruction of manners, but yet doth it not apply them to establish any doctrine." The Westminster Confession of Faith, the formulated creed of the Presbyterion Church, regards them as simply human writings, and denies them all authority. The several apocryphal books are of unequal merit. I Maccabees is a highly valuable history; while Bel and the Dragon is a monstrous fable. Taking them as a whole, they throw much light on the religious opinions and the political state of the Jews before the advent of Christ, and explain not a little which else would be obscure in the New Testament. The Greek Church prohibits their use.

**Apocynaceæ** (ap-ō-sin-as'ō-ī), an order of plants, the English dog-banes. Lindley places them under his gentianal alliance, and the *asclepiadaceæ*, or *asclepiads*, under his solanal one, thus separating two orders which in nature are closely akin. Both have monopetalous corollas, with five stamens, the fruit in follicles, and the juice milky; but they differ in the details of the sexual apparatus. In 1846, Lindley esti-

mated the known species of *apocynaceæ* at 566, since increased to about 600. Of 109 known genera only one, *vinca*, is found in England; the rest are to be found in warmer countries.

**Apoda**, in zoology (1) Aristotle's third section of *zootoka*, or air-breathing vivipara. It included the whales, which the Stagirite, with remarkable scientific accuracy, ranked with the warm-blooded quadrupeds; (2) the second order of the class *amphibia*, or *batrachia*. The body is like that of an earthworm, and is quite destitute of feet. The order contains but one family, the *cæciliadæ*; (3) according to Prof. Max Müller, a group of fishes belonging to the sub-order *physostomata*. It is so called because the ventral fins are wanting. It contains three families, the *muraenidæ*, or eels, the *gymnotidæ*, and the *symbranchidæ*.

**Apodal Fishes**, the name applied to such malacopterous fishes as want ventral fins. They constitute a small natural family, of which the common eel is an example.

**Apodosis**, in grammar, the latter member of a conditional sentence (or one beginning with *if*, though) dependent on the condition or protasis; as, "If it rain (protasis) I shall not go" (apodosis).

**Apogee**, that point in the orbit of the moon or a planet where it is at its greatest distance from the earth; properly this particular part of the moon's orbit.

**Apollinarians**, a sect of Christians who maintained the doctrine that the Logos (the Word) holds in Christ the place of the rational soul, and consequently that God was united in him with the human body and the sensitive soul. Apollinaris, the author of this opinion, was, from A. D. 362 till at least A. D. 382, Bishop of Laodicea, in Syria, and a zealous opposer of the Aryans. As a man and a scholar he was highly esteemed, and was among the most popular authors of his time. He formed a congregation of his adherents at Antioch, and made Vitalis their bishop. The Apollinarians, or Vitalians, as their followers were called, soon spread their sentiments in Syria and the neighboring countries, established several societies, with their own bishops, and one even in Constantinople; but the sect was suppressed in 428 by imperial edict.

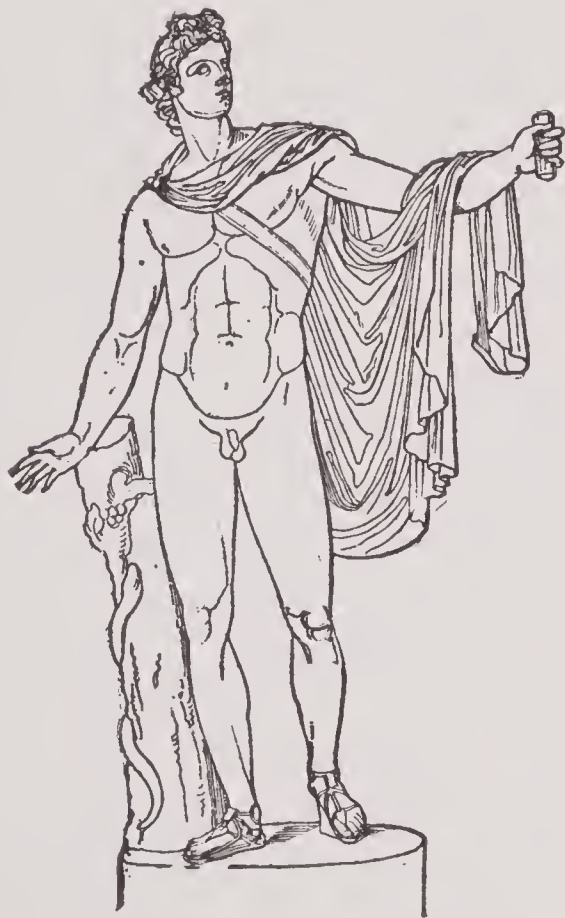
**Apollinaris Water**, a natural aërated water, belonging to the class of acidulated soda waters, and derived from the Apollinarisbrunnen, a spring in the valley of the Ahr, near the Rhine, in Rhenish Prussia, forming a highly esteemed beverage.

**Apollo**, son of Zeus (Jupiter) and Leto (Latona), who being persecuted by the jealousy of Hera (Juno), after tedious wanderings and nine days' labor, was delivered of him and his twin sister, Artemis (Di-



## Apollo

ana), on the Island of Delos. Skilled in the use of the bow, he slew the serpent Python on the fifth day after his birth; afterward, with his sister Artemis, he killed the children of Niobe. He aided Zeus in the war with the Titans and the giants. He destroyed the Cyclopes, because they forged the thunderbolts with which Zeus killed his son and favorite, Asklepios (Æsculapius). According to some traditions he invented the lyre, though this is generally ascribed to Hermes (Mercury). Apollo was originally the sun-god; and though in Homer he appears distinct from Helios (the sun), yet his real nature is hinted at even here by the epithet Phœbus, that is, the radiant or beaming. In later times the view was almost universal that Apollo and Helios were identical. From



APOLLO BELVIDERE.

being the god of light and purity in a physical sense he gradually became the god of moral and spiritual light and purity, the source of all intellectual, social, and political progress. He thus came to be regarded as the god of song and prophecy, the god that wards off and heals bodily suffering and disease, the institutor and guardian of civil and political order, and the founder of cities. His worship was introduced at Rome at an early period, probably in the time of the Tarquins. Among the ancient statues of Apollo that have come down to us, the most remarkable is the one called the Apollo Belvidere, from the Belvidere gallery in the Vatican at Rome. This statue was found in the ruins of Antium in

## Apollonius of Tyre

1503, and was purchased by Pope Julian II. It is now supposed to be a copy of a Greek statue of the 3d century B. C., and dates probably from the reign of Nero.

**Apollodorus**, a famous Athenian painter, about B. C. 408. Pliny records two of his pictures; one of a priest of Apollo at the altar, and the other representing the shipwreck of Ajax.

**Apollodorus**, born in Damascus, and lived in the reigns of Trajan and Hadrian. His fame as an architect caused the former to employ him in building a great stone bridge over the Danube, and other works. Apollodorus subsequently falling into disgrace with the Emperor Hadrian, was put to death by his command.

**Apollodorus**, a Greek writer who flourished 140 B. C. Among the numerous works he wrote on various subjects, the only one extant is his "Bibliotheca," which contains a concise account of the mythology of Greece down to the heroic age.

**Apollonius**, a Pythagorean philosopher, born at Tyana, about the beginning of the Christian era. Applying himself to philosophic studies, he adopted the system introduced by Pythagoras, and traveled through the East, professing miraculous powers; inducing some to consider him as a rival to the founder of Christianity. His asceticism of life, the miracles and prophecies attributed to him, and the wisdom exhibited in his discourses, brought to him many followers, who erected statues and temples in his honor. Died at Ephesus about A. D. 97. His life has been written by Philostratus.

**Apollonius of Perga**, Greek mathematician, called the "Great Geometer," flourished about 240 B. C., and was the author of many works, only one of which, a treatise on "Conic Sections," partly in Greek and partly in an Arabic translation, is now extant.

**Apollonius of Rhodes**, a Greek poet, born in Egypt, but long residing at Rhodes, where he founded a school of rhetoric. He afterward became keeper of the famous library of Alexandria, B. C. 149. He wrote a poem, called "Argonautica," which is still extant.

**Apollonius of Tyre**, the hero of a Greek metrical romance, very popular in the Middle Ages. It relates the romantic adventures of Apollonius, a Syrian prince, as well as those of his wife who was parted from him by apparent death, and his daughter, and closes with the happy reunion of the whole family. The original no longer exists; but there are three very early Latin versions, of which one was published by Welser (Augsburg, 1595); another is to be found in the "Gesta Romanorum;" and the third in the "Pantheon" of Gottfried



of Viterbo. From this Latin source have proceeded the Anglo-Saxon version of the 11th century (edition by Thorpe, 1834), the Spanish version of the 13th century, and several French and Italian versions in prose and verse of the 14th and 15th centuries. Shakespeare treated the subject in his drama of "Pericles," mainly following the version of Gower in his "Confessio Amantis," itself based on the "Pantheon" of Gottfried of Viterbo. The romance was rendered into German, probably from the "Gesta Romanorum," by a Vienna physician, Heinrich von der Neuenstadt, about the year 1300, in a poem of 20,000 lines. A hitherto unknown Middle German prose version of the story was edited by Schröter in 1872.

**Apollo**, a Jew of Alexandria, who learned the doctrines of Christianity at Ephesus from Aquila and Priscilla, became a preacher of the gospel in Achaia and Corinth, and an assistant of Paul in his missionary work. Some have regarded him as the author of the Epistle to the Hebrews.

**Apollyon** (a-pol'ē-on) a name used in Rev. ix: 11 for the angel of the bottomless pit.

**Apologetics**, the department of theology which treats of the establishment of the evidences and defense of the doctrines of a faith. Christian apologetics, generally called simply apologetics, treats of the evidences of Christianity, and seeks to establish the truth of the Bible and the doctrines deduced from it.

**Apologue**, a story or relation of fictitious events intended to convey some useful truths. It differs from a parable in that the latter is drawn from events that pass among mankind, whereas the apologue may be founded on supposed actions of brutes or inanimate things. Æsop's fables are good examples of apologues.

**Apology**, a term at one time applied to a defense of one who is accused, or of certain doctrines called in question. Of this nature are the Apologies of Socrates, attributed respectively to Plato and Xenophon. The name passed over to Christian authors, who gave the name of apologies to the writings which were designed to defend Christianity against the attacks and accusations of its enemies, particularly the pagan philosophers, and to justify its professors before the emperors. Of this sort were those by Justin Martyr, Athenagoras, Tertullian, Tatian, and others.

**Aponeurosis**, in anatomy, a name of certain grayish-white shining membranes, composed of interlacing fibers, sometimes continuous with the muscular fiber, and differing from tendons merely in having a flat form. They serve several purposes, sometimes attaching the muscles to the bones,

sometimes surrounding the muscle and preventing its displacement, etc.

**Apophyge** (ap-of'e-gē or ap'ō-fig), in architecture, the small curve at the top of a column by which its shaft joins its capital. It is sometimes called the spring of the column. Originally it was the ring which bound the extremities of wooden pillars to keep them from splitting, imitated in stonework. The same name is given to the corresponding concavity connecting the bottom of a pillar with the fillet at its base.

**Apophyllite** (ap-of'il-it), a tetragonal mineral, called also ichthyophthalmite, classed by Dana as the type of an apophyllite group of unisilicates. The hardness is 4.5 to 5; the specific gravity 2.3 to 2.4; the luster of the face of the crystal terminating the low prism, pearly; that of the sides, vitreous. Color, white or grayish; occasionally with greenish, yellowish, rose-red or flesh-red tint. It is generally transparent; is brittle, and has feeble double refraction. It is "hydrated calcepotassic silicate;" its composition being—silica, 51.60 to 52.69; lime, 24.71 to 25.86; potassa, 4.75 to 5.75; water, 15.73 to 16.73; and fluorine, 15.73 to 16.67. It occurs chiefly in amygdaloid, though occasionally in granite and gneiss. It is found at Ratho, near Edinburgh, and in Fife, Dumbarton and Inverness-shires. It occurs in Europe, in India, in Siberia, in America, in Australia and elsewhere. Dana subdivides it into Ordinary (1) Oxhaverite; (2) Teselite; (3) Leucocyclite; and places with it also Xylochlore.

**Apoplexy**, a serious malady, coming on so suddenly and so violently that anciently anyone affected by it was said to be *attonitus* (thunderstruck), or *sideratus* (planetstruck). When a stroke of apoplexy takes place, there is a loss of sensation, voluntary motion, and intellect or thought, while respiration and the action of the heart and general vascular system still continue. The disease now described is properly called cerebral apoplexy, the cerebrum or brain being the part chiefly affected. Another malady has been called not very happily pulmonary apoplexy. It is the pneumo-hemorrhage of Andral, and consists of an effusion of blood into the parenchymatous substance of the lung, like that into the substance of the brain in cerebral apoplexy.

**Apostate**, literally designates anyone who changes his religion, whatever may be his motive; but, by custom, the word is always used in an injurious sense, as equivalent to one who, in changing his creed, is actuated by unworthy motives. In early Christian times, the word was applied to those who abandoned their faith in order to escape from persecution; but it was also applied to such as rejected Christianity on speculative



## Apostle

grounds (the Emperor Julian, for instance). The apostates in times of persecution were styled variously *sacrificati*, *thurificati*, etc., according to the modes in which they publicly made known their return to heathenism, by offering sacrifices or incense to the gods of Rome. Controversies arose in the early Church as to the readmission of those who had so lapsed. The Roman Catholic Church at one period imposed severe penalties on apostasy. The apostate was naturally excommunicated; but sometimes also his property was confiscated, and he himself banished, or even put to death. The term is also applied, not only to those who become perverts to Mohammedanism, usually called renegades, but to such as exchange the Roman Catholic for the Protestant faith, and *vice versa*. It has often had great influence on the fortunes of a nation that a prince has apostatized. The most renowned instance in modern history is that of Henry IV., who became a Roman Catholic for peace's sake.

**Apostle**, one who is sent off or away from: one sent on some important mission; a messenger; a missionary. The name given, in the Christian Church, to the 12 men whom Jesus selected from His disciples as the best instructed in His doctrines, and the fittest instruments for the propagation of His religion. Their names were as follows: Simon Peter (Greek for Caiphas, the rock), and Andrew, his brother; James the greater, and John, his brother, who were sons of Zebedee; Philip of Bethsaida, Bartholomew, Thomas, Matthew; James, the son of Alphaeus, commonly called James the less; Lebbeus, his brother, who was surnamed Thaddeus, and was called Judas, or Jude; Simon the Canaanite, and Judas Iscariot. Of this number, Simon Peter, John, James the greater, and Andrew were fishermen; and Matthew, a publican or tax-gatherer. When the apostles were reduced to 11 by the suicide of Judas, who had betrayed Christ, they chose Matthias by lot, on the proposition of St. Peter. Soon after, their number became 13, by the miraculous vocation of Saul, who, under the name of Paul, became one of the most zealous propagators of the Christian faith. The Bible gives the name of apostle to Barnabas also, who accompanied Paul on his missions (Acts, xiv: 13), and Paul bestows it also on Andronicus and Junia, his relations and companions in prison. Generally, however, the name is used, in a narrower sense, to designate those whom Christ selected Himself while on earth, and Paul, whom He afterward called. In a still wider sense, preachers who first taught Christianity in heathen countries, are sometimes termed apostles: *e. g.*, St. Denis, the apostle of the Gauls; St. Boniface, the apostle of Germany; the monk Augustine, the apostle of England; the Jesuit

## Apostolic

Francis Xavier, the apostle of the Indies; Adalbert of Prague, the apostle of Prussia proper. Paul was the only apostle who had received a scientific education; the others were mechanics. Peter, Andrew, and John are called in the Scriptures (Acts iv: 13), *homines sine literis, idiotæ*. Peter employed his disciple St. Mark in writing the Gospel which bears his name. During the life of the Savior, the apostles more than once showed a misunderstanding of the object of His mission; and, during His sufferings, evinced little courage and firmness of friendship for their great and benevolent Teacher. After His death, they received the Holy Ghost on the day of Pentecost, that they might be enabled to fulfill the important duties for which they had been chosen. Of their subsequent lives, all that we know will be found under their respective names.

**Apostles' Islands, or The Twelve Apostles**, a group of 27 islands in Lake Superior. They belong to Wisconsin. The principal islands of the group are Ile au Chene, Stockton, Bear, Madeline, and Outer. They have an area of 200 square miles. Brown sandstone is exported and the islands are covered with a rich growth of timber. The cliffs have been worn into strange forms by the action of the waves. La Pointe, on Madeline island, formerly the county-seat of Ashland county, Wis., was settled by the French in 1680. Several missions were established very early on the islands by the Jesuits.

**Apostolic, or Apostolical**, pertaining or relating to the apostles.

**Apostolic Church**.—The Church in the time of the apostles, constituted according to their design. The name is also given to the four churches of Rome, Alexandria, Antioch, and Jerusalem, and is claimed by the Roman Catholic Church, and occasionally by the Episcopalians.

**Apostolic Constitutions and Canons**.—A collection of regulations attributed to the apostles, but generally supposed to be spurious. They appeared in the 4th century; are divided into eight books, and consist of rules and precepts relating to the duty of Christians, and particularly to the ceremonies and discipline of the Church.

**Apostolic Delegate**.—A permanent representative of the Pope in a foreign country. It is sometimes confounded with the word ablegate, the latter meaning a temporary representative of the Pope for some special function.

**Apostolic Fathers**.—The Christian writers who, during any part of their lives, were contemporary with the apostles. There are five — Clement, Barnabas, Hermas, Ignatius, Polycarp.

**Apostolic King**.—A title granted by the Pope to the Kings of Hungary, first con-



ferred on St. Stephen, the founder of the royal line of Hungary, on account of what he accomplished in the spread of Christianity.

*Apostolic See.*—The see of the Popes or Bishops of Rome; so called because the Popes profess themselves the successors of St. Peter, its founder.

*Apostolic Succession.*—The uninterrupted succession of bishops, and, through them, of priests and deacons (these three orders of ministers being called the apostolical orders), in the Church by regular ordination from the first apostles down to the present day. All Episcopal churches hold theoretically, and the Roman Catholic Church and many members of the English Church strictly, that such succession is essential to the officiating priest, in order that grace may be communicated through his administrations.

**Apostolics, Apostolici, or Apostolic Brethren**, the name given to certain sects who professed to imitate the manners and practice of the apostles. The last and most important of these sects was founded about 1260 by Gerhard Segarelli of Parma. They went barefooted, clothed in white, with long beard, disheveled hair, and bare heads, accompanied by women called spiritual sisters, begging, preaching, and singing, throughout Italy, Switzerland, and France; announced the coming of the kingdom of heaven and of purer times; denounced the papacy, and its corrupt and worldly church; and inculcated the complete renunciation of all worldly ties, of property, settled abode, marriage, etc. This society was formally abolished (1286) by Honorius IV. In 1300 Segarelli was burned as a heretic, but another chief apostle appeared—Dolcino, a learned man of Milan. In self defense they stationed themselves in fortified places whence they might resist attacks. After having devastated a large tract of country belonging to Milan, they were subdued, A. D. 1307, by the troops of Bishop Raynerius, in their fortress Zebello, in Vercelli, and almost all destroyed. Dolcino was burned. The survivors afterward appeared in Lombardy and in the south of France as late as 1368.

**Apostrophe.** (a) In the forms apostrophe and apostrophy:

In rhetoric, a figure of speech by which, according to Quintilian, a speaker turns from the rest of his audience to one person, and addresses him singly. Now, however, the signification is wider, and is made to include cases in which an impassioned orator addresses the absent, the dead, or even things inanimate, as if they were present and able to hear and understand his words. When Jesus, in the midst of an address to His apostles in general, suddenly turned to Peter and said, "Simon, Simon,

behold, Satan hath desired to have you, that he may sift you as wheat" (Luke xxii: 24-37), the apostrophe was in the Quintilian sense.

(b) In the forms apostrophe and apostrophus:

1. In grammar, the substitution of a mark like this (') for one or more letters omitted from a word, as tho' for though, 'twas for it was, king's for kinges.

2. The mark indicating such substitution, especially in the case of the possessive. The old possessive singular was *es*, and the apostrophe stands for the omitted *e*. Thus Chaucer has the "Knightes," "Monkes," and the "Clerkes" Tales, for what now would be written the "Knight's," "Monk's," and "Clerk's" Tales. The old spelling is preserved in the word Wednesday = Wodenes day = Woden's day. The name apostrophe is given also to the mark in the possessive plural, as brethren's, assassins'.

**Apothecary**, the name formerly given in England and Ireland to members of an inferior branch of the medical profession. The apothecary was in England a licentiate of the Apothecaries' Society of London; in Ireland, a licentiate of the Apothecaries' Hall of Ireland. Up to a comparatively recent period, however, no inconsiderable proportion of those who practiced as apothecaries, at any rate in England, were persons practicing without any license. The licensed apothecary frequently kept a shop in which he sold drugs and made up medical prescriptions, in this respect competing with the chemist and druggist. But he was entitled to attend sick persons, and prescribe for them; and though it was the almost universal practice of apothecaries to charge their patients only for medicines supplied, they had the alternative of charging for their attendances, but could not charge for both. The term apothecary has been long in disuse, though, no doubt, it is still a legal description for licentiates of the Apothecaries' Society of London, or of the Apothecaries' Hall of Ireland; and such licentiates are now, as licentiates in medicine before the law, on a par with the graduates of universities.

Anciently, the apothecaries were not distinguishable from the grocers (the surgeons being, in like manner, undistinguishable from the barbers); and it was not till 1617, in the 13th year of James I., that these bodies were formed into two distinct corporations. A statute of 1815 enacted that no person should practice as an apothecary, or act as an assistant to an apothecary, in any part of England or Wales, unless he had been examined by a court of examiners, and had received therefrom a certificate; and any person practicing without such certificate was disabled from recovering his charges, and for every such offense was,



## Apothecium

moreover, rendered liable to a penalty of £20. An act of 1874 amended the act of 1815, and gave the Apothecaries' Society power to co-operate with other medical licensing bodies in granting licenses.

**Apothecium**, the scutella or shields constituting the fructification of some lichens. They are little colored cups or lines with a hard disk, surrounded by a rim, and containing asci or tubes filled with sporules.

Also the cases in which the organs of reproduction in the *algacæ*, or sea weeds, are contained.

**Apotheosis**, a deification; the placing of a prince or other distinguished person among the heathen deities. It was one of the doctrines of Pythagoras, which he had borrowed from the Chaldees, that virtuous persons, after their death, were raised into the order of the gods. And hence the ancients deified all the inventors of things useful to mankind, and who had done any important service to the commonwealth. The Romans, for several centuries, deified none but Romulus, and first initiated the Greeks in the fashion of frequent apotheosis after the time of Augustus Cæsar. From this period, apotheosis was regulated by the decrees of the senate, and accompanied with great solemnities. It became at last so frequent as to be an object of contempt. The period of the Roman emperors, so rich in crime and folly, offers the most infamous instances of apotheosis. After Cæsar, the greater part of the Roman emperors were deified. The same hand which had murdered a predecessor often placed him among the gods. The savage Nero deified the beautiful Poppæa, after having killed her by a kick when she was pregnant. Constantinus had the double advantage of being deified by the religion which he had persecuted, and canonized by that which he supported.

**Apotheosis of Augustus**, the largest cameo in the world, carved in a sardonix almost a foot wide. There are 26 figures in all, among them Augustus, Æneas, Julius Cæsar, Tiberius, and Caligula. It was made in Rome, and is now in the Cabinet des Medailles, Paris.

**Appalachian Mountains** (ap-pa-lā'-chē-an), also called **Alleghanies**, a vast mountain range in North America, extending for 1,300 miles from Cape Gaspé, on the Gulf of St. Lawrence, S. W. to Alabama. The system has been divided into three great sections: the northern (including the Adirondacks, the Green mountains, the White mountains, etc.), from Cape Gaspé to New York; the central (including a large portion of the Blue Ridge, the Alleghanies proper, and numerous lesser ranges), from New York to the valley of the New river; and the southern (including the continuation of the Blue Ridge, the Black mountains, the Smoky mountains, etc.), from the New

## Apparition

river southward. The chain consists of several ranges generally parallel to each other, the altitude of the individual mountains increasing on approaching the South. The highest peaks rise over 6,600 feet (not one at all approaching the snow level), but the mean height is about 2,500 feet. Lake Champlain is the only lake of great importance in the system, but numerous rivers of considerable size take their rise here. Magnetite, hematite, and other iron ores occur in great abundance, and the coal measures are among the most extensive in the world. Gold, silver, lead, and copper are also found, but not in paying quantities, while marble, limestone, fire clay, gypsum, and salt abound. The forests covering many of the ranges yield large quantities of valuable timber, such as sugar maple, white birch, beech, ash, oak, cherry tree, white poplar, white and yellow pine, etc., while they form the haunts of large numbers of bears, panthers, wild cats, and wolves.

**Appalachicola** (-chi-cō-la), a river of the United States, formed by the Chattahoochee and Flint rivers, which unite near the northern border of Florida; length, about 100 miles; flows into the Gulf of Mexico, and is navigable.

**Appanage**, properly, lands assigned as portions to the younger sons, or sometimes the brothers of the French king, who in general took their titles from the appanages which they held. Under the first two dynasties of French kings, the sons of the monarch divided his dominions among them. Afterward the kingdom was assigned to the eldest, and appanages to the others. Then the dominant power of the latter princes was so circumscribed that their appanages could not be willed away to anyone, or descend to females, but, on the failure of male issue, were made to revert to the crown; and finally, on Nov. 22, 1790, the power hitherto possessed by the crown of granting appanages was taken away, and provision made for the younger sons of the royal family by grants from public funds. During the earlier period of the existence of French appanages, they were divided into royal and customary; the former being those granted to the king's brothers, and not allowed to be possessed by, or descend to, females; and the latter granted to the king's sisters, and consequently under no such restriction.

**Apparition**, according to a belief held by some, a disembodied spirit manifesting itself to mortal sight; according to the common theory an illusion involuntarily generated, by means of which figures or forms, not present to the actual sense, are nevertheless depicted with a vividness and intensity sufficient to create a temporary belief of their reality. Such illusions are now generally held to result from an overexcited brain, a strong imagination, or some



## Appeal

bodily malady. In perfect health, the mind not only possesses a control over its powers, but the impressions of the external objects alone occupy its attention, and the play of imagination is consequently checked, except in sleep, when its operations are relatively more feeble and faint. But in the unhealthy state of the mind, when its attention is partly withdrawn from the contemplation of external objects, the impressions of its own creation, or rather reproduction, will either overpower or combine themselves with the impressions of external objects, and thus generate illusions which in the one case appear alone, while in the other they are seen projected among those external objects to which the eyeball is directed. This theory explains satisfactorily a large majority of the stories of apparitions: still there are some which it seems insufficient to account for. In recent times, though the belief in ghosts of the old and orthodox class may be said to have almost died out, a new and kindred faith has arisen, that of Spiritualism.

**Appeal**, an application for the transfer of a cause or suit from an inferior to a superior court or judge. It differs from a writ of error in two respects: (1) That an appeal may be brought on any interlocutory matter, but a writ of error only on a definite judgment. (2) That on writs of error, the superior court pronounces the judgment, while on appeals it gives directions to the court below to rectify its decree. (Blackstone's "Commentaries," book iii, ch. 4.)

In the United States, the distinction between an appeal, which originated in the civil law, and a writ of error, which is of common law origin, is that the former carries the whole case for review by the higher court, including both the facts and the law; while the latter removes only questions of law. An act of Congress of 1875 provides that the judgments and decrees of the Circuit Courts of the United States shall not be re-examined in the Supreme Court unless the matter in dispute shall exceed the sum or value of \$5,000, exclusive of costs. No judgment, decree, or order of a circuit or district court, in any civil action at law or in equity, shall be reviewed in the Supreme Court on writ of error or appeal, unless the writ of error is brought, or the appeal is taken, within two years after the entry of such judgment, decree, or order; save in the case of infants, insane persons, and imprisoned persons, when the period is two years, exclusive of this term of disability. An appeal from a district court to a circuit court of the United States must be taken within one year. An appeal from the district court in admiralty to the circuit court must be made immediately after the decree, in open court, before the adjournment *sine*

## Appendicitis

*die*; and it should be taken to the next succeeding circuit court. An appeal may be taken from the State courts to the Supreme Court of the United States, in cases involving the validity of a treaty or statute of, or authorized under, the United States; on the ground of repugnance to the constitution, etc.

**Appendicitis**, a disease caused by inflammation, suppuration, and consequent gangrene in the tissue of the vermiform appendix, usually due to insufficient circulation of blood in the part itself. The interior of the appendix is big enough to admit only a medium sized darning needle. The interior caliber of the appendix is, however, often found dilated and containing foreign material. That most commonly found is a small hardened mass of fecal matter in size from that of a grape seed to a date pit, and so resembling these seeds as to sometimes be mistaken for them. The common belief that appendicitis is caused by the introduction of a grape or orange seed or some other seed into the appendix is practically erroneous, since such causes are so extremely rare as to form exceptions to the general rule. It is true, nevertheless, that occasionally seeds, bits of bone, small shot, gallstones, beans, pins, and other objects have caused fatal perforation of the appendix. Rheumatism and gout have both been observed to affect the appendix and to cause rheumatic or gouty inflammation of the part. Blows over the region of the appendix and inflammation of adjacent structures, such as the head of the cæcum (the portion of the bowel from which the appendix springs), are frequent causes of the disease. Adhesions or bands resulting from peritonitis are sometimes found to have bound the appendix to such an unnatural position as to occlude the blood supply to the part or to prevent the secretions from its interior discharging into the bowel, thus causing gangrene or abscess.

The appendix is an organ which appears to have no actual use in the present machinery of man, but in the earlier stages of man's development it is believed to have been a large pouch which played an important part in the digestive operations of the human system. By ages of disuse it has gradually shrunk to its present dimensions, and is known to science as a vestigial organ, one which is only a remnant of its former self and possessing but a vestige of its original functions. It is one of the most delicate and vital parts of the body, in the peritoneal cavity, usually to the right of the center of the abdomen, but in rare instances it has been found on the left side, and, still more rarely, otherwise placed. This discovery, made very recently, has caused the surgeons to be extremely careful to locate the trouble before using the knife.



Until a comparatively recent period the frequent and fatal part played by the vermiform appendix in peritoneal disorders, and especially in septic peritonitis, has not been understood by the medical profession. That was the reason that septic peritonitis was generally succeeded by the death of the sufferer soon after the symptoms were well established. When it was once proved that the poison which produced septic peritonitis came from the breaking down and consequent perforation or from abscess of the appendix the very root of one of man's worst ailments was laid bare. Further practice established beyond a doubt that in a large majority of cases the appendix could be removed by a single surgical operation and the patient restored to vigorous health if the disease was discovered in time and correctly diagnosed. The surgeons now regard the operation itself as one of the most simple, but to obtain the best results it should take place within a few hours after the patient begins to suffer from the disease. In fact the sooner the operation is had the better are the chances of recovery, while if the knife is not resorted to death is apt to ensue very promptly. The symptoms are so plain and unmistakable to the surgeon of to-day that any sufferer may know them himself:

1. The attack is nearly always sudden. It comes on when the person is apparently in the best of health, and without the slightest warning.

2. A sharp pain is felt in the very center of the abdomen. This is almost always the case, whether the appendix be in its correct place on the right side or displaced to the left.

3. A sore or tender spot, very painful to the touch, is located about where the incision must be made to find the appendix.

These are the three plain symptoms which have been found in thousands of cases with scarcely a variation. Thus it is that many sudden deaths occur to persons in robust health. They are thought to have colic, when the truth is that useless little organ, the appendix, has met with some kind of an accident.

Appendicitis usually occurs between the ages of 10 and 50 years. It is rare above or below those ages. It is more frequently among males than females, the exact proportion being unknown. The probable cause of this difference is of very recent discovery and is not even known generally among the medical profession. Dr. Clado, a French surgeon and investigator, sought an explanation of the comparative immunity of the female sex from the malady and discovered that the appendix in woman has an extra blood vessel (a small branch of the ovarian artery) that does not exist in man. This discovery was not only a bit of new knowl-

edge of great value, but was an additional proof of the theory that disease of the appendix is often due in part to its want of vital resistance. CYRUS EDSON.

**Appendix Vermiformis**, a worm-like, rudimentary process, which hangs from the cæcum or first part of the large intestine. It is from three to six inches in length, the upper end opening into the cæcum and the lower end being closed. It lies in the abdominal cavity just above the right groin and its functions are unknown.

**Apperception**, a psychological term denoting the mental act and faculty of writing or relating ideas or other mental states in groups or larger wholes of any sort. A particular object or idea is said to be apperceived when it is taken up into an earlier complex mental state and put into appropriate connection with its parts. It goes further than ASSOCIATION OF IDEAS (q. v.), since it recognizes the fact that the mind proceeds according to a more or less systematic plan and selects its materials—rejecting what is not fitting—and thus involves constructive imagination; while association deals with a more or less mechanical revival of ideas, according to their accidental contiguities and resemblances. The term apperception has become important in theories of education, since true education aims at training the pupil to select and to construct for himself. J. MARK BALDWIN.

**Appiani, Andrea** (ap-ē-an'ē), a painter born at Milan in 1754. As a fresco-painter he excelled every contemporary painter in Italy. He displayed his skill particularly in the cupola of Santa Maria di S. Celso at Milan, and in the paintings representing the legend of Cupid and Psyche, prepared for the walls and ceiling of the villa of the Archduke Ferdinand at Monza (1795). Napoleon appointed him royal court painter, and portraits of almost the whole of the imperial family were painted by him. He died in 1817.

**Appian Way**, the great Roman highway constructed by the below-mentioned Appius Claudius, from Rome to Capua, and afterward extended to Brundisium, and finished B. C. 312. It was built of stones four or five feet long, carefully joined to each other, covered with gravel, furnished with stones for mounting and descending from horseback, with milestones, and with houses at which to lodge.

**Appius, Claudius** (ap'ē-us), surnamed Cæcus, or the Blind, an ancient Roman, elected censor B. C. 312, which office he held four years. While in this position he made every effort to weaken the power of the plebs, and constructed the road and aqueduct named after him. He was subsequently twice consul, and once dictator. In his old age he became blind, but in B. C. 280 he



made a famous speech in which he induced the senate to reject the terms of peace fixed by Pyrrhus. He is the earliest Roman writer of prose and verse whose name we know.

**Appius, Claudius Crassinus**, a Roman decemvir (451 to 449 B. C.). Being passionately in love with Virginia, daughter of Virginius, a respectable plebeian absent with the army, he persuaded M. Claudius, his client, to gain possession of her, under the pretense that she was the daughter of one of his slaves. The people compelled him to set her at liberty; but Claudius summoned her before the tribunal of Appius, who decided that the pretended slave should be given up to her master. A fearful disturbance arose, and the decemvir was compelled to leave Virginia in the hands of her family; but he declared that he would pronounce his decision the next day. Virginius, hurriedly recalled from the army by his friends, appeared and claimed his daughter; but, after another mock trial, she was again adjudged to be the property of Marcus Claudius. To save his daughter from dishonor, the unhappy father seized a knife and slew her. The popular indignation excited by the case was headed by the senators Valerius and Horatius, who hated the decemvirate. The army returned to Rome with Virginius, who had carried the news to them, and the decemviri were deposed. Appius Claudius died in prison, by his own hand (as Livy states), or was strangled by order of the tribunes. Alfieri has written a tragedy on the death of Virginia.

**Apple**, the fruit of the *pyrus malus*, a species of the genus *pyrus*. All the different kinds of apple trees now in cultivation are usually regarded as mere varieties of the one species which, in its wild state, is known as the crab-tree, *pyrus acerba*. This plant is found in woods and waysides in most of the temperate parts of the northern hemisphere. Its fruit is austere and unpalatable, but is sometimes gathered for the sake of its acid juice, which, when fermented, forms the liquid called verjuice, used in cookery and for purifying wax. The Romans are said to have had 22 varieties of the *pyrus malus*, or cultivated apple tree. At the present time it is, perhaps, the most widely-diffused and valuable of all fruit-trees; and the varieties, which are adapted to almost every soil, situation and climate in the temperate zone, have become exceedingly numerous. About 1,000 varieties are cultivated in the United States. The apple-tree seldom reaches a greater height than 30 feet, but its large round head makes up for the want of height; and, altogether, it is a noble looking tree, especially when in full blossom. The flowers grow in bunches, and have a very fragrant odor. They are white inside, and have a delicate tinge of

pink externally. The tree is not always allowed to ramify in a natural manner, but is sometimes trained as an espalier, or as a wall tree. New varieties are being continually developed; and as they are generally propagated by grafting, the old ones gradually die out. The variety that produced the costard, or custard, which was at one time a favorite kind of apple, does not now exist, though the name of costermongers (costard-mongers) is still retained for itinerant vendors of apples. The apple is usually grafted on apple or crab stocks; but sometimes hawthorn stocks are used. For producing dwarf-trees, stocks of the paradise-apple, a very diminutive variety, are usually employed. The apple (alluding now to the fruit, and not to the tree producing it) varies greatly in form, size and color. It is regarded by botanists as the type of the kind of fruit to which they have applied the term *pome*. The eatable part has a more or less aromatic, sweet, or sub-acid taste, and contains starch, grape-sugar, and malic acid. Apples are commonly divided into dessert, baking and cider-making fruits; the first being highly flavored, the second such as become soft in baking or boiling, and the third those which are hard and austere. Apples are also classed under the general names of Pippins, Pearmains, Rennets, Colvilles, Russets, Codlins, etc. The uses of the apple for culinary and conserving processes are sufficiently well known. Cider, the fermented juice of the apple, is a favorite drink in many parts of England and France, and in some places of the United States. Malic acid, extracted from the apple, has long been used in medicine, and has latterly been largely employed as a mordant in dyeing.

**Apple of Discord**, in Greek mythology, the golden apple thrown into an assembly of the gods by the goddess of discord (Eris), bearing the inscription "For the fairest." Aphrodite (Venus), Hera (Juno), and Pallas (Minerva) became competitors for it, and its adjudication to the first by Paris so inflamed the jealousy and hatred of Hera to all of the Trojan race (to which Paris belonged) that she did not cease her machinations till Troy was destroyed.

**Apple of Sodom**, a fruit described by old writers as externally of fair appearance, but turning to ashes when plucked; probably the fruit of *solanum sodomcum*.

**Appleton**, city and county-seat of Outagamie co., Wis., on the Fox river and the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads; 25 miles S. W. of Green Bay. It is at the head of navigation on Lake Winnebago and on the Green Bay waterway, on a plateau 70 feet above the river, and near the Grand Chute rapids, whence it derives excellent power for manufacturing. The principal in-



## Appleton

dustry is the manufacture of farm implements, furniture, paper, flour, pulp, machinery, and woolen and knit goods. It is the seat of Lawrence University (Methodist-Episcopal), and has university and public-school libraries, three National banks, daily and weekly newspapers, and a property valuation of over \$3,500,000. Pop. (1890) 11,869; (1900) 15,085; (1910) 16,776.

**Appleton, Daniel**, founder of the American publishing house of D. Appleton & Co., was born at Haverhill, Mass., in 1785; he began business as a retail dealer; afterward settled in New York, and built up one of the largest businesses of its kind. He retired in 1848, leaving the business to four sons and their descendants. The success of the firm justified it in beginning, previous to 1857, the "New American Cyclopædia," under the editorship of George Ripley and Charles A. Dana, which was completed in 1863, in 16 volumes. A revised edition was published in 1872-1876. The same firm has issued many scientific and educational works.

**Appleton, John Howard**, an American chemist, born in 1844; was graduated at Brown University in 1863; was instructor in chemistry there in 1863-1868; and in the last year became professor of that department. Among his numerous publications are "The Young Chemist," "Quantitative Chemical Analysis," "Qualitative Chemical Analysis," "Chemistry of the Non-metals," "The Metals of the Chemist," "The Carbon Compounds," etc.

**Appleton, Nathan and Samuel**, American merchants and philanthropists, brothers, born in 1779 and 1766 respectively; engaged in the manufacture of cotton goods; were founders of the city of Lowell, Mass.; and widely known for their active benevolence. Nathan set up the first power loom ever used in the United States, in his Waltham mill. Nathan died in 1861; Samuel in 1853.

**Appoggiatura**, in music, a small additional note of embellishment preceding the note to which it is attached, and taking away from the principal note a portion of its time.

**Appold, John George**, an English mechanic and inventor of automatic machinery, born in 1800. He invented a centrifugal pump and a break which was used in laying the Atlantic cable. He died Aug. 31, 1865.

**Appomattox Court House**, a village in Appomattox county, Va., 20 miles E. of Lynchburg. Here, on April 9, 1865, General Lee surrendered to General Grant, and thus virtually concluded the Civil War.

**Apportionment Bill**, a bill adopted by the United States Congress every 10 years, and directly after the completion of the

## Apprenticeship

Federal census, which determines the number of members that each State is entitled to send to the National House of Representatives, and provides for the necessary reorganization of the Congressional electoral districts. The apportionment based on the census of 1890 was one member to 173,901 population; census of 1900, one to 194,182.

**Apprenticeship**, in law, a contract by which a person who understands some art, trade, or business, and called master, undertakes to teach the same to another person, commonly a minor, and called the apprentice, who, on his part, is bound to serve the master, during a definite period of time, in such art, trade, or business. At common law, an infant may bind himself apprentice by indenture, because it is for his benefit. But this contract, on account of its liability to abuse, has been regulated by statute in the United States, and is not binding upon the infant unless entered into by him with the consent of the parent or guardian, or by the parent or guardian for him, with his consent. The contract need not specify the particular trade to be taught, but is sufficient if it be a contract to teach such manual occupation or branch of business as shall be found best suited to the genius or capacity of the apprentice. This contract must generally be entered into by indenture or deed. The duties of the master are, to instruct the apprentice by teaching him the knowledge of the art which he had undertaken to teach him, though he will be excused for not making a good workman, if the apprentice is incapable of learning the trade, the burden of proving which is on the master. He must not abuse his authority, either by bad treatment, or by subjecting his apprentice to menial employments unconnected with the business he has to learn; but he may correct him with moderation for negligence and misbehavior. He cannot dismiss his apprentice except by consent of all the parties to the indenture. He cannot remove the apprentice out of the State under the laws of which he was apprenticed, unless such removal is provided for in the contract, or may be implied in its nature; and if he do so remove him, the contract ceases to be obligatory. An infant apprentice is not capable in law of consenting to his own discharge. After the apprenticeship is at an end, the master cannot retain the apprentice on the ground that he has not fulfilled his contract, unless especially authorized by statute. An apprentice is bound to obey his master in all his lawful commands, take care of his property, and promote his interests, endeavor to learn his trade or business, and perform all the covenants in his indenture not contrary to law. He must not leave his master's service during the term of the apprenticeship.



**Appropriation**, a specific sum set apart by the legislative power for a designated purpose. In the United States, no money can be drawn from the Treasury, excepting by appropriations made by law (Constitution, art. I). Under this clause it is necessary for Congress to appropriate money for the support of the Federal government, and in payment of claims against it. All bills for appropriating money originate in the House of Representatives; but may be amended in the Senate. The same procedure is observed in the several States.

**Approximation**, a term used in mathematics to signify a continual approach to a quantity required, when no process is known for arriving at it exactly. Although, by such an approximation, the exact value of a quantity cannot be discovered, yet, in practice, it may be found sufficiently correct; thus the diagonal of a square whose sides are represented by unity, is  $\sqrt{2}$ , the exact value of which quantity cannot be obtained; but its approximate value may be substituted in the nicest calculations.

**Apraxin, Feodor Mateievitch** (ap-rax'in), a Russian admiral, born in 1671. He may be considered as the creator of the Russian navy, and was the most powerful and influential person at the court of Peter the Great, who made him chief-admiral. In 1708, he defeated the Swedish general Lübeckér, in Ingermannland, and saved the newly built city of St. Petersburg from destruction. In 1713, he took Helsingfors and Borgo, and defeated the Swedish fleet. He was twice charged with embezzlement, tried, and condemned to pay a fine; but being too useful to be dispensed with, Peter, in both instances, neutralized the effects of the condemnation, by conferring upon him additional riches and dignities. He died in 1724.

**Apricot**, a fruit, that of the *prunus armeniaca*; also the tree on which it grows. It is not settled that it came, as the Latin specific name would imply, from Armenia. It is wild in Africa and in the Caucasus, where the mountains in many places are covered with it; it is found also in China and some other countries. It is esteemed only second to the peach.

**April**, the fourth month of the year. It was called Ooster, or Easter month by the Anglo-Saxons, and Grass month by the Dutch.

**April-fools' Day**.—The first day of April, so called from the old custom of sending any one, on this day, upon a bootless errand. This strange custom of April fools' day exists throughout Europe, and in those parts of the United States where the traditions of the mother-country prevail. One of the explanations of the custom is as follows: In the Middle Ages, scenes from Biblical history

were often represented by way of diversion, without any feeling of impropriety. The scene in the life of Jesus, where He is sent from Pilate to Herod, and back again from Herod to Pilate, was represented in April, and may have given occasion to the custom of sending on fruitless errands, and other tricks practiced at this season. The phrase of "sending a man from Pilate to Herod" is common in Germany, to signify sending about unnecessarily. The reason of choosing the first of April for the exhibition of this scene was, that the feast of Easter frequently falls in this month, and the events connected with this period of the life of Jesus would naturally afford subjects for the spectacles of the season. The tricks of the first of April may, however, be the remains of some Roman custom derived from the East, and spread over Europe, like so many other customs, by these conquerors. It is certain that the Hindus practice precisely similar artifices at the time of the Huli feast, on the 31st of March. One of the best tricks of this description is that of Rabelais, who, being at Marseilles without money, and desirous of going to Paris, filled some vials with brick-dust or ashes, labelled them as containing poison for the royal family of France, and put them where he knew they would be discovered. The bait took, and he was conveyed as a traitor to the capital, where the discovery of the jest occasioned universal mirth. In France, the unlucky party who may be fooled is called *un poisson* (fish) *d'Avril*; in Scotland, a *gowk* (cuckoo); in England and the United States, an April-fool.

**Apron**, a platform of plank at the entrance of a dock. The apron in ship-building is a piece of curved wood placed behind the lower part of the stem, and above the foremost end of the keel, to strengthen the stem. The apron also formerly was a piece of sheet lead used in covering the vent of a cannon. This word, as a part of wearing apparel, being termed "breeches" in the Geneva Bible of 1599 (See Gen. iii: 7), gave to that edition the popular name of "The Breeches Bible."

**Apse**, a portion of any building forming a termination or projection semicircular or polygonal in plan, and having a roof forming externally a semi-dome or semi-cone, or having ridges corresponding to the angles of the polygon; especially such a semi-circular or polygonal recess projecting from the eastern end of the choir or chancel of a church, in which the altar is placed. The apse was developed from the somewhat similar part of the Roman basilicæ, in which the magistrate (*prætor*) sat.

**Apsides**, the plural of APSE or APSIS; in astronomy, the two points in the elliptic orbit of a planet where it is at the greatest



## Apsley Strait

and at the least distance respectively from the body around which it revolves. The moon moving in an elliptic orbit around the earth, which is situated in one of the foci, is at what was anciently called its higher apse when it is in apogee, and at its lower one when it is in perigee. Similarly, the primary planets, including the earth and comets, moving in elliptic orbits around the sun, which is situated in one of the foci, pass through their higher apse when they are in aphelion, and their lower one when in perihelion. It is the same with the satellites of Jupiter when they are in apojove and perijove.

The line of the apsides is the line connecting the two apsides of a primary or secondary planet. Were it not for a motion of the apsides, it would exactly coincide with the major or longer axis of the ellipse.

The progression of the moon's apsides is a slow movement in the position of the apsides of the moon, produced by the perturbing attraction of other heavenly bodies. It is about three degrees of angular motion, in one revolution of the moon, and in the same direction as her progression in her orbit. The apsides of the primary planets are also, to a certain extent, perturbed.

The revolution of the moon's apsides is the movement of the apsides around the entire circumference of the ellipse, which takes place in 3,232.5753 mean solar days, or about nine years.

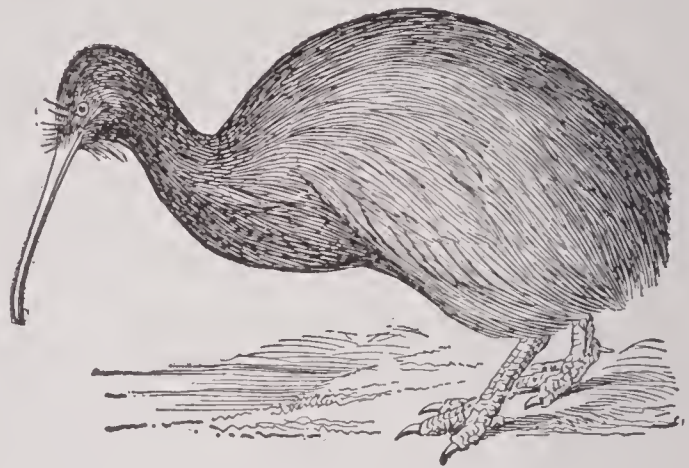
A libration in planetary apsides is a movement sometimes forward and sometimes backward in the apsides of Venus and Mercury, from perturbations caused by other heavenly bodies.

**Apsley Strait**, a narrow channel between Melville and Bathurst Islands, off the N. coast of Australia. It is about 40 miles in length, with a breadth varying from 2 to 5 miles. The land is low on either side, and the shores from one end of the strait to the other bordered by a broad belt of impenetrable mangroves, and indented by numerous salt-water creeks, which present the appearance of rivers. Alligators of enormous size abound in the Straits, many of them measuring from 14 to 17 feet in length. A settlement was formed in 1824, on the Melville Island side of the channel, about 8 or 10 miles from its N. entrance, but was subsequently abandoned.

**Apteryx**, a genus of birds, the typical one of the family *apterygidae*. Two species are known—the *A. australis* and *A. mantelli*, both from New Zealand. The natives call the former, and probably also the latter, Kiwikiwi, which is an imitation of their peculiar cry. The *A. australis* is somewhat less in size than an ordinary goose. It runs when pursued, shelters itself in holes, and

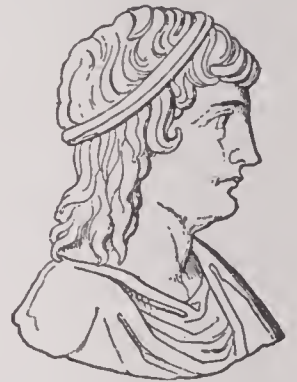
## Apulia

defends itself with its long bill; but unable as it is to fly, its fate, it is to be feared, will soon be that of the dodo—it is now almost extinct.



APTERYX OR KIWIKIWI.

**Apuleius, Lucius** (ap-ū-lē'us), a famous Latin satirist and writer of fiction; lived in the 2d century, and was a native of Northern Africa. Having inherited an ample fortune, he devoted himself to study and travel; attending first the schools of Carthage, then the Athenian schools of philosophy. His principal work is "Metamorphosis" or "The Golden Ass," which includes the charming epilogue of "Cupid and Psyche;" well known also is his witty "Apology," a defense against a charge of sorcery brought by the sons of a widow twice his age whom he had married. Herder calls the episode of Psyche, in the "Golden Ass," the most tender and diversified of all romances.



APULEIUS.

**Apulia** (ap-ū'lē-a), formerly a part of Sapygia (so called from Sapyx, son of Dædalus), including the modern Southeastern provinces of Capitanata, Terra di Bari, Terra d'Otranto, etc. In the most ancient times, three distinct nations dwelt here—the Messapians, or Sallentines, the Peucetians and the Dauni, or Apulians. The Peucetians were in the southern part, as far as the Aufidus; the Dauni in the northern, as far as Mount Garganus. The old Latin traditions speak of Daunus, a King of the Apulians, who was expelled from Illyria, and retired to this part of Italy. According to the tradition which conducts the wandering heroes of the Trojan war to Italy, Diomed settled in Apulia, was supported by Daunus in a war with the Messapians, whom he subdued, and was afterward treacherously killed by his ally, who desired to monopolize the fruits of the victory. Roman history informs us of no other Apulian Kings, but mentions Arpi, Luceria and Canusium as important cities.



Aufidus, a river of Apulia, has been celebrated by Horace, who was born at Venusia, in this territory. The second Punic War was carried on for years in Apulia. Cannæ, famous for the defeat of the Romans, is in this region. Puglia, the modern name, is only a melancholy relic of the ancient splendor which poets and historians have celebrated. It now supports more sheep than men, and has no political meaning, being merely the name of a geographical district. Area 7,376 square miles; pop. (1898) 1,910,799.

**Apurè** (a-pö'rä), a navigable river of Venezuela, formed by the junction of several streams which rise in the Andes of Colombia; it falls into the Orinoco.

**Apurimac** (a-pö-rē-mak'), a river of South America, which rises in the Andes of Peru; and being augmented by the Vilcamayu and other streams forms the Ucayale, one of the principal headwaters of the Amazon.

**Apus**, in zoology, a genus of entomostacans, the typical one of the family *apodidae*. They have the carapace of one piece, and completely enveloping the anterior part of the animal. Though the name implies that they are footless, yet they have about 60 pairs of feet.

In astronomy, one of Lacaille's 27 southern constellations. Its English name is the Bird of Paradise, that animal being once erroneously supposed to be destitute of feet.

**Aqua**, a word much used in pharmacy and old chemistry. *Aqua fortis* (= strong water), a weak and impure nitric acid. It has the power of eating into steel and copper, and hence is used by engravers, etchers, etc. *Aqua marina*, a fine variety of beryl. *Aqua regia*, or *aqua regalis*, a mixture of nitric and hydrochloric acids, with the power of dissolving gold and other noble metals. *Aqua Tofana*, a poisonous fluid made about the middle of the 17th century by an Italian woman, Tofana or Toffania, who is said to have procured the death of no fewer than 600 individuals by means of it. It consisted chiefly, it is supposed, of a solution of crystallized arsenic. *Aqua vitæ* (= water of life), or simply *aqua*, a name familiarly applied to the whisky of Scotland, corresponding in meaning with the *usquebaugh* of Ireland, the *eau-de-vie* (brandy) of the French.

**Aquamarine**, a name given to some of the finest varieties of beryl of a sea-green or blue color. Varieties of topaz are also so called.

**Aquarians, or Aquarii**, Christians in the primitive Church who used water instead of wine in the Lord's Supper. Some of them did so from holding sentiments like those now entertained by total abstainers, while others, employing wine at the even-

ing communion, used water in the morning one, lest the smell of wine might betray their assemblies to persecuting foes.

**Aquarium**, an artificial tank, pond, or vessel, filled with salt or fresh water, and used, in the former case chiefly for the purpose of keeping alive marine animals in circumstances which render it easy to study their habits, and in the latter for cultivating aquatic plants. The most wonderful aquarium in the world was that of the Fisheries Department of the World's Columbian Exposition, in Chicago in the summer of 1893.

**Aquarius**, in astronomy (1) the 11th of the 12 ancient zodiacal constellations, now generally called signs of the Zodiac. It is generally quoted as "Aquarius, the Water-bearer." (2) A division of the ecliptic—that between 300° and 330° of longitude,



AQUARIUS.

which, on account of the precession of the equinoxes, has gradually advanced from the constellation Aquarius, once within those limits. The sun enters this part of his course about the 21st of January, at which time there are generally copious rains in Italy, whence the name Aquarius = the water-bearer or waterman. (Herschel's "Astronomy," §§ 380, 381.) It is marked thus ☿.

**Aquatic Animals**, animals living in or about water. Apart from any speculations as to the more or less watery nook where the first forms of life were cradled, it is worth noting that the home of almost all the simpler animals is distinctly and necessarily aquatic. While a few of the protozoa, such as one of the amœbæ, occur in damp places on land, or within other organisms, the vast majority live freely in the water, and the same is true of the sponges, cœlenterates, and echinoderms. Among worms, however, more emphatic exceptions occur, such as the earthworm, where the structure



## Aquatic Animals

and habit of the animal has become distinctly adapted to terrestrial life. While the great majority of crustaceans again are aquatic, a few, such as the wood-louse and the land crab, are modified for life ashore. The crowd of insects, spiders, and myriapods are of course terrestrial or aerial, though here also the habits of some adult forms, and the life of some of the young, are distinctly aquatic. Among mollusks also there is an equally familiar occurrence of both aquatic and terrestrial habit, while numerous forms illustrate the transition from the former to the latter. The ascidians are exclusively marine. Some fishes have a limited power of life out of the water, the double-breathing dipnoi being in this connection especially instructive. Among many amphibians, the transition from water to *terra firma* is seen in the individual life-history, when the fish-like gilled tadpole becomes the lunged gill-less frog; while in a few exceptional cases, such as the black salamander of the Alps, the life is terrestrial from first to last, and even the young dispense with their preliminary swim as tadpoles, although a brief recapitulation of their aquatic life is still represented by a gilled stage within the body of the parent. The instance of the gilled axolotl becoming, in the absence of sufficient water, the gillless amblystoma, forcibly illustrates the importance of the medium as a factor in evolution. Among reptiles there are numerous aquatic forms — chelonians, lizards, snakes, and crocodiles, though the absence of any gill respiration marks the progressive general adaptation to terrestrial life. While an emphatically terrestrial amphibian like the tree frog seeks a watery hole for the rearing of the young gill-breathing tadpoles, the habit is reversed in such reptiles as the sea turtle, which, having returned to the more primitive aquatic home, yet revisits the land for egg laying purposes. The cradle of the young in both cases indicates the ancestral habit of the parent. Among the emphatically aerial birds, there are cases like that of the penguin, where the structure has become adapted to an almost exclusively aquatic life. And so among mammals, the sea cow, the seal, and the whale are familiar illustrations of very different types which have returned to the primeval watery home and aquatic habit, with consequent change of structure.

To sum up the adaptations to aquatic life would obviously be to attempt to compress a large department of comparative physiology. It is more important simply to note the general fact that, in the water, animals are subjected to influences somewhat different in detail from those which mold their congeners ashore. Even contact with a different medium, varying in composition, in currents, in pressure, in contained food and

## Aquatic Plants

oxygen, and the like, obviously involves a great diversity in structure. Modes of motion, from the swimming bell of a medusoid contracting and expanding in the tide, to that of the lowest vertebrates as illustrated in the pelagic tunicates, or from the paddling of worm and crustacean to that of fish and frog, duck and seal, are at once familiar adaptations to, and necessary results of aquatic life. Similarly, the smooth and frequently fish-like form, especially of actively locomotive water-animals, is a very noticeable adaptive result of the conditions of life. In the more thoroughly aquatic animals, which have remained in the primitive environment, and have not merely returned to it, the blood is usually purified by being spread out on feathery gills which catch the oxygen dissolved in the water; while in terrestrial forms which have betaken themselves to an aquatic life, the ordinary direct "air breathing" is still accomplished at the surface of the water, or in some isolated cases of insects and spiders, by means of the air entangled in their hairs, or even conveyed into their submerged homes. The aquatic respiration of some larval insects, the power that some crustaceans and fishes have of keeping up a respiration on land with a minimum of water about their gills, and above all, the cases of the double breathing fishes or dipnoi, and of amphibians already referred to, are especially instructive in regard to the problem of transition from one medium to the other. The genuinely aquatic animals are known to have a body temperature not much higher than that of the surrounding medium, and often survive even the freezing of the water; while in the higher warm-blooded vertebrates which have returned to an aquatic habit, various modifications, such as thick fur and plumage, waterproof varnish, formation of blubber, serve as protections against the cold.

**Aquatic Plants**, plants growing in or belonging to water. The presence of water is not only essential to the active life of all organisms, but is peculiarly necessary for plants which are for the most part dependent for food supply on matter dissolved in water, as well as on the carbonic anhydride mingled with the surrounding medium. Numerous plants are, moreover, in the strict sense of the word aquatic, having never acquired or having lost all direct connection with the soil. The simplest plants or algæ are almost all aquatic, though many occur in damp situations on land, or on other organisms, while others remain for long periods quiescent in comparative dryness. Many algæ are absolutely isolated in the water, while others are more or less intimately fixed to some solid substratum. Fungi are very seldom found in water, and lichens are also emphatically terrestrial.



## Aquatint

Some liverworts, again, occur floating in lakes, but the majority grow in very damp places, and mark the transition to the generally terrestrial life of mosses and ferns. Some rhizocarps, such as *salvinia*, are aquatic, with leaves rising to the surface, while others are land or marsh plants, like the higher horse-tails and club-mosses.

Among the flowering plants, or phanerogams, a return to aquatic life is exhibited by numerous, though exceptional cases, while a very large number grow in moist situations, and have a semi-aquatic habit. The simple monocotyledons, known as *helobiae* or marsh lilies, are more or less strictly water-plants. The arrow head (*sagitaria*), and other *alismaceæ*; the *butomis* of the marshes; *hydrocharis*, with floating kidney-shaped leaves; the water soldier (*stratiotes*), with narrow submerged leaves; and the Canadian pond weed (*anacharis*), which, though entirely flowerless in Europe, threatens to choke some canals and lakes, are familiar representatives. The little duck weed (*lemna*) floating on the surface of stagnant pools, is one of the commonest aquatic monocotyledons; and the pond weeds (*potameæ*) found both in fresh and salt water; the lattice plant (*ouvirandra*), with its skeleton leaves; various estuarine and fresh water naiadaceous plants, *e. g.*, *zostera* and *naias*, are also common instances, while those growing in marshy ground are much too numerous to mention. Among dicotyledons, the white water buttercup (*ranunculus aquatilis*), with its slightly divided floating, and much dissected submerged leaves; the yellow and white water-lilies (*nymphaea*); the sacred lotus flower of the Ganges and Nile (*nelumbium*); the gigantic *Victoria regia* of tropical South America; and the insectivorous bladderwort or *utricularia*, are among the most familiar aquatic forms.

**Aquatint**, a method of etching on copper by which a beautiful effect is produced, resembling a fine drawing in sepia or Indian ink. The special character of the effect is the result of sprinkling finely powdered resin or mastic over the plate, and causing this to adhere by heat, the design being previously etched, or being now traced out. The nitric acid (*aqua fortis*) acts only in the interstices between the particles of resin or mastic, thus giving a slightly granular appearance.

**Aqua Tofana** (ak'wä tō-fä'na), or **Aquetta**, a poisonous liquid which excited extraordinary attention at Naples, at the end of the 17th and beginning of the 18th centuries. Tofana, a Sicilian woman, was strangled after having murdered with it many hundreds of men. The strangest stories, with regard to its composition, have gone abroad. The drink is described as transparent, tasteless water, of which five or

## Aqueduct

six drops are fatal, producing death slowly, without pain, inflammation, convulsions, or fever. Gradual decay of strength, disgust of life, want of appetite, and constant thirst, were its more immediate effects, speedily causing entire and rapid consumption. We believe it to be useless to give the different formulæ which have been suggested for the composition of this substance. It was probably the same poison as that notoriously used in Italy during the 15th and 16th centuries, of which Pope Alexander VI. died in 1503, and so fearfully celebrated in history as the "Wine of the Borgias."

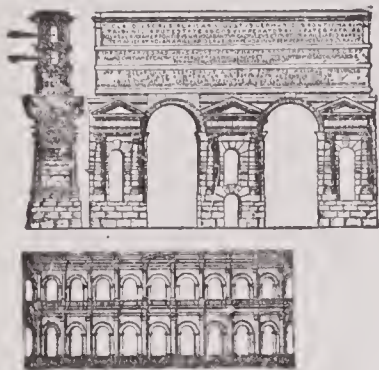
**Aqueduct**, an artificial channel or conduit for the conveyance of water from one place to another; more particularly applied to structures for conveying water from distant sources for the supply of large cities. Works for supplying communities with water must have been constructed at a very early period. In China there are said to be aqueducts dating back to prehistoric times. In Persia and Assyria there are structures, the remains of which indicate that they were used for aqueducts, but their history is not clear. Recent excavations at Jerusalem have laid bare wells and channels cut in the solid rock, and indicate that the water supply of the city was brought from the neighborhood of Bethlehem and Hebron. These channels seem to have been composed of earthen pipes incased in stones, and covered with rough rocks cemented together. It is supposed that King Solomon built aqueducts; others are ascribed to Ramses the Great, in Egypt, and to Semiramis in Assyria. There are also early remains at Palmyra in the wilderness. In the Island of Samos have recently been discovered remains of a tunnel nearly a mile long and containing water pipes about 9 inches in diameter. These may have been built in 687 B. C., by Eupalinos of Megara. Water was brought to Athens from Mt. Hymettos and Mt. Pentelikon; Thebes, Megara, Pharsalos, and other places also had aqueducts. In Patara, a city of Lycia, in Asia Minor, there is a very ancient aqueduct, consisting of an embankment of rough stone 250 feet high and 200 feet long, with an archway at the center of the valley, allowing the stream to pass through it underneath. The channels for the water consist of cubical stone blocks about a yard in dimension, with a hole 13 inches in diameter, the blocks being closely connected and cemented together.

*The Aqueducts at Rome.*—For 442 years Rome was satisfied with water from the Tiber, from wells and from the abundant springs which gushed forth within its precincts. The first aqueduct was the joint work of Appius Claudius Cæcus and Caius Plautius Venox, censors in 312 B. C. Appius Claudius built the conduit, Venox discovered the springs. The entire length of



## Aqueduct

the aqueduct was 16,445 meters, or about 10 miles, and it furnished 115,303 cubic meters a day. The second aqueduct was begun in 272 B. c., by Manius Curius Dentatus, and was finished three years later. Its length was 63,704 meters, or about 45 miles, and it furnished 277,866 cubic meters a day; it was not used for urinking, but for irrigating gardens and flushing drains. In 144 B. c. the Senate determined to repair the two old aqueducts and build a new one. This work was begun by Quintus Marcius Rex. The Marcian aqueduct brought the water from 36 miles away in the territory of Arsoli, and fed water to the highest platform of the capitol. It was restored in 33



**AQUEDUCT OF CLAUDIUS.** one and restored the aqueduct, building a branch 4 miles in length for his baths; in 305–306 Diocletian performed the same service. The viaducts and bridges by which it crossed the highlands are magnificent. There are seven bridges, some of them carrying four aqueducts. The Marcian reaches Rome at the Porta Maggiore, where no less than 10 water supplies met. It was restored as recently as 1869, and brings a water supply from the Sabine Mountains. The noble arches which stretch across the Campagna for some 6 miles on the road to Frascati, are a portion of this aqueduct. The Aqua Tepula and Aqua Julia, combined by Agrippa in 33 B. c., had a length, the one of 17,745 meters, or 10 miles, the other of 22,853 meters, or about 12 miles, and a combined flow of 104,300 cubic meters a day. Of the nine aqueducts which brought water to ancient Rome, three still supply the modern city, viz., the Aqua Virgo, now Acqua Vergine, finished by Agrippa, 27 B. c., and restored by Pope Nicholas V. in 1453; the Aqua Trajana, now Acqua Paolo; and the Aqua Marcia.

The Romans also constructed important aqueducts for the cities throughout their empire. In 120 A. D., the Emperor Hadrian constructed the aqueduct of Saghuam, which supplied Carthage with water, bringing it by arched bridges of stone or concrete about 60 miles. This aqueduct still supplies Tunis with water. Hannibal is said to have erected an aqueduct at Martorell, in Spain. The aqueduct of Alcantara, also in Spain, stretches over the Tajo, and is 125 feet high, with a span of over 100 feet. There are

## Aqueduct

other Spanish aqueducts at Chelves, at Merida, over the Albareges, three stories high, and the aqueduct at Segovia, originally built by the Romans, which has in some parts two tiers of arcades 100 feet high, is 2,921 feet in length, and is one of the most admired works of antiquity. The one at Evora, in Portugal, is still in excellent condition. One of the finest aqueducts in Europe is the Pont du Gard, built in the 3d or 4th century, or possibly by Agrippa, 19 B. c., at Nimes, in Southern France. It is still in a good state of preservation. It is higher than any about Rome itself, being fully 180 feet in height, and the length of its highest arcade is 873 feet. The bridge is composed of three tiers of arches, each less wide than the one below. It is admirably constructed of large stones, and no cement was used except for the canal on the top. There is an aqueduct at Paris, built by Julian in 360 A. D.; also a very important aqueduct at Constantinople, built by Hadrian and restored by Theodosius. Since 1885 the water has been furnished the city by an aqueduct built by a French company, taking the supply from Lake Derkos, whence the water is pumped 358 feet into a reservoir. The ruins of an aqueduct exist at Mayence, and of another near Metz, Germany. The aqueduct at Spoleto, Italy, is attributed by some to the East Gothic King Theodoric, in 500 A. D., and by others to Theodelapius, the third Duke of Spoleto, 604 A. D. It is built of brick and rests between two steep cliffs on 10 arches, and is 290 feet in height and 231 yards in length. The ground plan is apparently Roman, while the pointed arches indicate a restoration in the 14th century. A window midway affords a view.

There are many other important aqueducts. One of the most remarkable is that constructed by Louis XIV., in 1684, to convey the waters of the Eure from Point Gouin to Versailles. Troops to the number of 40,000 were employed in this great undertaking. Thousands of these men died during the progress of the work, which was interrupted during the war of 1688 and never resumed. The bridge at Maintenon, forming part of this aqueduct, even in its incomplete state, is, in point of magnitude, the grandest structure of the kind in the world. The remains consist of 47 arches, each 42 feet wide and 83 feet high. The piers are 25 feet 6 inches thick.

The first important aqueduct in England was built in 1613, to conduct the waters of the New river to London, over a distance of 20 miles. Wooden aqueducts were first used, but were replaced by embankments. Very large works were constructed during nine years, ending in 1877, to bring water from Longdendale, between Sheffield and Manchester, to the latter city. In this instance the



## Aqueduct

aqueducts consist for the most part of tunnel and covered conduit, but for 8 miles the water is conveyed in large cast iron pipes laid along or under the public roads. Before the Longdendale works were finished, the question of a greater supply had to be considered. This led to the adoption of the scheme for bringing water from Lake Thirlmere in Cumberland to Manchester. The length of the line is nearly 100 miles, and the works were carried out in 1885-1894. A tunnel, about 3 miles in length and 270 feet below the surface, forms the first part of the aqueduct. The distance is close on 100 miles ( $95\frac{3}{4}$  to Prestwich reservoir)— $13\frac{3}{4}$  in tunnels, 38 in shallow tunnels cut from the surface, and  $44\frac{1}{2}$  miles in siphon pipes of 40 inches' diameter. The aqueduct passes under Dunmail Raise, N. of Grasmere, Ambleside, Windermere, and Kendal, to the E. of Lancaster and Preston, across the rivers Lune and Ribble, past Chorley, and W. of Bolton. The ultimate supply is 50,000,000 gallons daily; the cost, \$21,500,000.

In Scotland, the Loch Katrine aqueduct supplies Glasgow with water coming from a distance of 26 miles. An aqueduct was built in 1738, conducting water for a distance of about 9 miles into the city of Lisbon. For a part of the way it is underground, but near the city is carried over a deep valley for a distance of 2,400 feet, on several arches, the largest of which has a span of 115 feet, and is 250 feet high. The aqueduct of Caserta was built in 1573, by Vanvitelli, by order of Charles III. and his son, for the purpose of supplying the gardens of Caserta with water from Monte Taburno, a distance of 25 miles. It now conducts the water to Naples and crosses 20 valleys; the last 15 miles the water is carried in iron pipes. The Canal de Marseilles, 57 miles in length, conveys water from the River Buranée to Marseilles, and is a magnificent specimen of French engineering. It was finished in 1847. At Roquefavour, it crosses a valley on a bridge, the length of which is 1,290 feet; its height is 270 feet. The Vienna aqueduct is nearly 60 miles long, and was finished in 1873. At several places in its course there are extensive aqueduct-bridges, built either entirely of stone or stone and brick. This aqueduct supplies 20,000,000 gallons of water per day.

There are a number of important aqueducts in America. For 125 years, the city of Otumba, in Mexico, received its supply of water through the aqueduct of Zempoala, which, however, has not been used since 1700, though the aqueduct is said to be in almost perfect condition. It is 27 miles long. New York is supplied with water from Croton river, which falls into the Hudson above Sing Sing. The first aqueduct was constructed between the

## Aquila

years 1837 and 1842, is 38 miles long, with a general declivity of  $13\frac{1}{4}$  inches to the mile, and is 8 feet 5 inches in height, and 7 feet 8 inches in greatest breadth. Stone brick, and cement are used for the enclosing masonry. When the conduit reaches the Harlem river, the water is conveyed in iron pipes over a splendid bridge, 150 feet above the river.

An aqueduct for supplying Boston with water was first built in 1846-1848, and exactly 30 years later a new aqueduct was built from the Sudbury river to Boston, and was carried across the Charles river and Waban valley by two fine bridges. As the supply of water did not prove sufficient for the growth of the city, a large reservoir was built, taking a large part of the town of Boylston, Mass., so that it was supposed the supply of water, when the valley was filled, would suffice for many years to come.

**Aqueous Humor**, the limpid watery fluid which fills the space between the cornea and the crystalline lens in the eye.

**Aqueous Rocks**, mechanically formed rocks, composed by matter deposited by water. Called also sedimentary or stratified rocks.

**Aquifoliaceæ** (ak-wē-fō-lē-as'ē-ī), hollyworts, an order of monopetalous plants, ranked by Lindley under his gentianal alliance. It consists of trees or shrubs with coriaceous leaves, small axillary flowers, and fleshy indehiscent fruit with from two to six seeds. The common holly, *ilex aquifolium*, is the type of the order. In 1846 Lindley estimated the number of known species at 110.

**Aquifoliaceæ**, a natural order of plants; the holly tribe. The species consist of trees and shrubs, and the order includes the common holly (*ilex aquifolium*) and the *I. paraguayensis*, or Paraguayan tea tree.

**Aquila** (ak-wē'la), a town of Italy, on the Pescara river, near the Apennines, 58 miles N. E. of Rome; is the capital of the province of Aquila, and is strongly fortified. It is noted for its manufactures of wax, linen, paper, and its trade in saffron, which is largely cultivated in the adjacent territory. Here are several churches of much interest. The town suffered much injury by earthquakes in 1688, 1703, and 1706. It has a citadel, constructed in 1534. Emperor Frederick II. built Aquila on or in the vicinity of the ancient site of Amiternum, about 1240. Pop. 19,027.

**Aquila**, a native of Pontus, flourished about 130 A. D., celebrated for his exceedingly close and accurate translation of the Hebrew Scriptures into Greek.

**Aquila, Kaspar**, a German Protestant theologian, born in Bavaria, Aug. 7, 1488; assisted Luther in the translation of the Old Testament; became pastor at Saalfeld in 1527; was outlawed by Charles V. in



## Aquileja

1548; fled the country; and after 1552 returned to Saalfeld, where he died Nov. 15, 1560.



KASPAR AQUILA.

**Aquileja** (äk-il-ä'yä), **Aglar**, or **Aquileia**, an old town of Austria, 22 miles W. N. W. of Trieste. It is in the shore provinces, near the Gulf of Venice. Before the fall of the Roman empire, it was the great emporium of trade between the north and south of Europe, and was often called the "Second Rome." Cæsar Augustus frequently resided here, and several councils of the Church, the first in 381, were held here. In the 6th century, the title of Patriarch was taken by the bishops of Aquileja, who assumed second rank to the Pope. The town was destroyed by Attila in 452, when the inhabitants numbered 100,000. Pop. about 2,000.

**Aquinas, Thomas** (ak-wī'nas,) or **Thomas of Aquino**, the prince of scholastic theologians, was of the family of the Counts of Aquino, and was born about 1226, in the castle of Rocca Secca, near Aquino, a small town half-way between Rome and Naples. He received the rudiments of his education from the Benedictine monks of Monte-Casino, and completed his studies at the University of Naples. A strong inclination to solitude and the religious life determined him, against the will of his family, to enter (1243) the order of Preaching Friars founded by St. Dominic, who had been dead 22 years. In order to frustrate the attempts of his mother to remove him from the convent, he was sent away from Naples, first to Rome and then to Paris; but his brothers took him by force from his conductors, and carried him to the paternal castle. Here he was guarded as a prisoner for two years, when, by the help of the Dominicans, he contrived to escape, and went through France to the Dominican Convent at Cologne, in order to enjoy the instructions of the famous Albertus Magnus. According to another account, he owed his release from confinement to the interference of the Em-

## Aquinas

peror and the Pope. At Cologne he pursued his studies in such silence that his companions gave him the name of the "Dumb Ox." But Albert is said to have predicted "that this ox would one day fill the world with his bellowing." In 1248, being 22 years of age, he was appointed by the general chapter of his order to teach at Cologne, together with his old master, Albert. He now began to publish his first works, commentaries on the ethics and the philosophy of Aristotle. In 1252 he was sent to Paris. His masterly application of this philosophy to the systematizing of theology, soon procured him a distinguished reputation. It was not, however, till 1257 that Aquinas and his friend St. Bonaventura, the Franciscan, obtained their degree of doctor, as the University of Paris, under the influence of William de St. Amour, was hostile to the mendicant friars. He vindicated the principles of these orders in an important work; and, in a disputation in presence of the Pope, procured the condemnation of the books of his adversaries. He continued to lecture with great applause in Paris, till Urban IV., in 1261, called him to Italy to teach in Rome, Bologna, and Pisa. It was at this time he composed most of his great works.

Even during his life, Aquinas enjoyed the highest consideration in the Church. His voice carried decisive weight with it; and his scholars called him the "Angel of the Schools," or "Angelie Doctor." A general chapter of Dominicans in Paris made it obligatory on the members of the order to defend his doctrines. Both Urban IV. and his successor, Clement IV., who were much attached to Aquinas, pressed upon him the highest ecclesiastical dignities in vain. So great was his modesty, and his love of poverty and study, that he refused the Archbishopric of Naples. The works of Aquinas are all written in Latin. The most important of them is the "Summa Theologiæ," which, though only professing to treat of theology, is in reality designed to form a complete and systematic summary of the knowledge of the time. As all things proceeded from God, every branch of knowledge was regarded by Aquinas and the schoolmen generally as a part of the knowledge of God, which man can not hope to comprehend completely.

Like most of the other scholastic theologians, he had no knowledge of Greek or Hebrew, and was almost equally ignorant of history; but his numerous writings display an intellectual power of the highest order. He gave a new and scientific foundation to many doctrines of his Church, especially that of transubstantiation. He also treated Christian morals according to an arrangement of his own, and with a comprehensiveness that procured him the title of the "Father of Moral Philosophy." The defi-



niteness, clearness, and completeness of his method of handling theology were such that his "Summa Theologiæ," which may be said to be the first attempt at a complete theological system, remains to this day substantially the standard authority in the Roman Church. Another important work of Aquinas is his "Summa Contra Gentiles," which deals chiefly with the principles of natural religion. His commentaries on Scripture and devotional treatises also have a high reputation. His influence on the theological thought of succeeding ages was immense. At the Council of Trent, the "Summa" was honored with a place on the table by the side of the Bible. It was at Bologna that he began this, his greatest work, by which his name will always be connected, but which he never lived to complete. A legend tells how, when engaged in fervent prayer, regarding this book, he heard the words from his crucifix: "Thou hast written well of Me, Thomas: what reward dost thou ask?" and he answered, "None other but Thyself, O Lord." On Dec. 6, 1273, he was writing at Naples the 90th question of the third part of the "Summa," when weakness of health compelled him to break off his studies. But Gregory X., who had called a general council to effect the union of the Greek and Latin Churches, summoned Aquinas to defend the papal cause at Lyons, where the council was to meet on May 1, 1274. He set out, though suffering from fever, and was surprised by death on the road at the Cistercian abbey of Fossa-Nuova, March 7, 1274. All Europe mourned his loss. Miracles were said to be wrought at his funeral. Universities, religious orders, and princes contended for the honor of possessing his body. It was finally bestowed by the Pope on Toulouse, where it was received by 150,000 persons, headed by Louis, Duke of Anjou. Aquinas was canonized by John XXII. in 1323, and proclaimed a "Doctor of the Church," by Pius V. in 1567.

The only scholastic theologian who in any degree rivaled Aquinas in his own age, was the so called "Subtle Doctor," Duns Scotus, of the order of St. Francis. The Franciscans naturally followed Scotus, and the Dominicans Thomas, and henceforward medieval theologians were divided into two schools, Scotists and Thomists. The divergencies which penetrate more or less every branch of doctrine depend upon the different systems of metaphysics or scholastic philosophy upon which the theologies were based. The differences concerned the idea of God, the operations of grace and of justification, the mode in which the sacraments take effect, etc. Popularly, Scotism is best known for its advocacy of the Immaculate Conception of Mary, and for the doctrine, with which it is remotely connected, that the Incarnation would have taken place (though of

course without suffering or death) if Adam had not sinned. The more recondite peculiarities of Scotist theology and philosophy are now almost entirely confined to the theologians of the Franciscan order. On the other hand, Thomism represents, with few exceptions, the general teaching of the Catholic Church. The school is now not so much opposed by the Scotists as by the eclectic school of Jesuit theology. The first complete edition of Aquinas' works was published in 17 volumes folio, at Rome, in 1570. They have been frequently reprinted, the latest and best edition having been begun in 1883, under the auspices of Leo XIII. The most convenient edition of the "Summa" is that of Migne (four volumes). St. Thomas was the author of the famous "Pange Lingua," and other eucharistic hymns of the Roman Breviary. (See the "Life of St. Thomas of Aquin," by the Very Rev. R. B. Vaughan, O. S. B., and works by Otten, Lecoultre, and Eucken.)

**Aquitania** (ak-wē-tā'nē-a), later **Aquitaine**, a Roman province in Gaul, which comprehended the countries on the coast from the Garonne to the Pyrenees, and from the sea to Toulouse. It was brought into connection with England by the marriage of Henry II. with Eleanor, daughter of the last Duke of Aquitaine. The title to the province was for long disputed by England and France, but it was finally secured by the latter (1453).

**Arabah**, a deep, rocky valley or depression in Northwestern Arabia, between the Dead Sea and Gulf of Akabah, a sort of continuation of the Jordan Valley.

**Arabella Stuart**, commonly called the **LADY ARABELLA**, was the only child of Charles Stuart, Earl of Lennox, younger brother to Henry, Lord Darnley, the husband of Mary, Queen of Scots. She was, therefore, cousin-german to James I., to whom, previously to his having issue, she was next in the line of succession to the crown of England, being the granddaughter of Henry VII. by the second marriage of his eldest daughter Margaret. Her proximity to the throne was the source of her misfortune. Elizabeth, for some time before her decease, held the Lady Arabella under restraint, and refused the request of the King of Scotland to give her in marriage to the Duke of Lennox, with a view to remove her from England. The detection of a plot of some English nobles to set aside James in favor of Arabella, of which she was altogether innocent, ultimately proved her destruction: for, although left at liberty for a time, when it was afterward discovered that she was secretly married to the grandson of the Earl of Hertford, both husband and wife were committed to the Tower. After a year's imprisonment, they contrived to escape, but the unhappy lady was retaken. Remanded to the Tower,



## Arabesque

the remainder of her life was spent in close confinement. She died in 1615, aged 38 years.

**Arabesque** (ar-a-besk'), a style of ornamentation in which are represented men, animals (the latter consisting of mythic as well as actual forms); plants, with leaves, flowers, and fruit; mathematical figures, etc.; the whole put together in a whimsical way, so that, for instance, the animals not merely rest upon the plants, but grow out of them like blossoms. There are three kinds



ARABESQUE ARCHWAY.

of arabesque: (1) (and oldest), that of the Romans, without the animals. They occur in the mural paintings at Pompeii, Herculaneum, and other places. (2) That of the Arabs, also without the animals. This is well seen in the Alhambra. (3) The Christian arabesque, with the figures introduced. It appears in illuminated medieval manuscripts and elsewhere.

**Arabia**, the extreme S. W. part of Asia, called by the natives Jezîret el Arab, that is, the Peninsula of the Arabs; and by the Turks and Persians, Arabistan. Arabia is encompassed on three sides by the sea, namely, on the N. E. by the Persian Gulf, on the S. E. by the Indian Ocean, and on the S. W. by the Red Sea. Its extreme S. point, Ras-Arah (the Cape St. Anthony of some maps), lies in lat.  $12^{\circ} 35' N.$ ; lon.  $44^{\circ} 4' E.$  Thirty miles to the W. of it are the Straits of Bab-el-Mandeb. The extreme E. point of Arabia, Ras-el-Had, stands in lat.  $22^{\circ} 23' N.$ ; lon.  $60^{\circ} 5' E.$  A line drawn from the head of the Gulf of Suez to that of the Persian Gulf, and marking the limits of the Arabian peninsula on the N., will be found to run nearly in the 30th parallel of N. latitude, but a portion of what is considered Arabia extends N. of this. Arabia includes also the peninsula of Sinai, between the Gulf of Suez and that of Akabah. The whole area of the vast country thus described does not probably fall much short of 1,000,000 square miles.

## Arabia

*Divisions.*—According to Ptolemy, ancient Arabia consisted of Arabia Petræa, Arabia Deserta, and Arabia Felix, a division which has likewise been followed in modern times, but which is both founded on erroneous principles, and unwarranted by the example of the inhabitants of the country. The name of Arabia Felix, or Arabia the Happy, is derived from an incorrect translation of the word *Yemen*, which does not signify happy, but the country lying to the right of Mecca, in the same manner as the Arabic term for Syria, Al-Sham, denotes the country lying to the left of that city. Arabia Petræa likewise has been erroneously translated Stony Arabia, the epithet Petræa having been bestowed on it by Ptolemy, from the once flourishing city of Petra.

The first of the divisions met with in proceeding down the Red Sea is Hejaz, which, as it includes the sacred cities Mecca and Medina, is always set forth conspicuously by Arab geographers. It extends a short way within the mountain barrier, and terminates in the S. in about lat.  $20^{\circ} N.$  Next comes Yemen, which, according to some writers, embraces the whole of South Arabia; but the name is now generally used in a confined sense, Yemen proper occupying the S. W. part of the peninsula, and comprising a Tehama or maritime lowland on the shores of the Red Sea, with an elevated inland district of considerable breadth. It contains the towns of Sana and Mocha. Appertaining to Yemen is Aden, now a free port in the hands of the British. Next Yemen, on the E., is Hadramaut, the W. portion of which is a desert five days' journey in length. The limits of this province are, however, variously assigned by authors, some extending the name to almost the whole of the S. E. coast, while others confine it to a district only 100 miles in length. Beyond Hadramaut, in the latter narrower sense, lies Mahrah, beyond which again extends the principality of Shejer or Shehr, at the E. termination of which, near the coast, is the populous district of Dhofar, which has occasionally figured as an independent State. At the E. angle of the peninsula is situated Oman. On the S. shores of the Persian Gulf is Bahrein, from which, toward the head of the gulf, extends the maritime district of Hajar, while at a short distance S. W. in the interior lies the fertile district of El-Ahsa, the name of which is sometimes also given to the coast. The interior of Arabia, from Hejaz and Yemen across to the vicinity of the Persian Gulf, is comprised by Arab geographers, under the single name of Nejed. Toward the N. W. and N. are the deserts of Sinai, and those of Sham, Jezîreh, and Irak (Syria, Mesopotamia, and Babylon). The two most populous districts are Yemen and Oman.



*Climate.*—The climate of Arabia resembles that of Africa. The mountains obstruct the mitigating influence of the sea breeze; scorching aridity and barrenness characterize both high and low grounds, and the date palm is often the only representative of vegetable existence. There are even districts which in the course of the year are refreshed by only one shower of rain, while a sky almost perpetually unclouded overspreads the sterile plains. The short rainy season, which, in consequence of the shifting winds prevailing in the Red Sea, visits the W. coasts in our summer months, fills with water, but only periodically, the depressions in the surface or *wadis*, and a winter marked by slight frosts occurs in the table-lands of the interior and N. E. The simoom occasionally blows during the hot season, though only in the N. districts.

*Productions.*—Arabia is destitute of large forests, and extensive plains of green turf have their place supplied by steppe-like tracts, which, however, covered with aromatic herbs, afford excellent pasture to noble breeds of horses. The terrace portions of the country, which enjoy a more temperate climate, exhibit a greater luxuriance of vegetation. Here the date and cocoanut palms and various excellent sorts of fruit flourish along with durra (a species of millet which is here generally cultivated instead of European corn), the finest coffee in the world (the staple commercial product of the country), and many aromatic plants and substances, such as gum-arabic, benzoin, mastic, balsam, aloes, myrrh, frankincense, etc. There are also cultivated in different parts of the peninsula, according to the nature of the soil and climate, beans, rice, lentils, tobacco, melons, saffron, colocynths, poppies, olives, the kath bush (*Catha* or *Celastrus edulis*), the leaves of which are in general use, like those of the coca in Peru, as an excitant, sesame, the castor oil plant, etc. In its fauna also, as corresponding with the desert nature of the country, Arabia presents much of an African type. Sheep, goats, and oxen supply man's immediate domestic and personal wants; the horse and camel are his faithful attendants on his wide peregrinations; asses and mules, of a stronger make and better appearance than those of Europe, are common in the mountainous districts; the desert is inhabited by gazelles and ostriches hurrying rapidly from oasis to oasis; and the lion, panther, hyena, and jackal crouch in ambush for the passing prey. Monkeys, pheasants, and doves are the peaceful occupants of the fertile districts, in which, however, locusts frequently commit tremendous havoc. There are several species of serpents and lizards, and scorpions and poisonous spiders are numerous. Fish and turtles abound on the coasts, and pearl oysters in the Persian

Gulf. Among mineral products may be mentioned saltpeter, mineral pitch, and petroleum, which are found in the interior highlands, salt, sulphur (in Hadramaut), and several precious stones, as the carnelian, agate, and onyx. Iron, copper, and lead are far from abundant, and the country is also poor in the precious metals.

*Population.*—The population of Arabia has been estimated by some at 12,000,000, by others at no more than 4,000,000. The former number is certainly too high, and it is believed that between 5,000,000 and 6,000,000 is near the truth. The Arabs present, as a nation and as individuals, much that is peculiar both in their mental and physical development. They are of middle stature, of a powerful make, and have a skin of a brownish color. Their features express dignity and pride; they are naturally active, intelligent, and courteous; and their character is marked by temperance, bravery, and hospitality, along with a strong propensity for poetry. On the other hand, they are revengeful in their disposition and predatory in their habits. The women have the entire education of the children in their early years. The most fortunate events in the estimation of an Arab are the birth of a camel, a mare of noble breed bringing forth a foal, or a triumph achieved by a poet. The first religion of the Arabs, the worship of the stars, was supplanted by the doctrines of Mohammedanism, which succeeded rapidly in establishing itself throughout Arabia. Besides the two principal sects of Islam, the Sunnites (the most numerous) and the Shiites (on the E. coast), there also exists, in very considerable numbers, a third sect, the Wahabees, which arose in the latter half of the 18th century, and to which the Bedouins of Nejed belong. There are also numerous Jews, who dwell among the Arabians, and are chiefly employed in trade.

The whole of the W. coast, comprising the districts of Hejaz and Yemen, and in quite recent times part of the E. coast, namely the republic of Koweit at the head of the Persian Gulf, and the district of El Ahsa, are more or less under the suzerainty of the Turks. The area of the W. strip is about 200,000 square miles in extent, and has a population of about 1,130,000; while the E. strip has an area of about 31,000 square miles and a population of about 200,000. Even in these districts, however, the chief offices of government are performed by the chieftains of the small territories into which the districts are subdivided. The most extensive districts politically united in the rest of Arabia are the kingdoms of Oman and Nejed, the former with an area of 81,000 square miles, and a population of 1,598,000; the latter (the kingdom of the Wahabees) with an area of perhaps



200,000 square miles, and a population of about 1,219,000.

The mode of life of the Arabs is either nomadic or settled, or in other words, they either live in tents and derive their subsistence from the rearing of cattle, wherever sufficient pasture is obtainable, and from the transport of caravans through the desert; or from the pursuits of agriculture and commerce. The nomadic tribes in Arabia are termed Bedouins, Beduins, or Bedawins; those following settled occupations, Hadji and Fellahs. A considerable trade, partly overland, partly maritime, is carried on, chiefly in coffee, dates, figs, spices, and aromatic substances of various kinds, though the present amount of traffic is scarcely a shadow of what it was in the times previous to the discovery of the passage by the Cape of Good Hope. Commerce is partly in the hands of foreigners, among whom the Jews and Banians are the most numerous. The latter are a tribe of Indian merchants, who, however, only remain long enough in the country to enable them to return with wealth to their own land. At present the trade of Arabia is almost exclusively confined to exports of raw material or imports of foreign manufactures, domestic industry being scarcely able to supply the most necessary articles of consumption, and the inhabitants are thus rendered dependent on foreign nations for the greater portion of their manufactured commodities. The period of intellectual development among the Arabs is now indeed long past its zenith, but it does not appear yet to have sunk so low as is often assumed. Even in the desert children are taught to read, write, and cipher, and in the towns there are higher schools for satisfying the taste for scientific pursuits. The political constitution of the Arabs is patriarchal, and is based on a love of freedom. The titles of the chiefs of the tribes are emir, sheikh, or imam, whose functions appear in general to be limited to the command of the army in war, the collection of tribute, and the administration of law by the eadis or judges.

*History.*—The history of the Arabs previous to Mohammed is obscure, and owing to their slight connection with the rest of the world of little interest. The evidence of language, tradition, and other things, establishes the fact that Arabia must have been settled at a very early date by two branches of one race. One of these branches inhabits the S. and E. of the peninsula (Yemen, Hadramaut, and Oman), and considers itself as forming the "pure" Arabs, while the other branch it gives the name of Mostareb, or "Arabified." The oldest traditions regarding the origin of the former branch point to an immigration from Africa, which took place about the S. W. corner of the peninsula, and the physical appearance and structure of the Southern Arabs, the

remnants of their dialect (which is now superseded by that of the N. branch), and various institutions and customs prevailing in the parts of Arabia inhabited by them, all confirm the notion that they were originally identical with the nearest inhabitants of Africa. The N. branch, on the other hand, though bearing an unmistakable affinity with the S., shows (in its language and other respects) more traces of Asiatic than African influence.

The Arabs of the S. branch were the first to attain to any considerable political power. A kingdom belonging to this branch is said to have existed in the S. for upward of 2,000 years, embracing when in a flourishing condition, the whole of the S. half of the peninsula, and sometimes extending its boundaries by conquest very much farther. There is no doubt that there actually was such a kingdom, called the kingdom of Yemen, and having its capital first (it is said) at Mareb, and afterward at Sana, both in the district of that name; but how long that kingdom subsisted cannot be determined. Its kings belonged to the Himyarite dynasty, but this designation Himyarite is sometimes applied by Arab writers to the ruling classes of the S. branch, and sometimes to the whole branch. The Yemenite kingdom was rendered subject by the Abyssinians for upward of 70 years in the 6th century of the Christian era, during which period Christianity was proclaimed in the land. Ultimately the heir to the throne of the Himyarite dynasty was restored through the assistance of Chosroes, King of Persia (605 A. D.). but about 30 years later the kingdom was finally overthrown by the followers of Mohammed. Another Himyarite kingdom was that of Hira on the W. shore of the Lower Euphrates. It seems also to have extended at times to the region between the Euphrates and the Tigris, so as to give the name of Irak Arabi to that district. The dates given for the foundation of this kingdom are widely different. Its overthrow is placed in the 5th century of our era. In the 1st century of the Christian era the Himyarite kingdom of Ghassan was founded in Lower Syria and Hejaz. It lasted till the time of Mohammed. The last Himyarite kingdom that need be mentioned is that of Kindeh, which detached itself from that of Hira early in the 3d century, and lasted about 160 years. Its sway extended over Northern Nejed. The divided forces of the Arabs could not always successfully resist the Roman arms, and though their country was never completely reduced to the condition of a province, yet the princes in the N. at least lived in a state of dependence on the Roman emperors, and were regarded as their viceroys. In the S. the Romans had no influence. An expedition was fitted out against Yemen in the reign of Augustus (24 B. C.), but it



completely miscarried. With the decline of the Roman empire Arabia made vigorous struggles for independence, which could easily have been brought about by a union of the various tribes. But the Arabian peoples continued dispersed and broken, and passed many centuries in internal conflicts, during which the central highlands (Nejed) became the theater of those chivalrous contests so celebrated by the native poets. Christianity early gained many adherents in Arabia, though it did not succeed in entirely banishing the ancient worship of the stars. Several Christian bishoprics were established, subject to the metropolitan at Bozra, in Palestine. The town of Elhira, near the Euphrates, contained many Arabian Christians and convents, and the reigning king, Ennomân-ben-el-mondsir, became a convert to Christianity not long before the time of Mohammed. The conflict of the Arabs with Roman despotism was more especially the cause of attracting to their country numbers of Christian sects, among others the Monophysites and Nestorians, who sought a refuge from the persecutions to which they were subjected by the maintainers of orthodoxy throughout the East. Jews also were very numerous in Arabia after the destruction of Jerusalem, and even made some proselytes, chiefly in Yemen. The wide differences between the various sects produced in the minds of many an indifference to all the existing religions, and was probably one of the principal causes that the doctrines of Mohammed found so speedy an acceptance in Arabia.

With Mohammed a new phase commences in the history of the Arabian peoples, who are wont to designate respectively the periods before and after the appearance of the prophet as those of ignorance and knowledge. Mohammed belonged to the Mostareb, and among them to the tribe of Koreysh, which had occupied a position of great influence in Arabia since the beginning of the 5th century, when it managed by craft to obtain possession of the city of Mecca, which was not only a city of great commercial importance, but was regarded as sacred by the Arabs on account of its containing the Kaaba.

During the whole of the 6th century the Mostareb generally were increasing in power, and by the beginning of the 7th, when Mohammed had grown to manhood, they had absorbed the kingdom of Kindeh, and had extended their sway at the expense of those of Yemen, Hira, and Ghassan. By the time of Mohammed's death, in 632, his religion had acquired a firm hold in Arabia, and after that event his successors, acting on the commands of the Koran, began to spread it by force of arms beyond the bounds of the peninsula. The nation, now for the first time acting as a body, played for several centuries an important part on the

stage of the world's history, and advanced in a career of victory beyond its natural frontiers, to found empires in three quarters of the globe. The brilliant period of Arabian history, indeed, as regards foreign countries, came to a termination in Asia in 1258, on the fall of the caliphate of Bagdad, as also about the same time in Africa and Europe, in the latter of which the Moorish dominion was finally overthrown (in the kingdom of Granada in Spain) in the last decade of the 15th century; yet the epoch of the Arab sway must ever occupy a distinguished place in the intellectual history of mankind. The internal history of the country during its foreign conflicts presents little more than unimportant accounts of some Bedouin tribes, and the fortunes of the caravans, which made the annual pilgrimage to Mecca. In 1517 Turkey subjected Hejaz and Yemen, and received the nominal submission of the tribes inhabiting the rest of Arabia. The subjection of Hejaz has continued down to the present day, with a brief interval in the latter half of the 16th century, and another longer interval in the 19th century, when the Pasha of Egypt was dominant in Arabia; but Yemen achieved its independence in 1630, and maintained it till 1871, when the territory again fell into the hands of the Turks. In 1839 Aden, in Yemen, was occupied by the British.

In the E. Oman became virtually independent of the caliphs in the middle of the 8th century, and grew into a well-organized kingdom. In 1507, however, its capital, Maskat or Muscat, was occupied by the Portuguese, who were not driven out till 1651. Oman was temporarily subjugated by the Persians under Nadir Shah in the first half of the 18th century. They were expelled by Saood, who was made Imam of Oman, and under whom it extended its sway over part of the opposite coast of Persia as well as the islands lying between and over the coast of Zanzibar. Since 1867 the kingdom of Oman has been again confined to the mainland of Arabia. The appearance of the Wahabees about the middle of the 18th century is the first event since the time of Mohammed that affected Arabia generally. The moral effects of this event exercise still a powerful influence; the political were soon effaced by the ruler of the neighboring country of Egypt. Mehemet Ali, Pasha of Egypt, subdued the coast of Hejaz, as also several places on that of Yemen, and in 1818, by means of a great victory gained by Ibrahim Pasha, and the destruction of their capital city Derreyeh, put a stop to the further extension of the Wahabite power. He also expended large sums in the maintenance of his sway in Arabia, which secured to him the trade of the Red Sea. The events of 1840, however, in



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Syria, compelled him to concentrate his forces, and he soon found himself obliged, as thwarting the European line of policy, to renounce all claims to the territories lying beyond a line drawn from the Dead Sea to the Gulf of Akabah. The Hejaz thus again became immediately subject to Turkish sway. Turkey has since extended its rule not only over Yemen as already mentioned, but also over the district of El Ahsa on the Persian Gulf; but the extreme weakness of the Turkish empire scarcely warrants the expectation that its tenure of power in Arabia will last very many years longer.

*Language.*—The Arabic language belongs to the Semitic dialects, among which it is distinguished for its richness, softness, and high degree of development. By the spread of Islam it became the sole written language and the prevailing speech in all Southwestern Asia, and Eastern and Northern Africa, and for a time in Southern Spain, in Malta, and in Sicily; and it is still used as a learned and sacred language wherever Islam is spread among people who in daily life speak Indian, Persian, or other languages. The study of Arabic is important not only on account of the wide area over which it is still spoken and the extensive literature it contains, but also because it is almost an indispensable preliminary to the study of some of the other languages of the East. Almost a third part of the Persian vocabulary consists of Arabic words, and there is the same proportion of Arabic in Turkish. A scientific treatment of the Hebrew language first became possible through comparing it with the Arabic. The characters originally used in writing the Arabic language were borrowed from the old Syrian Estrangelo alphabet, which, however, was very inadequate for the purpose, having only 16 signs for the 28 Arabic consonants. This alphabet is now superseded by the Neski. As in all Semitic languages (except the Ethiopic) it is read from right to left. There are valuable Arabic grammars by Erpen (1613), De Sacy (1831), Ewald, Caspari, Wolff (2d ed. 1867); and in English by Wright (based on that of Caspari, but practically a new work, London, 1874–1875), and Palmer (London, 1874). The great standard Arabic-English dictionary is that of Ed. W. Lane (continued by his nephew, Lane Poole, a most extensive work). Other valuable works are Richardson's "Persian-Arabic-English Dictionary"; Newman's "Dictionary of Modern Arabic" (1871); Badger's "English-Arabic Dictionary" (1881); and Salmoné's "Arabic-English Dictionary" (1890).

*Literature.*—Of the first cultivation of the literature of this country we have but few accounts. That poetry early flourished in Arabia may be inferred from the character of the inhabitants, who are at the pres-

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ent day much given to poetry. In the fairs of Mecca and (from the 5th century after Christ) at Okadh, poetical contests were held, and the poems to which the prize was awarded were written on byssus in letters of gold, whence they were called *Modsahabat* (gilt), and hung up on the wall of the sacred temple containing the kaaba at Mecca, on which account they also got the name of *Moallakat* (hung up). The collection of the Moallakat contains seven poems by seven authors—Amr-ul-kais, Tarafa, Zohair, Lebid, Antar, Amr-ben-Kelthum, and Hareth. They are distinguished by deep feeling, lofty imagination, richness of imagery and sentiment, national pride and love of freedom. Many other poems belonging to the time before Mohammed, some of equal age with those of the Moallakat, are also preserved in collections. The influence of Mohammed gave a new direction to Arab poetry. The rules of faith and life which he laid down were collected by Abubekr, first caliph after his death, corrected and published by Othman, the third caliph, and constitute the Koran. The warlike times of Mohammed and the first caliphs, however, were not favorable to the cultivation of literature. The progress of the Arabs in the arts and sciences may be said to have begun with the government of the caliphs of the family of the Abassides, A. D. 750, at Bagdad.

Here Haroun al Rashid (786–808) invited learned men from all countries and paid them princely salaries. He caused the works of the most famous Greek writers to be translated into Arabic and spread abroad by numerous copies. Under the government of Al Mamun (813–833) excellent schools were established at Bagdad, Bassora, Bokhara, Cufa, and large libraries at Alexandria, Bagdad, and Cairo. The Caliph Motassem, who died A. D. 842, was of the same disposition, and while literature was thus favored by the dynasty of the Abassides in Bagdad, it received not less encouragement from that of the Ommiades in Spain. What Bagdad was for Asia the university at Cordova was for Europe, where, particularly in the 10th century, the Arabians were the chief pillars of literature. At a time when learning found scarcely anywhere else a place of rest and encouragement, the Arabians employed themselves in collecting and diffusing it in the three great divisions of the world. In Spain were established numerous academies and schools, which were visited by students from other European countries; public libraries were collected, one of them said to contain 600,000 volumes; and important works were written on geography, history, philosophy, medicine, physics, mathematics, and especially on arithmetic, geometry, and astronomy. There are a number of terms still in use, such as almanac, algebra, alcohol,



azimuth, zenith, nadir, which were borrowed originally from the Arabs.

Most of the geography in the Middle Ages is the work of the Arabians. Among their chief writers on geographical subjects are El-Istaklri ("Liber Climatum," edited by Möller, Gotha, 1839), Abu-Ishak-al-Faresi, Ibn-Haukal, who wrote about 815, "El-Edrisi," 1150 (French translation published by Jaubert in 1836 at Paris), Yakuti, who died in 1249, and Abulfeda; and much that the most renowned among them, Abulfeda and Edrisi, have written, is still useful and important in regard to historical geography. Even more important than the geographical text-books are the descriptions of countries which were written by Arab travelers; such as those by Ibn-Foslan, who traveled in Russia in the 9th century; by Mohammed ibn-Batuta, who traveled in Africa, India, China, Russia, etc., in the 13th century; and by Leo Africanus, who traveled in Africa and Asia in the 15th century.

The Arabian historians since the 8th century have been very numerous, though they have not yet been long enough known to European scholars to enable them to derive full advantage from them. The oldest known historian is Hesham Ben-Mohammed Al-Kelbi (died 819). Several other historians lived in the same century. Masudi, the Persians Tabari and Hamsa of Ispahan, and the Christian patriarch Ibn el Batrik or Eutychius of Alexandria, were the first that attempted universal histories. These were followed by Abulfaraj and George Elmakin, both Christians, Abulfeda, Nuvairi, Alfachri, and others. Native historians wrote on the history of the Arabs in Spain and in Mauretania; others, such as Abdulatif and Makrisi, wrote on the history of Egypt; others compiled biographical dictionaries or wrote lives of individuals. The style of most of the historians is simple and void of ornament. Indeed their histories are little more than voluminous chronicles.

The philosophy of the Arabians was of Greek origin and derived principally from that of Aristotle, who through them became known in Spain and thence in all the W. of Europe, having been translated from Arabic into Latin. Hence the origin of the scholastic philosophy may be traced to the Arabians. The Arabians seem to have become acquainted with the works of the Greek philosophers in Bagdad, where a knowledge of them was disseminated by the Nestorian Christians who had been expelled from Syria in the 5th century and found refuge and patronage in Persia. During the 8th and 9th centuries numerous versions of the principal works of Aristotle were made into Syriac and thence into Arabic; and once Aristotle had been introduced to their knowledge the Arabian philosophers both in the E. and the W. did little else than ad-

vance nearer and nearer to a faithful interpretation of that master. Of their philosophical authors the most celebrated are Alfarabi (died 950), who wrote on the principles of nature; Ibn Sina, or Avicenna, who was born about 980 and died A. D. 1037, and, besides other philosophical writings, was the author of a treatise on logic, physics, and metaphysics, and of a commentary on the works of Aristotle; Alghazzali (1058-1111), who wrote a work attacking all heathen philosophical systems; and in Spain Avicbron (died 1070), a Jew, the same with Solomon ben Gebirol; Ibn Badja, known to Europeans as Avempace (died 1138); Ibn Tofail (died 1190); and (one of the greatest of them all) Ibn Roshd, or Averroes (1126-1198). Of these, Avicenna was by far the most important, and his influence on Western thought was considerable.

Nearly all the Arabian philosophers were at the same time physicians; for the physical sciences, including medicine, were not then separated from philosophy. At Jondisabur, Bagdad, Ispahan, Firuzabad, Bokhara, Cufa, Bassora, Alexandria, and Cordova, from the 8th to the 11th century medical schools were instituted, and with the devoted study bestowed on this branch of science the nation could not fail of making important advances in it, though, in reality, they were here also dependent on the Greeks. Anatomy made no progress among them, because the Koran expressly prohibited dissections. To their famous writers on medicine belong Aharun (who first described the smallpox), Jahiah Ben Serapion, Jacob Ben Ishak Alkendi, John Mesve, Rhazes, Ali Ben Abbas, Avicenna (who published the "Canon of Medicine," for a long time the best work of the kind), Ishak Ben Soleiman, Abulcasim, Ibn Zohar, Averroes (the author of "A Compendium of Physic").

Mathematics the Arabians enriched, simplified, and extended. Mohammed Ben Musa and Thabet Ben Korrah particularly distinguished themselves in this department. Nassireddin translated the "Elements" of Euclid. Jeber Ben Afla wrote a commentary on the "Trigonometry" of Ptolemy. Astronomy was especially cultivated, there being famous schools and observatories at Bagdad and Cordova. As early as A. D. 812 Alhazen and Sergius had translated into Arabic the "Almagest" of Ptolemy, the first regular treatise on astronomy. Albatani, in the 10th century, noted the advance of the line of the earth's apsides and the obliquity of the ecliptic. Alpetragius wrote a theory of the planets. Geography was treated scientifically, in connection with mathematics and astronomy, particularly by Abulfeda.

The Arabian scholars devoted much time to grammar and rhetoric, much attention



being paid to expounding the Koran, and in preparing works dealing with it.

Much as the severer sciences were cultivated the genius of the people for poetry was not fettered. After the 9th century the Oriental peculiarities of Arabian poetry became more and more strong; the tone grew mystical and extravagant and the language lost its purity. Motenabbi deserves to be noticed for his tender elegies in a classic style; Abu Ismael Tograi, vizier of Bagdad, for his elegies and poems; Hariri for his history of an unscrupulous but amusing vagabond in his work entitled "Mekammat," admirably translated into German by Rückert, into English by Chapellon and Preston; Ibn-Arabshah for his narrative tales, etc.; Asmai for his great heroic romance, "Life of Antar." The dramatic excepted there is no sort of poetry which the Arabians have left unattempted. There is no doubt that they had by this means a powerful effect on modern European poetry, for no small share of the romantic poetry of the Middle Ages belonged to the Arabians. The tales of fairies, genii, enchanters, and sorcerers in particular, passed from the Arabians to the Western poetry. Some of the books most widely read in the Middle Ages, such as "The Seven Wise Masters" and the "Fables of Pilpay," found their way into Europe through the instrumentality of the Arabs. To this rich and many-sided intellectual life among the Arabs in the Middle Ages the intellectual poverty of the 19th and past two or three centuries offers a striking contrast. Arab literature now scarcely offers anything worthy of notice. Learning is chiefly confined to the production of commentaries and scholia, discussions on points of dogma and jurisprudence, and grammatical works on the classical language. Among authors who have written to a certain extent under the influence of European culture, we must mention Michael Sabbagh of Syria ("The Carrier Pigeon," Arabic and French, Paris, 1805); Sheikh Refaa of Cairo ("The Broken Lyre," Paris, 1827; "Manners and Customs of the Europeans," Cairo, 1834); Nasif-Effendi of Beyrout, who produced a work of the same character as that of Hariri (Beyrout, 1856); and Ahmed Faris (died, 1887), journalist and miscellaneous writer. Translations of modern European works (Jules Verne's and others) are numerous. A number of periodicals are published in Arabic.

**Arabian Architecture.** See ARCHITECTURE.

**Arabian Nights' Entertainments,** or "The Thousand and One Nights," a celebrated collection of Oriental tales, which have, since their introduction to the civilized world, become the delight of all who peruse them. This collection, which had long been famous throughout the East, was

brought to the notice of Europeans by the translation of Antoine Galland, a great French Orientalist, in 1704. It speedily became translated into the other principal European languages, fixed popular admiration, and to this day retains its place in popular literature. The scheme of its conception is so well known that it would be needless here to relate it. These tales, though fabulous in substance, possess in the most eminent degree the characteristic imagery and poetical versatility of the Orientals. Numerous imitations have at times appeared, which but feebly compare with the original; perhaps the best of modern paraphrases is that of Oehlenschläger's "Aladdin," which is founded on one of the well known tales of the original series. The best editions are by Lane, the English Orientalist, and Burton.

**Aracacha, or Arracacha** (ar-a-kä'cha), a genus of umbelliferous plants of Southern and Central America. The root of *A. esculenta* is divided into several lobes, each of which is about the size of a large carrot. These are boiled like potatoes and largely eaten in South America.

**Aracan** (ar-a-kan'), the most northern division of Lower Burma, on the Bay of Bengal; area, 14,526 square miles; pop. (1891) 669,540. It was ceded to the English in 1826, as a result of the first Burmese war.

**Aracari**, the name given in Brazil to several scansorial birds ranked as aberrant members of the *rhamphastidæ*, or toucan family. They are placed under *pteroglossus* and its allied genera. They have smaller bills than the toucans proper, and are of brighter colors, being generally green, with red or yellow on their breasts.

**Araceæ** (ar-as'cē-i), an order of endogenous plants having for their inflorescence a spadix placed within a spathe. They have neither calyx nor corolla. The leaves are frequently cordate. The fruit is succulent, with many seeds. They are acrid in character, and often poisonous. The *caladium sequinum*, or dumb cane of the West Indies and South America, when chewed, causes the tongue so to swell as to cause temporary dumbness. In 1847, Dr. Lindley estimated the known genera at 26, and the species at 170. There is one species known as the *arum maculatum*.

**Arachidic Acid** ( $C_{20}H_{40}O_2 = C_{19}H_{39}:COOH$ ), a monatomic fatty acid, obtained by the saponification of the oil of the earth nut (*arachis hypogæa*). It crystallizes in minute scales, which melt at 75°. It is soluble in boiling alcohol and in ether.

**Arachis**, a genus of leguminous plants belonging to the sub-order *cæsalpinicæ*. The *A. hypogæa*, the underground arachis (Greek *hypogeios* = subterranean), is thus called



because the legumes are produced and matured beneath the soil. The plant is believed to have come originally from Africa, but it is now cultivated in the warmer parts both of Asia and America. The legumes are eatable. The seeds have a sweet taste, and furnish a valuable oil used for lamps and as a substitute for olive oil. In South Carolina they are employed for chocolate.

**Arachnida**, the class of animals which contains spiders, scorpions, and mites. It belongs to the articulata or annulosa, and the sub-class arthropoda, and is appropriately placed between the crustacea on the one hand, and the insecta on the other. The highest crustacea have 10 feet, the arachnida 8, and the insecta 6. The arachnida are wingless, have no antennæ, breathe by means of tracheal tubes or pulmonary sacs performing the function of lungs. As a rule, they have several simple eyes. They have no proper metamorphosis. They live in a predatory manner. Cuvier divided the class into two orders, *pulmonariæ* and *tracheariæ*: that is, those breathing by lungs and those breathing by tracheæ. The former include the spiders proper and the scorpions; the latter, the acari (mites) and their nearer and more remote allies. Huxley separates the arachnida into six orders: (1) *Arthrogastra*, including scorio, chelifer, phrynus, phalangium, galeodes, etc.; (2) *arancina*, or spiders; (3) *acarina*, or mites and ticks; (4) fresh-water *arctisca* or *tardigrada*, called water-bears; (5) *pycnogonida* (marine animals); and (6) *pentastomida* (parasites).

**Arachnoid Membrane**, one of the three coverings of the brain and spinal cord, is situate between the dura-mater and the pia-mater. It is non-vascular, transparent, and remarkably thin. Its outer surface, next the dura mater, is free, smooth, and glistening; its inner surface is connected to the pia mater by numerous delicate threads, which traverse the space (sub-arachnoid) between the two membranes. Some anatomists regard the space between arachnoid membrane and dura-mater (sub-dural) as a serous cavity bounded by a serous membrane, of which the arachnoid membrane is its visceral layer, and the inner free shining surface of the dura mater its parietal layer. The sub-arachnoid space contains a fluid named cerebro-spinal, which in health varies in amount from two drachms to two ounces.

**Arack**, or **Arrack**, a spirituous liquor manufactured in the East Indies from a great variety of substances. It is often distilled from fermented rice, or it may be distilled from the juice of the cocoanut and other palms. Pure arack is clear and transparent, with a yellowish or straw color, and a peculiar but agreeable taste and smell; it contains at least 52 to 54 per

cent. of alcohol. In India, where the word is continually used by Anglo-Indians and others, arack is made by double distillation chiefly from "todi" or "toddy," a sweet juice derived from the unexpanded flowers of various palm-trees, and notably of the cocoanut (*cocos nucifera*). It is manufactured also from the succulent flowers of the bassia genus of trees, from rice, and from other vegetable products. Liberty to sell it in the several districts of India is farmed out to native contractors at a stipulated sum, notwithstanding which it is obtainable at a very cheap rate, which leads to a good deal of drunkenness both among European soldiers in the East, and the low caste natives of India. The beverage arack may be imitated by dissolving 40 grains of flowers of benjamin in a quart of rum. Dr. Kitchiner calls this "Vauxhall nectar."

**Arad**, capital of a district in Eastern Hungary; on the right bank of the Maros, an affluent of the Theiss; pop. (1900) 56,260, including many Jews. It is an important railway center, and is 95 miles S. E. of Budapest, and 74 miles E. of Szegedin by rail. It carries on a large trade in corn, spirits, wine, and tobacco, and is one of the greatest cattle markets in Hungary. During the 17th century it was often captured, and at last destroyed by the Turks. During the Revolutionary War of 1849 it was occupied for a time by the Austrians, who capitulated to the Hungarians in July. In August Arad was surrendered to the Russians by Görgei; many of the prisoners were massacred; and in October, 13 Hungarian officers were executed here by order of the infamous Haynau. New Arad, on the other side of the river, has over 6,000 inhabitants, including many Germans.

**Araf**, the Purgatory of Islam, the place between Paradise and Hell. Its position has not been defined with the usual exactness of Mohammed, but it is undoubtedly a place of purification by fire.

**Arafat**, or **Jebel er Rahmeh**, a hill in Arabia, about 200 feet high, with stone steps reaching to the summit, 15 miles S. E. of Mecca; one of the principal objects of pilgrimage among Mohammedans, who say that it was the place where Adam first received his wife, Eve, after they had been expelled from Paradise and separated from each other 120 years. A sermon delivered on the mount constitutes the main ceremony of the Hadj or pilgrimage to Mecca, and entitles the hearer to the name and privileges of a Hadji or pilgrim.

**Arago**, **Dominique François** (är-ä-gō'), an eminent French astronomer and physicist; born near Perpignan, Feb. 26, 1786. His biographical notices of distinguished men of science hold a high place in literature



## Arago

for clearness of thought and beauty of style. Elected to the Chamber of Deputies after the Revolution of 1830, he eloquently took



DOMINIQUE FRANÇOIS ARAGO. numerous and important.

English translations of separate portions of his works have been published, notably his "Autobiography," "Popular Lectures on Astronomy," "Meteorological Essays," and "Biographies of Scientific Men." He died in 1853.

**Arago, Emmanuel**, a French advocate and politician; son of Dominique; born at Paris in 1812; called to the bar 1837; took part in the Revolution of 1848; renounced politics after the *coup d'état* of 1852, but continued to practice at the bar. After the fall of the empire he again took a prominent part in public affairs, and held several important offices. He published poems and many theatrical pieces. He died Nov. 26, 1896.

**Arago, Etienne Vincent**, a French poet, journalist, and playwright, born at Perpignan, Feb. 9, 1802, brother of Dominique. He wrote, mostly in collaboration with others, a number of comedies, vaudevilles, and melodramas; and under the pseudonym of Jules Ferney, made himself known through his feuilletons in the "Siècle." By far his best production, however, is "Spa, Its Origin, History, Waters, etc." (1851), an epic in seven cantos. Beside this, "A Voice from Exile" (1860), and "The Blue and the White" (1862), a historical romance of the wars in the Vendée, deserve mention. He died in 1892.

**Arago, Jacques Etienne**, a French writer of travels, born at Estagel, March 10, 1790; brother of the preceding. Till 1837 his literary work consisted in the production of light theatrical pieces. He then lost his sight and made a voyage around the globe, which afforded material for two charming books: "Promenade Around the World" (1838) and "A Blind Man's Voyage 'Round the World." He had some pain-

## Aragonite

ful experiences on this side of the globe, which are detailed in the "Travels of a Blind Man in California" (1851). He died in 1855.

**Aragon**, once a kingdom, now divided into the three provinces of Saragossa, Huesca, and Teruel, in the N. E. of Spain; greatest length from N. to S., 190 miles; breadth, 130; area, 17,980 square miles; pop. (1900) 912,711. It is bounded on the N. by the Pyrenees, and borders on Navarre, the Castiles, Valencia, and Catalonia. The Ebro flows through Aragon in an S. E. direction, receiving numerous tributaries from the lofty regions of the Pyrenees and from the Sierras in the S. The province is naturally divided into the level country along the Ebro, and the N. mountainous district of Upper Aragon. The central plain is sterile, poorly supplied with water, and intersected by deep ravines. The valleys of Upper Aragon are the most beautiful and fertile of all the Pyrenean valleys. The slopes of the hills are clothed with forests of oak, beech, and pine. The minerals of the province are copper, lead, iron, salt, alum, saltpeter, coal, and amber. The silkworm industry has been introduced. Aragon early became a Roman province; and, on the fall of the empire, passed into the hands of the West Goths, but was conquered by the Moors in the beginning of the 8th century. The rulers of Aragon, after it had been recovered from the Moors and united with Catalonia (1137), became powerful; obtained possession of the Balearic Isles in 1213, of Sicily in 1282, of Sardinia in 1326, and of Naples in 1440. By the marriage of Ferdinand of Aragon with Isabella, heiress of Castile, in 1469, the two States of Aragon and Castile were united, and formed the foundation of the later Spanish monarchy. After Ferdinand's death in 1516, the union of the States was made permanent. The chief towns are Saragossa, Calatayud, Huesca, and Teruel.

**Aragonite**, or **Arragonite** (from ARAGON, in Spain, where it was first found), a mineral with orthorhombic crystals, generally six-sided prisms, though the rectangular octohedron is considered its regular form. It occurs also globular, reniform, coralloidal, columnar, stalactitic, and incrusting. The hardness is 3.5-4; the sp. gr., 2.927 to 2.947; the luster vitreous or nearly resinous on fractured surfaces. Its color is white, gray, yellow, green, or violet; it is transparent or translucent, and brittle. The composition is carbonate of lime, 95.94 to 99.31, with smaller quantities of strontian carbonate, etc. Dana thus divides it: Var. 1. Ordinary: (a) Crystallized in simple or compound crystals, or in radiating groups of acicular crystals; (b) Columnar, including Satin-Spar; (c) Massive. 2. Scaly massive. 3. Stalactitic or Stalagmitic.



4. Coralloidal. 5. Tarnovicitic. Mossottite and Oserskite also rank with Aragonite. It occurs in Spain, Austria, Italy, England, America, and elsewhere.

**Aragonite Group**, Dana's second group of anhydrous carbonates, comprising aragonite, manganocalcite, witherite, bromlite, strontianite, and cerussite.

**Araguay** (ar'a-gay), or **Araguaya**, a large river of Brazil, which rises in about 19° S. lat., near the Parana, flowing to about 6° S. lat., where it joins the Tocantins. The united stream, after a course of 1,000 miles, falls into the delta of the Amazon in S. lat. 1° 40'. Many tribes of warlike Indians dwell on its banks.

**Arakan Yoma Mountains**, a range 700 miles long, stretching from the mountains of the Naga City downward along the E. of Chittagong division, Bengal, and Arakan division, Lower Burma, and through the Irawadi division, and terminating in Cape Negrais; highest peak, Blue Mountain, 7,100 feet. The range is very steep, and there are few practicable passes. The principal are one on the road leading from An, altitude, 4,663 feet; and one on the road from Sandoway to Padaung, in Prome district.

**Aral Lake** (ä'ral), separated by the plateau of Ust-Urt from the Caspian Sea, is the largest lake in the steppes of Asia. It lies wholly within the limits of Russian Central Asia, embracing an area of about 24,000 square miles. It is fed by the Sir-Darya (the ancient Jaxartes) on the N. E. side, and the Amu-Darya (or ancient Oxus) on the S. E. It has no outlet, and is generally shallow, its only deep water being on the W. coast, where it reaches a depth of 225 feet; but it shoals gradually eastward to a mere marshy swamp. Its level is 117 feet above that of the Caspian, which is 84 feet below the surface of the Black Sea. Like other lakes which are drained only by evaporation, it is brackish. Fish, including sturgeon, carp, and herring, are abundant. The lake is dotted with multitudes of islands and islets. Owing to the shallowness of its waters, and its frequent exposure to fierce and sudden storms from the N. E., navigation is difficult; and a flotilla of flat-bottomed gunboats, built for this sea by the Russians, and which took part in the operations against Khiva in 1873, alone patrols its surface. The history of the Sea of Aral is very remarkable. Sir Henry Rawlinson and Col. Yule collected references made to it in Greek, Latin, Arabic, and Persian writers, and established the fact that the area it now occupies has been dry land twice within historical times—the Jaxartes and the Oxus then running S. of the Sea of Aral to the Caspian. This was the case during the Græco-Roman period, and again during the 13th and 14th

centuries after Christ. The Russian Government, which pushed its frontier as far E. as the Aral in 1848, has abandoned the idea of the diversion of the Oxus to the Caspian Sea, and has proposed to unite the two lakes by means of the steppe river Chogan, round the northern edge of the Ust-Urt plateau.

**Aralia**, a genus of plants, the typical one of the order *araliaceæ*. *A. umbellifera* exudes an aromatic gum. *A. nudicaulis* is used as a substitute for sarsaparilla. The berries of *A. spinosa*, the angelica tree, prickly ash, or toothache tree, of America, infused in wine or spirits, are used in cases of colic, while a tincture of them is prescribed in toothache. *A. racemosa*, the spikenard of America, is also regarded as a medicinal plant.

**Aram, Eugene** (ā'ram), a self-taught scholar whose unhappy fate has been made the subject of a ballad by Hood and a romance by Lord Lytton, born in Yorkshire, England, in 1704. In 1734 he opened a school at Knaresborough. About 1745 a shoemaker of that place, Daniel Clarke, was suddenly missing under suspicious circumstances; and no light was thrown on the matter till 13 years afterward, when an expression dropped by one Richard Houseman respecting the discovery of a skeleton supposed to be Clarke's, caused him to be taken into custody. From his confession an order was issued for the apprehension of Aram, who had long quitted Yorkshire, and was at the time acting as usher at the grammar school at Lynn. He was brought to trial on Aug. 3, 1759, at York, where, notwithstanding an able and eloquent defense which he made before the court, he was convicted of the murder of Clarke, sentenced to death, and executed. He was among the first to recognize the affinity of the Celtic to the other European languages, and under favorable circumstances might have done some valuable work in philological science.

**Aramæan** (ar-am-ā'an), or **Aramaic**, a Semitic language nearly allied to the Hebrew and Phœnician, anciently spoken in Syria and Palestine and eastward to the Euphrates and Tigris, being the official language of this region under the Persian domination. In Palestine it supplanted Hebrew, and it was it, and not the latter, that was the tongue of the Jews in the time of Christ. Parts of Daniel and Ezra are written in Aramaic, or, as this form of it is often incorrectly named, Chaldee, from an old notion that the Jews brought from Babylon. An important Aramaic dialect is the Syriac, in which there is an extensive Christian literature.

**Aranjuez** (ar-an-hū'āth) (probably the Latin *Ara Joris*), a town of Spain, on the left bank of the Tagus, 30 miles S. S. E. of



## Arany

Madrid by rail, in a beautifully wooded valley. The town is regularly built, with broad streets intersecting each other at right angles. The palace was long a favorite spring resort of the royal family, and was altered and added to by successive sovereigns from Charles V. downward. The famous gardens were laid out by Philip II.; their most splendid ornament are the great elm trees brought from England by Philip II., which radiate from a central plot in 12 avenues. At Aranjuez was concluded a treaty between France and Spain in 1772, and it was also the scene of the abdication of Charles IV. in 1808. When the court was here, the population used to reach 20,000; in 1900 it was 12,670.

**Arany, Janos** (or'ony), a Hungarian poet, born at Nagy-Szalonta, March 1, 1817; educated in the college at Debreczin, 1832-1836, he was employed as a teacher in his native place; in 1840 was appointed notary there; and won immediate success with his first epical production in 1845. During the Hungarian Revolution he held a government position; then lived in needy circumstances in his native town until 1854, when he obtained a professorship at Nagy-Körös. Thence he was called to Budapest in 1860 as director of the Kisfaludy Society; founded the literary weekly "Koszorú" ("The Wreath"); and in 1865 was appointed secretary of the Hungarian Academy, of which he had been a member since 1859. Owing to his feeble health he resigned in 1878. As a national poet he ranks immediately after Petöfi and Vörösmarty, his epical creations deserving to be acknowledged as ornaments not only of Hungarian but of modern poetry in general. He is a master of the ballad and a translator of highest merit, as proven by his versions of Tasso, Goethe, Shakespeare, and, above all, his translation of Aristophanes (3 vols., 1880). Works: "The Lost Constitution," a humorous epic (1845, prize of Kisfaludy Society), depicted the doings at the county elections; "The Taking of Murány" (1848, prize); "Katalin" (1850); "Toldi," an epical trilogy (1851-1854-1880), exalting the deeds of the Hungarian Samson; "The Gypsies of Nagy-Ida" (1852); "Buda's Death" (1864, prize); "Prose Writings" (1879). He died in Budapest, Oct. 22, 1882.

**Arapaima** (ar-ap-ā'ma), a genus of tropical fishes, including the largest known fresh water forms. They are found in the rivers of South America, and are sometimes taken in the Rio Negro, 15 feet in length, and 400 pounds in weight. They are shot with arrows or harpooned, and are highly esteemed as food; salted, they are conveyed in large quantities to Para. The genus *arapaima* belongs to the family *osteoglossidæ*, allied to the *clupeidæ* or herring, and

## Aratus of Sicyon

is remarkable for the mosaic work of strong bony scales with which the body is covered. The head is also protected by bony armature. *Osteoglossum* and *heterotis* are closely related genera, found in various parts of the tropics.

**Ararat**, a celebrated mountain in Armenia, forming the point of contact of Russia with Turkey and Persia, to all of which it belongs. It rises, an isolated cone, on the S. border of the plain of the Aras or Araxes. S. E. from Mount Ararat proper, or the Great Ararat, rises the Little Ararat, their summits in a direct line being about 7 miles apart, and their bases blending into each other by the interposition of a wide valley. The summit of the Great Ararat rises 16,964 feet above the sea-level. It is covered with perpetual snow and ice for about 3 miles from its summit downward in an oblique direction. On the entire N. half it shoots up, from about 14,000 feet above the sea, in one rigid crest to its summit, and then stretches downward on its S. side to a level not quite so low, forming the Silver Crest of Ararat. Little Ararat rises 13,093 feet above the sea. Its declivities are steeper than those of the Great Ararat. The mass of Ararat forms a feature of stupendous grandeur in the landscape, as it shoots up abruptly from the plain. It is of volcanic origin, but there is only one eruption of the mountain on record. This, accompanied by an earthquake which destroyed 6,000 houses, took place in 1840. The top of the Great Ararat was first reached by Professor Parrot in 1829; it has been repeatedly reached since. The upper portion contains several glaciers, and the climate is severe. According to tradition Mount Ararat was the resting place of the ark when the flood abated.

**Aras**, a river of Armenia, rising S. of Erzerum at the foot of the Bingol-dagh; it flows for some miles through Turkish territory N. E. to the new Russian frontier. Here it turns eastward to the Ervian plain N. of Ararat, whence it sweeps in a semi-circle mostly between the Russian and Persian territories round to its confluence with the Kur, 60 miles from its mouth in the Caspian; length, 500 miles.

**Aratus** (a-ra'tus), a Greek poet and astronomer; born at Soli, Cilicia, flourishing about 290-260 B. C. His chief work was an astronomical poem entitled "Phænomena" ("Aspects of the Heavens"), in 1,154 verses; the plan being in imitation of Hesiod, while the style is borrowed from Homer. Greatly admired in antiquity, it was translated into Latin by Cicero and others. He was a friend of the poets Theocritus and Callimachus.

**Aratus of Sicyon**, a statesman of ancient Greece, born 272 B. C. In 251 B. C. he



overthrew the tyrant of Sicyon and joined it to the Achæan League, which he greatly extended. He accepted the aid of Antigonos Doson, King of Macedon, against the Spartans, and became in time little more than the adviser of the Macedonian king, who had now made the league dependent on himself. He is said to have been poisoned by Philip V. of Macedon, 213 B. C.

**Araucania** (ar-ō-ka'nē-a), the country of the Araucos or Araucanian Indians, in the south of Chile. The Chilean province of Arauco, lying between the Andes and the Pacific Ocean, and bounded on the N. by Concepcion, on the S. by Valdivia, was formed in 1875, with an area of 8,100 square miles, and a population (1892) of 88,332. A large part of the territory in Arauco and the more southerly province of Valdivia, is occupied by Indians, who have of late mostly submitted to Chilean authority. The Araucanians are interesting as furnishing the only example of Indian self-government in the presence of the European races. They are a fierce and warlike people, and have a kind of military aristocratic constitution. Formerly the government rested in the hands of four chiefs (*Toquis*), each nominated by one of the four divisions of the people, and one of whom was elected "great toqui." Each toqui had under him five apoulmenes (district chiefs), to each of whom were subordinate nine ulmenes (township rulers). The ulmenes and apoulmenes (who succeeded by primogeniture) formed the general assembly of the nation, and were called together by the grand council to decide on war or peace, the election of military commander, etc. Their religion corresponds to their old political institutions; their supreme being is the grand toqui of the universe. The Araucanians have no temples nor idols, support no priests, and but rarely sacrifice. After death the soul passes into a happy region which lies beyond the Andes. They have been long noted for their love of independence, and for the bravery with which they have withstood the arms of their Spanish and Chilean invaders. Their country is divided from N. to S. into four parallel regions, with varying soil and climate. These are the coast region, the plain region, the region of the lower Andes, and the region of the higher Andes. Araucania has the proud distinction of being the only portion of the New World that has never received the European yoke. From the days of Pizarro and Almagro downward, it has uniformly vindicated its freedom—its wars of independence having lasted, with intervals of precarious truce, from 1537 to 1773. In 1861 a French adventurer, Tonneins by name, ingratiating himself with the Indians, was elected King of Araucania, as Orélie Antoine I. He was

soon at war with Chile, and was captured and allowed to go to France. Returning to Araucania, he kept up a struggle with the Chilians in 1869–1870, but repaired once more to France in 1871, where he posed for a time as a dispossessed king, and died in 1878.

**Araucaria** (ar-ō-kā'rē-a), a genus of plants belonging to the order *pinaceæ* (conifers) and to the family or section *abietinæ*. The inflorescence is terminal; the male flowers in cylindrical spikes; and the fruit succeeding the female ones large and globular; each scale, if not abortive, bearing a single seed. The branches are verticillate and spreading, with stiff pointed leaves. Five or six species are known; all from the Southern Hemisphere. The one so common in English gardens is *A. imbricata*, a native of the mountainous parts of Southern Chile. It is of hardy constitution, scarcely requiring protection, except in very severe weather. Another species, *A. excelsa*, or Norfolk Island pine, is a splendid tree of giant size. All the genus are ornamental from their fine and unfading foliage. Araucarian pines were abundant in Europe during the oolitic period, associated with mammals, fishes, etc., whose nearest living analogues are now confined to Australia and the adjacent regions.

**Araxes.** See ARAS.

**Arbela**, now **Erbil**, or **Arbil**, a small town of Assyria, E. from Mosul, famous as having given name to the battle in which Alexander finally defeated Darius, 331 B. C. The battle was really fought near Gaugamela (the "camel's house"), to the N. W. of Arbela.

**Arbitration**, an adjudication by private persons, called arbitrators, appointed to decide a matter or matters in controversy, either by written or oral submission, by agreement of the disputants. It differs from a reference which is made by the order of a court of law. The proceeding generally is called a submission to arbitration; the parties appointed to decide are termed arbitrators, not referees; and their adjudication is called an award. This mode of settling disputes has been approved by legislatures at various times, and there are statutes in a number of States regulating the proceeding.

*Legal Arbitration.*—Infants and others not *sui juris* cannot submit controversies to arbitration. The matters that may be submitted to an arbitrator are all personal disputes and differences that might otherwise be made the subject of controversy in the courts of civil jurisdiction, except matters respecting a claim to an estate in real property, in fee or for life, which in New York cannot be submitted to arbitration; in some other States they may be. Thus breaches of contract generally, breaches of



## Arbitration

promise of marriage, trespass, assaults, charges of slander, differences respecting partnership transactions or the purchase price of a piece of personal property, all may be referred to arbitration. Questions relating to real property in the State of New York cannot be the subject of arbitration. Differences between landlord and tenant, where no claim of title is interposed, may be. Pure questions of law may also be referred to the decision of an arbitrator. Actions at law and suits in equity may also be settled by arbitration; and this kind of reference may be made at any stage of the proceedings, sometimes even after the verdict, and probably, by analogy, after decree in equity. Questions relating to the future use and enjoyment of property, and future or anticipated differences between parties, may likewise be so submitted, but not in New York. In some of the States, however, some matters depending on points strictly technical are excluded from arbitration, in view of the fact that often arbitrators are not learned in the law. A matter clearly illegal cannot be made the subject of a valid submission. But where transactions between parties have been brought to a close by general award, apparently good, the courts have refused to reopen them on a suggestion that some legal item had been admitted in account. It is not the policy of law to refer to arbitration felonies and other criminal offenses of a public nature, because the public safety requires them to be punished, and for this purpose they can be properly tried only in one of the ordinary courts of the country. Partners and corporations may make submission to arbitration. The arbitrator ought to be a person who stands perfectly indifferent between the disputants; but there are no other particular qualifications for the office, and the choice by parties of the person who they agree shall decide between them is perfectly free. In matters of complicated accounts mercantile men are greatly preferred. In other cases it is usual to appoint lawyers, who, being accustomed to judicial investigations, are able to estimate the evidence properly, to confine the examination strictly to the points in question, and, making the award, to avoid those informalities in respect to which it might afterward be set aside. Both time and expense are thus saved by fixing on a professional arbitrator.

*Mode of Procedure.*—The proceedings before an arbitrator are regulated generally according to the forms observed in courts of law. The arbitrator on the day appointed hears the case and makes his award, which need not be in writing, for a verbal award is perfectly valid; but in practice it is usual for the arbitrator to make a written award. This award in its effect

## Arbitration

operates as a final and conclusive judgment respecting all the matter submitted, and binds the rights of the parties for all time. An award may be set aside on the ground of corruption and fraud in the arbitrator, and for any material irregularity or illegality appearing on the face of the proceedings, such as is beyond or not covered by the submission. But the tendency of the courts is to favor arbitration, and maintain awards, unless such serious grounds as are above referred to, can be substantiated. Where there are two arbitrators the submission often provides that in the case of their differing in opinion the matter referred shall be decided by a third person, called an umpire, who is generally appointed under a power to that effect by the arbitrators themselves. But they cannot make such appointment unless specially authorized so to do by the terms of the submission. This umpire rehears the case, and for this purpose is invested with the same powers as those possessed by the arbitrators, and is bound by the same rules. It remains to be stated in general concerning arbitration that from the nature of the case there can be no appeal, on the merits of the dispute submitted, to any public tribunal whatever. In New York the proceeding to vacate an award, and the grounds on which it can be made, are regulated by statute.

*Court of Arbitration.*—By chapter 278, Laws of 1874, the legislature of New York established the "Court of Arbitration of the Chamber of Commerce of the State of New York," defined its jurisdiction, and regulated its proceedings. Gov. Dix nominated, and the Senate confirmed, the Hon. Enoch L. Fancher as the official arbitrator, or judge of the court. Its work was chiefly confined to commercial matters and disputes of shipping merchants, though during its existence almost all subjects of controversy have been before the court and decided. There is no appeal from the decision of the official arbitrator; though, where a defeated party desires it, a rehearing of the case is always granted. No costs nor fees to attorneys or counsel can be recovered; each party, whether defeated or not, must bear his own costs and expenses. The London Corporation and the London Chamber of Commerce founded jointly in 1892 a Chamber of Arbitration, or Tribunal of Commerce, for settling trade and commercial difficulties; and the great coal dispute and strike of 1893 led to a conference which secured a peaceful conclusion for the time, and the foundation of a permanent "Board of Reconciliation," consisting of representatives both of owners and of the miners. Diplomatic conferences, which often obviate war, belong to a different category.

International arbitration has been dis-



cussed frequently and at length. It has been employed in matters of debate between nations more than a hundred times. As between the United States and Great Britain, the San Juan boundary question, the Alabama question and the Bering Sea sealing controversy, have been so arranged. The first general treaty of arbitration ever drawn between nations was signed Jan. 11, 1897, in Washington, by Richard Olney, Secretary of State for the United States and Sir Julian Pauncefote, Ambassador of Great Britain to the United States, for Great Britain. This treaty was placed before the United States Senate, Jan. 11, 1897, accompanied by a special message from President Cleveland, but the Senate refused to ratify it. Since then similar treaties have been made and ratified between Italy and the Argentine Republic and between the Argentine Republic and Uruguay. The Universal Peace Congress at The Hague, in 1899, established an International Court of Arbitration, to which the debt dispute of Great Britain, Germany, and Italy against Venezuela was referred in 1903. New South Wales has an arbitration tribunal for the purpose of settling industrial disputes. This tribunal consists of a judge of the supreme court, a representative appointed by the employers and a representative nominated by the employees. International arbitration has made more or less continuous gains in recent years. Two important instances of its progress were the treaties signed by the United States with France and China in 1908. See HAGUE, THE; PEACE CONGRESS, UNIVERSAL. BENJAMIN F. TRUEBLOOD.

**Arblay, Madame d'.** See BURNEY, FRANCES.

**Arbor Day,** a day set apart to encourage the voluntary planting of trees by the people. The custom was inaugurated by the Nebraska State Board of Agriculture in 1874, which recommended that the second Wednesday in April annually be designated as Arbor Day, and that all public school children should be urged to observe it by setting out young trees. The custom has since been extended, till now nearly every State and Territory in the country has set apart one day by legislative enactment or otherwise, for this purpose; several of the States making the day a legal holiday, and others making it a school holiday. In the thickly settled cities of the Eastern and Middle States the ceremony usually consists of planting a shade or ornamental trees on the grounds of public or other school buildings. In more thinly settled sections the children and their elders set out trees on the principal thoroughfares and in public park reservations. In Canada the first Friday in May is celebrated as Arbor Day.

**Arboriculture.** See FORESTRY.

**Arbor Vitæ,** literally the tree of life. (1) In botany, a name given to the trees belonging to the coniferous genus *thuja*. *T. occidentalis*, or American arbor vitæ, is a well known and valued evergreen. (2) In anatomy, a dendriform arrangement which appears in the medulla of the brain when the cerebellum is cut through vertically.

**Arbuthnot, John,** a Scottish humorist; born near Arbuthnot Castle, Kincardineshire, Scotland, April 29, 1667; was physician to Queen Anne. His literary fame rests mainly on "The History of John Bull" (1712), at first attributed to Swift, but proved to have been the work of Arbuthnot. Primarily designed to satirize the Duke of Marlborough, and to oppose the continuance of the war of the Spanish succession, this work was the means of fastening the sobriquet and the typical character of John Bull upon the English nation; but owing to its ardent and extreme toryism it is now little read, and known chiefly by brilliant extracts. It is said to have suggested to Swift the composition of "Gulliver's Travels." He also wrote a number of serious works which have been highly valued. He died in London, Feb. 27, 1735.

**Arbutus,** a genus of plants belonging to the order of *ericaceæ* (heath worts). A species, the *A. unedo*, or austere strawberry tree, is found, apparently wild, in the neighborhood of the Lakes of Killarney. It has panicles of large, pale greenish-white flowers and red fruit, which, with the evergreen leaves, are especially beautiful in the months of October and November. Trailing arbutus is a creeping or trailing plant (*epigæa repens*) with rose colored blossoms, found chiefly in New England in the spring. Commonly called May flower, or sometimes ground laurel.

**Arc,** in geometry, a portion of the circumference of a circle, cut off by two lines which meet or intersect it. Its magnitude is stated in degrees, minutes, and seconds, which are equal to those of the angle which it subtends. Hence, counted by degrees, minutes and seconds, the arc of elevation and the angle of elevation of a heavenly body are the same, and the two terms may be used in most cases indifferently. The straight line uniting the two extremities of an arc is called its chord. Equal arcs must come from circles of equal magnitude, and each must contain the same number of degrees, minutes, and seconds as the others. Similar arcs must also each have the same number of degrees, minutes, and seconds, but they belong to circles of unequal magnitude. Concentric arcs are arcs having the same center.

In mathematical geography, an arc of the earth's meridian, or a meridional arc, is an arc partly measured on the surface of the



## Arc

earth from N. to S., partly calculated by trigonometry. Such arcs have been measured in Lapland; in Peru; from Dunkirk, in France, to Barcelona, in Spain; at the Cape of Good Hope, and from Shanklin Down, in the Isle of Wight, to Balta, in Shetland. It was by these measurements that the earth was discovered to be an oblate spheroid.

In electricity, a voltaic arc is a luminous arc, which extends from one pencil of charcoal to another, when these are fixed to the terminals of a battery in such a position that their extremities are one-tenth of an inch apart.

**Arc, Joan of.** See JOAN OF ARC.

**Arca**, a genus of conchiferous mollusks, the typical one of the family *arcadæ*. The shell is strongly ribbed, or cancellated, hinge straight, with very numerous transverse teeth. They are universally distributed, but are commonest in warm seas. They inhabit the zone from low water to 230 fathoms. In 1875 Tate estimated the known recent species at 140, and the fossil ones at 400, the latter commencing with the lower silurian rocks. Of the recent species, *A. noæ*, *A. tetragona*, *A. lactea*, *A. raridentata*, and *A. barbata* occur in England. The fossil species are found in the United States, Europe, and Southern India.

**Arcachon** (ar-ka-shôn'), a bathing place which has grown up since 1854, on the S. side of the Bassin d' Arcachon, 34 miles S. W. of Bordeaux, France. The fine broad sands are admirably adapted for bathing; and the place is sheltered by sand hills, covered with extensive pine woods, in which game abounds. Its main street stretches 2½ miles along the shore, with the pine-forest immediately behind. The climate is always temperate, and the rainfall is 32 inches. Its numerous villas among the firs are much frequented in winter by invalids afflicted with lung disease. Scientific oyster culture is practiced here on a large scale. There are 3,300 oyster "parks" in the lagoon, lined with 6,000 ova tiles for the collection of oyster spat, and calculated to yield 200,000,000 infant oysters in a single season. Pop. (1901), 7,120.

**Arcade**, a series of arches of any form, supported on pillars, either inclosing a space before a wall, or any building which is covered in and paved; or, when used as an architectural feature for ornamenting the towers and walls of churches entirely closed up with masonry. The cloisters of the old monasteries and religious houses were, strictly speaking, arcades. The term is also applied to a covered passage having shops on either side of it. Two arcades inscribed in a greater arcade are called geminous arcades. This arrangement, seen for the first time in the Byzantine

## Arcesilaus

architecture, became common in the Gothic buildings. Often in the latter there are three inscribed arcades, and that in the middle is sometimes greater than the two others.

**Arcadia**, the classical name of Middle Peloponnesus, now forming the modern province of Arkadia, in the Morea, Greece. It occupies a high tableland, having on the N., Achaia, E., Argolis, W., Elis, and, on the S., Laconia and Messenia. Area 1,600 square miles. It is intersected by mountain ranges, some of which are very lofty, and contains plains of some extent. Its principal river is the Roufia (*Alpheus*), the largest in the Morea. Lake Stymphalus, of classic mention, is found here. From its elevation, Arcadia is much colder and more rigorous than the rest of the Morea. The inhabitants still retain their primitive mode of life as shepherds, living in tents, and pursuing a migratory existence. The plane, fir, ilex, chestnut, oak, etc., are common, and deer and game plentiful. Chief towns, Tripolitza, Londari, Karitena, etc. Many interesting ruins are seen here, among them the remains of the cities of Phigaleia, Megalopolis, and Pallantium. Pop. (1896) 167,092. From its first inhabitants, the Pelasgi, the land derived the name Pelasgia. In later times, it was divided among the 50 sons of Lycaon, into kingdoms, and received from Arcas the name Arcadia. In the course of time, the small kingdoms made themselves free, and formed a confederacy. The principal were Mantinea, where Epaminondas obtained a victory, and a tomb (now the village of Mondri), Tegea (now Tripolitza), Orchomenus, Pheneus, Psophis, and Megalopolis. Their chief deity was Pan; their chief business, breeding of cattle and agriculture. This occasioned the pastoral poets to select Arcadia for the theater of their fables. Thus it has been made to appear as a paradise, although it was far from deserving this character.

**Arcadius**, born in 377, died 408; son of the Emperor Theodosius, on whose death in 395 the empire was divided, he obtaining the E., and his brother Honorius the W. He proved a feeble and pusillanimous prince.

**Arcesilaus** (ar-ses-ē-lā'us), a Greek philosopher, founder of the New Academy, was born at Pitane in Æolia, Asia Minor, 316 B. C. He studied philosophy, first under Theophrastus the Peripatetic, and afterward under Crantor. He ultimately became the head of the academic school or those who held the doctrines of Plato; but he introduced so many innovations that its philosophic character was completely changed in the direction of scepticism. His great rivals



EMPEROR

ARCADIUS.



were the Stoics. He denied the Stoical doctrine of knowledge, which he affirmed to be, from its very nature, unintelligible and contradictory. He also denied the existence of any sufficient criterion of truth, such as the "irresistible conviction" of the Stoics, and recommended abstinence from all dogmatic judgments. In practice he maintained that we must act on grounds of probability. It is not easy to determine satisfactorily what his theory of morals was. A wit, a poet, and a man of frank and generous disposition, which seems to have captivated his disciples even more than his philosophy, he was yet accused of the grossest profligacy. He died in his 76th year (241 B. C.).

**Arch**, in architecture, a series of wedge-shaped stones or bricks, so arranged over a door or window in an edifice for habitation, or between the piers of a bridge, as to support each other, and even bear a great superincumbent weight. The stones and bricks of a truncated wedge shape used in building arches are called *voussoirs*. The sides of an arch are called its haunches or flanks, and by old English writers of the 16th century its hause. The highest part of the arch is called its crown, or by the old English authors the scheme or skeen, from the Ital-



SEMI-CIRCULAR  
ARCH.

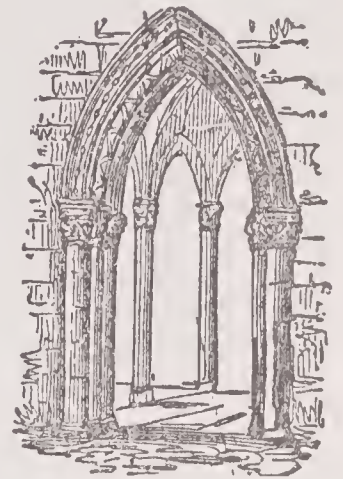


HORSESHOE  
ARCH.

ian schiena. The lowest *voussoirs* of an arch are called springers, and the central one which holds the rest together the keystone. The under or concave side of the *voussoirs* is called the intrados, and the outer or convex one the extrados of the arch. A chord to the arch at its lower part is called its span, and a line drawn at right angles to this chord, and extending upward to its summit, is called its height. The impost of an arch is the portion of the pier or abutment from which the arch springs. If the height of the crown of an arch above the level of its impost is greater than half the span of the arch, the arch is said to be surmounted. If, on the contrary, it is less, then the arch is said to be surbased. The curved arch was known to the Assyrians and the Old Egyptians. Sir J. G. Wilkinson considers that it existed in brick in the reign of Amenoph I., about B. C. 1540, and in stone in the time of Psammetichus II., B. C. 600. The evidence is derived from

the ruins of actual buildings, but paintings appear to carry the arch back to about 2020 B. C. There is no mention of the genuine arch in Scripture, the term "arches," in Ezek. xl: 16, being a mistranslation.

The arch was brought into extensive use by the Romans, and everywhere prevailed till the 12th century A. D. when the arch pointed at the apex, and called in consequence the pointed arch — the one so frequently seen in Gothic architecture — appeared in Europe as its rival. The forms of both curved and pointed arches may be varied indefinitely. Of the former may be mentioned the horseshoe arch, a name which explains itself, and the foil arch, from Latin *folium* = a leaf, of which there are the trefoil, the cinquefoil, and the multifoil varieties, so named from the plants after which they are modeled.



POINTED ARCH.

Other arches are the pointed one; the equilateral one, when the centers of the circles whose intersection constitutes the pointed arch, coincide with the angular points at the two sides of the base; the lancet arch, when the centers of the circles fall beyond these points; the drop arch, when they fall within the base; and the segmented pointed arch, the sides of which constitute segments of circles containing less than 180 degrees. Besides these there are several other varieties of arch distinguished by their respective forms.

**Arch, Triumphal**, a structure raised by the Romans to celebrate a victory, or some great historical event; or to add an additional luster to the commemoration of the military exploits of a victorious general. These structures originated in the custom of adorning with the spoils of war the gate by which a successful military leader entered Rome on his return from battle. After a time these temporary monuments were replaced by others of the more enduring nature of stone and bronze. The *arcus triumphalis*, as the Romans styled this form of structure, was usually erected in some public thoroughfare. In design they were commonly either one large arch, or one large central arch, with one or two smaller ones on each side. In every case the fronts and sides of the erection were decorated with trophies, the entablature being crowned with some piece of sculptural allegory, beneath which was an inscription emblazoning the deeds of the hero in whose honor the



## Arch

arch was erected. The most remarkable of these edifices still existing are the arch of Augustus at Rimini; that of Trajan at Beneventum; at Rome, those of Constantine, Severus, Drusus, Gallienus, and Titus. The oldest and most admirably proportioned, however, is that of Titus, whose conquest of Judæa it was built to celebrate. The arch in the highest estate of preservation is that of Constantine. Many similar monuments of departed Roman greatness exist in France, Egypt, Spain and Greece. France possesses of modern arches the greatest number. Those of the Porte St. Denis and Porte St. Martin, erected in 1673 and 1674 respectively, record the victories of Louis XIV. The splendid Arc du Carrousel, forming the western entrance of the Tuileries, built in honor of the French armies, was commenced in 1806, and finished in 1809; in height it is 47 feet, in breadth 55. Surmounting it is a great equestrian group, composed of a chariot drawn by four horses, and guided by the allegorical figures of Peace and Victory. But the grandest and most colossal triumphal arch of modern construction is that standing at the end of the Avenue des Champs Elysées, at Paris. It was erected to commemorate the victories of Napoleon I. and his armies, and, although commenced in 1806, was not completed until after the revolution of 1830. It has three arches, the central one being 95 feet high. In the interior are graven the names of the most eminent of the French generals, with that of their leader. London possesses but two structures of this kind — the arch at Hyde Park, supporting the equestrian statue of the Duke of Wellington, and the Marble Arch. New York has erected a Washington arch, and an elaborate naval arch was erected in fac-simile on Fifth avenue in 1899, preparatory to perpetuation in marble hereafter.

**Arch, Joseph**, an English reformer, born in Barford, Warwickshire, in 1826, and, while still a farm laborer, became a Primitive Methodist preacher. In 1872 he founded the National Agricultural Laborers' Union, and thereby, according to Justin M'Carthy, "began the emancipation of the rural laborers." He afterward visited Canada to inquire into the labor and emigration questions; and, in 1885–1886, he represented in Parliament the northwest division of Norfolk, which again returned him in 1892 and 1895.

**Archæan** (ar-kē'an) **Rocks**, the oldest rocks of the earth's crust, crystalline in character, and embracing granite, syenite, gneiss, mica-schist, etc., all devoid of fossil remains. These rocks underlie and are distinctly separate from the stratified and fossiliferous formations, which indeed have chiefly taken origin from them.

## Archangel

**Archæology**, the science which makes us acquainted with the antiquities of nations that have lived and died, and the remains of various kinds which throw a light upon the history of those now existing. Almost every country now boasts its national archæological society. The term is capable of a very widely extended signification, including everything that is connected with the rise and progress of any nation, its history, laws, religious observances, public and private buildings, manners and customs of all classes of the people, the arts in use among them, and the extent of their acquirements and discoveries in science. The archæologist seeks to study and preserve any materials which tend to elucidate the objects already mentioned, and these materials naturally resolve themselves into three great divisions, each susceptible of further subdivision. The first class may be considered to consist of all records, written or printed, legal documents, old chronicles, diaries of a public or private nature, State papers, letters, etc. The second may be termed oral, or traditional, in contradistinction to the first, which may be broadly called written archæology, and consists of the ballads, legends and folk-lore of a people, their sports, superstitions, and the rise and origin of local customs, proverbs and expressions. The third, termed monumental archæology, consists of works of art, paintings, sculpture, coins, medals, pottery, glass, wooden and metal utensils, tools of all descriptions, armor, weapons, carriages, boats, roads, canals, walls, encampments, burial-grounds, earthen mounds for purposes of defense or sepulture, and even human and animal remains. Every country owns, in a greater or less degree, relics of antiquity highly interesting to the archæologist. From the sculptured stones and obelisks of Egypt and Assyria, records have been unravelled by Layard, Rawlinson, and other savants, that throw great light on the early history of those countries, and offer convincing testimony of the indisputable truth of Holy Writ. In Mexico and Central America, evidences have been found of the existence of a clever and ingenious people who had died before the discovery of the Western Hemisphere. See AMERICAN ANTIQUITIES.

**Archæopteryx**, a genus of fossil birds. *A. lithographica* (Von Meyer) is a fossil bird allied to the *gallinacæ*, but constituting a distinct order in the class of birds, in the opinion of Prof. Owen. Mr. Parker makes it akin to the palamedea, or screamer. It occurs in the Solenhofen shale, believed to be of Upper Oolitic age.

**Archangel**, a province of Russia in Europe, occupying the entire country from the Ural Mountains on the E. to Finland on the W., and from the Vologda and Olonetz on the S. to the Arctic Ocean and White Sea



## Archangel

on the N. Nova Zembla, and some large islands of the Arctic Sea are also included within it; area 331,640 square miles. The largest part of this great territory is bleak, sandy, and perpetually sterile. Immense plains, lakes and morasses, interspersed with occasional pastures, form the features of the country. The principal source of wealth lies in the forests, which are almost inexhaustible. Hunting and fishing are the principal occupations of the inhabitants. The reindeer, among the Laps in the N. W., and the Samoyedes in the N. E., is domesticated. Chief productions are hay, hemp, cordage, mats, tallow, tar, turpentine, potash, etc. The natives, though of Finnish origin, have now become essentially Russian. The Samoyedes, who are in the lowest scale of civilization, and spread over a vast tract of country, do not exceed in number 7,000; the Laps, not more than 2,000. The chief towns are Archangel, the capital, Onega, and Dwina. Pop. (1908) 413,500.

**Archangel**, a seaport, capital of the Russian government of same name, on the right bank of the Northern Dwina, about 20 miles above its mouth in the Arctic Ocean, and 670 miles N. E. of St. Petersburg. It extends about 2 miles on a low flat along the river, and is ill built, mostly of wooden houses, arranged in two very irregular main streets, and numerous narrow lanes with wooden pavements. The most noticeable buildings are the churches, all Greek but an Anglican and two others that are Protestant, ecclesiastical seminary, two gymnasiums, navigation and engineering school, marine hospital, extensive stone bazar, etc. There are shipbuilding yards, and a government dockyard. The principal manufactures are linen, leather, canvas, cordage, and beer.

Below the town the river divides into several branches and forms a number of islands, one of which, called Sollenbole, is the harbor. It is not accessible to vessels drawing more than 17 feet, but the depth is being increased by dredging. Small craft ascend for 300 miles above the town, and thus furnish the means of a very important inland trade. The principal exports are oats, linseed, flax, tow, tallow, train oil, mats, deals and battens, pitch and tar, and the imports coffee, spices, salt, woolens, hardware, etc. The port is closed for six months by ice. Railways are being laid to connect the town and province with the rest of the empire. The entrance to the Dwina was discovered by Richard Chancellor in 1554; he being driven there by a storm. The city was founded in 1584; and for many years was the only port in Russia open to the ships of foreigners. Pop. (1900) 21,096.

## Archduke

**Archbishop**, a chief bishop. The attentive reader of the Acts of the Apostles, noting that nearly the whole missionary energy of St. Paul was expended upon the cities and chief towns rather than on the villages and the country districts, will be prepared to learn that there were flourishing churches in the leading centers of population, while, as yet, nearly all other parts remained pagan. So strong, however, was the evangelistic spirit prevailing, that in due time every one of the first formed churches was surrounded by a number of younger and less powerful congregations which it had called into being. The pastors of these new churches being called bishops, that term no longer appeared a dignified enough appellation for the spiritual chief of the mother church, and, about A. D. 340, the Greek title of *archiepiscopus* was introduced to meet the difficulty. Two archbishops figure at the Council of Ephesus, in 431, and in subsequent centuries the designation became common over Christendom.

In England the early British churches were, in large measure, swept away by the Anglo-Saxon invaders, who were heathens, and the country consequently required to be reconverted. The great southern center from which this was done was Canterbury, then the capital of Kent, where King Egbert gave Augustine, the chief missionary, a settlement. In the N., York, the chief town of Northumbria, where King Edwin built a shrine for Paulinus, became the great focus of operation for that part of England; hence the two archbishoprics now existing are those of Canterbury and of York. The prelate who occupies the former see is Primate of all England, while his brother of York, is only Primate of England, the superiority of the see of Canterbury, long contested by that of York, having been formally settled in A. D. 1072. The former is the first in dignity after the princes of the blood; the latter is not second, but third, the Lord Chancellor taking precedence of him in official rank. An archbishop is often called a metropolitan. He exercises a certain supervision over the bishops, and receives appeals against their decisions in matters of discipline. In the United States the Roman Catholic Church is the only one which has dignitaries of this rank, and in 1900 the entire country was divided into 14 archdioceses.

**Archdeacon**, an ecclesiastical dignitary next in rank below a bishop, who has jurisdiction either over a part of or over the whole diocese. He is usually appointed by the bishop, under whom he performs various duties, and he holds a court which decides cases subject to an appeal to the bishop.

**Archduke**, a duke whose authority and power is superior to that of other dukes. In France, in the reign of Dagobert, there was



## Archegosaurus

an Archduke of Austrasia; and at a later period, the provinces of Brabant and Lorraine were termed archduchies. The Dukes of Austria assumed the title of archduke in 1156; but the dignity was not confirmed till 1453. In the present day, this title is not assumed by any excepting the princes of the imperial House of Austria.

**Archegosaurus** (ar-kē-go-sā'rus), a fossil saurian reptile, found by Goldfuss, in 1847, in large concretionary modules of clay-ironstone, from the coal field of Saarbrück. Four species have been described. Prof. Owen makes it a remarkable connecting link between the reptile and the fish, and on these grounds: it is related to the salamandroid-ganoid fishes by the conformity of pattern in the plates of the external cranial skeleton, and by the persistence of the chorda dorsalis, as in the sturgeon, while it is allied to the reptiles by the persistence of the chorda dorsalis, and the branchial arches, and by the absence of the occipital condyle or condyles, as in *Lepidosiren*, and by the presence of labyrinthic teeth, as in *Labyrinthodon*, which, however, also ally it to the ganoid *Lepidosteus*.

**Archelaus** (ar-kel'ā-us), a king of Macedonia, natural son and successor of Perdiccas II. He was a liberal patron of literature and the arts, and greatly favored, among others, Euripides and Zeuxis. He died about 398 B. C.

**Archelaus**, a Greek philosopher, the disciple and successor of Anaxagoras. Archelaus is said to have had Socrates for his pupil at Athens. Flourished about 440 B. C.

**Archelaus**, son of Herod the Great. His reign is described as most tyrannical and bloody. The people at length accused him before Augustus (Judea being then dependent upon Rome). The Emperor, after hearing his defense, banished him to Vienne, in Gaul. To avoid the fury of this monster, 7 A. D., Joseph and Mary retired to Nazareth.

**Archelaus**, the son of Apollonius, a sculptor. He was a native of Ionia, and is thought to have lived under Claudius. He executed in marble the apotheosis of Homer, which was found, in 1568, at a place called Fratocchia, belonging to the House of Colonna.

**Archenholz, Johann Wilhelm von** (är'-chen-hölts), a German historian (1743-1812). He took part in the closing campaigns of the Seven Years' War and retired as captain, 1763; traveled extensively in Europe, lived in England the greater part of 1769-1779, and settled in Hamburg in 1792. His book on "England and Italy" (1785), extensively translated, obtained a phenomenal success. A sequel to it was "Annals of British History" (1789-1798,

## Archery

20 vols.). His "History of the Seven Years' War" (1789; augmented 1793, 13th ed. 1892) is still the most popular account of that war.

**Archer, Thomas**, an English novelist and essayist. His works deal with the conditions of the working classes and with social evils. Among the best known are: "A Fool's Paradise" (1870; "Profitable Plants" (1874).

**Archer, William**, a Scottish critic, born at Perth, Sept. 23, 1856. He graduated at Edinburgh University, 1876, and was called to the bar, 1883. He has long been dramatic critic for various London papers, and has published books on the drama, including: "English Dramatists of To-day" (1882); "Masks or Faces: a Study in the Psychology of Acting" (1888); "Henry Irving," a critical study (1883); "William Charles Macready, a Biography" (1890). He is the English translator of Ibsen's dramas (1890-1891).

**Archer Fish**, the *toxotes aculator*, which shoots water at its prey. It is found in the East Indian and Polynesian Seas.

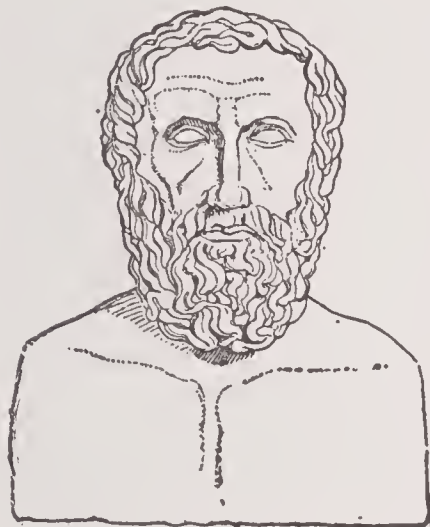
**Archery**, the art of shooting with a bow and arrow. This art, either as a means of offense in war, or as subsistence and amusement in time of peace, may be traced in the history of almost every nation. It always, however, declines with the progress of time, which introduces weapons more to be depended on, and not so easily exhausted as a bundle of arrows. With the ancients, the sagitarii, or archers, were an important class of troops. In the Middle Ages, the bow was much more used by the burghers than by the barons. The Swiss were famous archers. In modern times, this weapon is used by the Asiatic nations, by the tribes of Africa, by the American Indians, etc. In 1813 and 1814, irregular troops, belonging to the Russian army, particularly the Bashkeers, appeared in Paris, armed with bows and arrows, and made surprising shots. This weapon was the leading arm of the English people for centuries, and their expertness in the use of it was proverbial. Great dependence was placed upon archers in war; and frequently has the success of a battle been attributed to their means, as at Cressy, Poitiers, and Agincourt. Most of the English sovereigns had a body guard entirely consisting of archers. In the reign of Charles II. the Royal Company of Archers, as it was called, became merged in the Artillery Company of London. Archery has been revived in modern times as a pastime, and is largely practiced. The Toxophilite Society of London was first established in 1781. The principal instruments employed in archery are the bow, string, arrow, glove and brace. The bows are generally made of yew and ash, and the best arrows come



## Archill

from the latter description of wood. The distance to which an arrow can be sent by a good archer is generally from 200 to 250 yards.

**Archill, Argol, Orchil, Orchill, or Orchal**, two species of lichen, the *rocella tinctoria* and *R. fusiformis*, which grow in the Canary and Cape Verde Islands. They are found on rocks near the sea. They produce a fine but fugitive purple dye, and are largely employed for that purpose. Arriving in this country in its natural state, it is ground between stones so as to be completely bruised, but not reduced to powder. Then it is moistened with a strong spirit of urine, or with urine itself mixed with quicklime. In a few days it acquires a purplish-red, and finally a blue color. In the former state it is called archil, in the latter lacmus or litmus. Cudbear is similarly made. Other lichens, such as the *variolaria orcina*, the *lecanora tartarca*, etc., are sometimes used in place of the *rocella*.



ARCHILOCHUS.

**Archilochus** (ärkil'ö-kus), a Greek poet; flourished in the 7th century B. C. Of his life, nothing is definitely known. He was classed by the ancients with the greatest poets, Homer, Pindar, Sophocles; but of his works only a few fragments have come down to us. His lyrics, in iambic verse, were often pointed with

the bitterest satire; besides satires he wrote hymns, elegies, and epodes.

**Archimedes** (är-kē-mē'dēs), the most famous of ancient mathematicians, was a native of Syracuse. He possessed equal knowledge of the sciences of astronomy, geometry, hydrostatics, mechanics, and optics. Among his inventions were the combination of pulleys for lifting heavy weights, the revolving screw, and a spherical representation of the motion of the heavenly bodies. His inventive genius was especially exemplified in the defense of Syracuse when besieged by Marcellus. It is said that on this occasion he devised a burning-glass, formed of reflecting mirrors of such power that by it he set fire to the enemy's fleet. This well known story is, however, believed to be equally an invention. Upon the city being taken by storm, Archimedes, then in his 74th year, was among those who lost their lives, B. C. 212. His burial place was afterward discovered by Cicero. Eight of the works

## Archimedes

of Archimedes have descended to posterity. They are: "On the Sphere and Cylinder," "On the Equilibrium and Center of Gravity of Planes," "The Measurement of a Circle," "On Conoids and Spheroids," "On Spirals," "The Quadrature of the Parabola," "The Arenarius," and "On Floating Bodies."

**Archimedes, Principle of**, a well known principle in hydrostatics, the discovery of which is attributed to the celebrated philosopher whose name it bears. This important theorem may be thus defined: When a solid is immersed in a fluid, it loses a portion of its weight, and this portion is equal to the weight of the fluid which it displaces, that is, to the weight of its own bulk of the fluid. An experimental proof of this principle is thus obtained: From one of the arms of a balance is suspended a hollow cylinder, having a cylindrical mass of any substance capable of exactly fitting into it, hanging from it by means of a thread. From the other arm of the balance hangs a scale-pan, into which weights are placed until the solid cylinder and the hollow one are exactly counterbalanced. Water is then poured into a vessel around the solid cylinder, until it is completely immersed; upon which the weights in the scale pan will preponderate, the solid cylinder seeming to have lost a considerable portion of its weight. The balance will, however, be brought into equilibrio, if water be poured into the upper hollow cylinder until it is quite full. Now, as this hollow cylinder is of such a size that the solid mass exactly fits its interior, it follows that the water with which the hollow cylinder is filled is precisely equal in bulk to the solid cylinder; which proves that the apparent loss of weight suffered by the latter is precisely equal in weight to a mass of water equal in bulk to itself. This very ingenious method forms one mode — but not the most exact — by which the specific gravity of solids is ascertained. A wonderful story is told in connection with the discovery of this important principle. Hiero, King of Syracuse, intending to offer to the gods a crown, caused one to be manufactured of pure gold. When brought home, the crown appeared to be of full weight, but it was suspected that a part of the gold had been stolen, and a like weight of silver substituted. Archimedes was desired to investigate the supposed fraud, and while engaged in solving the difficulty, he happened to enter the bath, where, observing that a certain quantity of water overflowed, equal to the bulk of his body, he instantly saw in it the solution of the problem. Carried away by his ardor, he is said to have hastened home, without waiting to dress, crying out, "Eureka!" ("I have found it!")



**Archimedian Screw, or Spiral Pump,** a machine invented by Archimedes, the celebrated Syracusan philosopher, while studying in Egypt. Observing the difficulty of raising water from the Nile to places above the reach of the flood tides, he is said to have designed this screw as a means of overcoming the obstacle. It consists of a pipe twisted in a spiral form around a cylinder, which, when at work, is supported in an inclined position. The lower end of the pipe is immersed in water, and when the cylinder is made to revolve on its own axis, the water is raised from bend to bend in the spiral pipe until it flows out at the top. The Archimedian screw is still used in Holland for raising water, and draining low grounds. The Dutch water screws are mostly of large size, and are moved by the wind, one windmill furnishing sufficient motive power to keep several screws going at once.

**Archipelago,** a term applied to such tracts of sea as are interspersed with many islands. It is more especially applied to the numerous islands of the Ægean Sea, or that part of the Mediterranean lying between Asia Minor and Greece. These islands are principally divided into two groups called the Cyclades and Sporades. The former contains the Islands of Kythnos, Lyra, Seriphos, Keos, Anoros, Tenos, Naxos, Thera, Ios, Melos, Kimolos, etc., all belonging to Greece, and forming the province of the Cyclades, containing an aggregate population (1896) of 134,747. The Sporades group consists of Seio, Cos, Rhodes, Samos, Mitylene, Lemnos, etc., and had a population (1896) of 115,515.

**Architecture,** the art of building, especially with a view to beauty or magnificence. The first habitations of man were such as nature afforded, or cost little labor to the occupant—caves, huts, and tents; but as soon as men rose in civilization and formed settled societies they began to build more commodious and comfortable habitations. They bestowed more care on the materials, preparing bricks of clay or earth, which they dried in the air, or baked by fire.

*Egypt.*—The history of architecture is generally regarded as beginning with the construction of the Egyptian pyramids, 4,000 or 3,000 years B. C. The architecture remaining from the middle empire (3000–2100 B. C.) is chiefly represented by the tombs found at Abydos where excavations, in the early part of 1900, laid bare very interesting details of ancient life, and in the tombs hewn out of the rocky cliffs of the W. bank of the Nile. Several of these tombs at Beni Hassan were made architectural by decorative treatment with columns with 8, 16 or even 32 sides, having something like embryonic flutings and a

square abacus, suggesting the Greek Doric order and therefore said to be "Proto-Doric." The development of Egyptian art and architecture was interrupted for a number of centuries by the invasion of the shepherd kings (Hyksos); but after their expulsion about 1700 B. C., a new series of dynasties reigned at Thebes, and the temples and tombs erected by Thothmes, Amenophis, and Queen Hatasu, by Seti and Ramses, are splendid monuments of Egyptian genius.

*Other Ancient Styles.*—The typical form of Chaldean and Assyrian architecture was the pyramid made of mounds or terraces built of crude brick and sometimes faced with hard brick or even stone brought from the mountains of Mesopotamia. Vaults and arches were used to a certain extent. The buildings were splendidly decorated with alabaster slabs elaborately carved, by painted plaster and brilliantly enameled tiles. Recent excavations at Niffer point to a considerable knowledge of architecture displayed fully 7,000 years ago.

Persia had excellent building material and with the growth of luxury following the period of conquest the Achæmenidæ who reigned from 566 to 330 B. C. distinguished themselves by erecting magnificent palaces. Egyptian and Assyrian systems were applied with modifications. The Hebrews had no distinctively national architecture. The temple at Jerusalem, a few rock tombs, and the city gates of Jerusalem are the only monuments of Jewish architecture.

The architecture of the far Orient stands by itself. The earliest Buddhist remains in India are attributed to Asoka, who reigned from 272 to 236 B. C. They consist of stupas or topes, which are mounds inclosing relic shrines, chaityas or temple halls cut in the rocks, and viharas or monasteries. It is supposed that the Buddhist style of architecture directly influenced the Jaina temples, the earliest of which, built on Mount Abu in the Indian desert, in 1032, by Vimala Sah, consists of a court 140 feet long and 90 feet wide and surrounded by cells and a double colonnade. The dome and columns are covered by an exuberance of carvings and sculptures.

In China the buildings are generally of wood, clearly framed, adorned, and often grotesque in their ornamentation. The frequency of earthquakes in Japan militated against any monumental architecture. The gateways to the temples are often of richly carved wood. The imperial palace at Tokyo is composed of one-storied wooden buildings.

*Greece.*—The architecture of classic Greece is due to the Dorians and Ionians. As the column was the most important feature in the Greek public architecture, the two distinctive forms of it, called respect-



ively Doric and Ionic, gave their name to the systems of columnar design. The column of the Doric order, from three and a half to seven diameters in height, was tapering, and had neither pedestal nor base; its shaft had 20 shallow flutings with sharp edges. The capital, which was half the diameter in height, had no astragal or knuckle-bone moldings, but was made up of a circular echinus or ovolo adorned with fine grooves and a square abacus or tile-cap without fillet or ornament. On the abacus rested the plain architrave with a narrow fillet on the upper edge. The frieze was divided into square panels called metopes, separated by vertical triglyphs, each of two vertical grooves with chamfered edges. Over each column was a triglyph and one or two in each column. The cornice projected and rested on a bed-mold of one or two simple moldings. The soffit, or under surface of the molding was adorned with square flat projections called mutules each having 18 conical shaped ornaments called guttæ depending from it. The tympanum or inclosed triangular field of the gable was often adorned with sculptures, as were also the metopes. The best examples of Doric architecture were the temples of Athene (Minerva), called the Parthenon, and the temple of Theseus at Athens and the temple of Athene at Sunion (Sunium). Primitive wood construction seems to be imitated in the details of the Grecian Doric. The triglyphs represent the ends of cross beams made of three planks; the mutules, the sheathing of the eaves, the guttæ, the heads of the spikes. Simple and dignified as were the details of the Doric order, they were rendered brilliant by artistically contrasted colors -- red, green, blue, buff, and gold.

In the Ionic order, the column was slender. It stood on a base usually composed of two convexed moldings of semi-circular profile, short tori separated by a semi-circular concave molding, called the scotia, and sometimes also provided with a plinth or square flat base block. The shaft, which was 8 or 10 times its diameter in height, had 24 deep, narrow flutings, separated by narrow fillets. The capital had a bead or astragal, and echinus, above which was a horizontal band ending on both sides in scrolls or volutes. The architrave was separated from this by a thin molded abacus. Above this came the entablature, comprising an architrave of several flat bands crowned by thin moldings, a frieze without metopes and frequently sculptured in relief, above that a cornice of exquisite workmanship. Often this was crowned by a row of narrow blocks or dentils supporting a high cymatum carved with honeysuckle ornaments. The origin of the Ionic order is still a matter of dispute, but it is believed to have been derived from Asiatic

sources. The examples found at Halicarnassus, Miletus, Priene, Ephesus, and elsewhere in Asia Minor, are among the most splendid representatives of this order.

A third order of architecture, sometimes regarded as a special one, is called the Corinthian; but this is a late outgrowth of the Ionic. The Greeks developed this less than the Romans. The architecture of the Greek religious and secular edifices depended largely for beauty upon the development of these orders, and the temples especially, ruins of which have lasted till our day, show that their mastery of proportion and detail and exquisite symmetry has never been surpassed.

The historical development of Grecian architecture has been divided into six periods. (a) The Archaic, from 650 to 500 B. C., in which the Doric order was exclusively used and is typified by the temple at Corinth, the northern temple at Selinus in Sicily, the temple in Paestum, in Southern Italy, and the temple at Assos, in Asia Minor. (b) The Transitional, from 500 to 460 B. C., typified by the temple of Athena at Ægina, the temple of Zeus at Olympia, and the supposed temple of Herakles (the Theseus) at Athens. (c) The Periclean, from 460 to 400 B. C., the most perfect monument of which was the Parthenon, the temple on the Acropolis, measuring 220 by 100 feet, the work of Iktinos and Kallikrates, built for the chryselephantine statue of Athena Parthenos, by Phidias. The monuments of this age are regarded as the most magnificent of all the architectural triumphs of the Greeks. (d) The Alexandrian, from 400 to 300 B. C., marked by sumptuous splendor rather than artistic perfection. The temple of Apollo Didymæus, at Miletus, was 366 by 163 feet. The temple of Artemis (Diana) measured 342 by 163 feet. (e) The Decadent period, from 300 to 100 B. C., marked by weakness and lack of life in Athens itself, but having some superb examples of architecture in Asia Minor. (f) The Roman period, lasting from 100 B. C. to A. D. 200, of which the temple of Olympian Zeus, at Athens, measuring 354 by 171 feet, is regarded as the most important monument. Several of the columns of this temple were carried to Rome and served as models in the development of the Roman Corinthian order.

*Italy.*—The Romans were a composite people, and each of the elements which went to make up the nation furnished its quota toward the development of the practical architecture which covered Italy and indeed all parts of the Roman empire with splendid monuments. The city of Rome itself was founded 753 B. C. When the Etruscans were absorbed, they contributed to Roman architecture the knowledge of the vault. The Cloaca Maxima and the even earlier sewer which was discovered a



few years ago, remain a monument of their engineering skill. The few buildings of republican Rome were mostly of Etruscan design and workmanship. After the Greek States had been conquered by the Romans and the multitude of artistic spoils had been brought back to Italy, together with a host of Greek artists, the city began to be decorated with splendid buildings, in which Greek ideas were modified to meet new needs. The Etruscan column with its simple entablature was retained. The Doric and Ionic forms were adopted and the Corinthian was developed into an independent order, while the Composite order was added to the list. Monolithic shafts were erected instead of those built out of super-imposed drums. Columns of porphyry or verd-antique were highly polished and fluting was omitted. The arch and vault were made the base of almost all designs and the Roman skill in engineering enabled them to conquer tremendous difficulties in the process of building. New methods of ornamentation with elaborate carving were employed for both exterior and interior decoration and most brilliant colors were used. Floors, wall spaces, and ceilings were often covered with elaborate mosaics, and the most rare and richly colored marbles were brought from all parts of the known world. Besides the Colosseum, the Pantheon, the Theater of Marcellus, and the remains of temples, baths, with their great vaulted halls, triumphal arches and other monuments still survive in Rome itself and in the provinces of the empire as examples of ancient architecture. One of the noblest of all the temples of Rome was the circular temple, called the Pantheon, built by Hadrian early in the 2d century A. D., measuring 143 feet in diameter, with the walls 20 feet thick and supporting a semi-spherical dome rising to a height of 140 feet. The Roman baths were also wonderful examples of architectural engineering and of practical utility. The Roman theater was built of wood. The first stone theater was built 55 B. C. by Pompey. The Colosseum was completed 82 A. D., and measured 607 by 506 feet, was 108 feet high and accommodated 87,000 spectators. Triumphal arches were among the most characteristic products of Roman architecture. There were no less than 38 of these in Rome itself. The most perfect of those still extant is the arch of Titus. The arch of Constantine, built 330 A. D., near the Colosseum, had sculptures taken from the earlier arch of Trajan. The later emperor built magnificent palaces. At Pompeii are the well preserved remains of many houses which are supposed to be typical of Roman architecture. The general plan of these houses seems to be of Greek origin.

*Early Christian Architecture.*—Constantine endowed Bethlehem and Jerusalem

with splendid churches, and when he founded his new cathedral at Byzantium on the Bosphorus, he dedicated the church to the Holy Wisdom (Hagia Sophia). Only one of the basilicas of Constantine is left in Rome, St. John Lateran, but modern alterations have largely changed it. The Church of St. Paul Beyond the Wall was built by Theodosius, in 1386. It lasted till 1821 and has since been rebuilt and is regarded as one of the most impressive places of worship in Rome. Early Christian architecture was characterized by the basilica with three or four aisles and the use of wooden roofs. Byzantine architecture was characterized by vaulted monuments, with the pendentive dome supported on the summit of four arches spanning the four sides of a square. Instead of taking concrete for the substructure, they used brick and stone, and many of their forms of vaulting were of remarkable ingenuity. The interior was richly decorated, characterized by colors in mosaics rather than carvings. The most important building in Byzantine architecture is the Church of St. Sophia, built 532 to 538 A. D. The dome rests upon four arches and the nave measures 200 by 100 feet, flanked by enormously wide aisles, and rises 180 feet. So perfectly is it poised that in 1,500 years it has not been destroyed by the earthquakes which have ruined so many buildings in the East. The Church of St. Mark, at Venice, which was begun in 977, has a fine dome, and the decoration of its interior still preserves its brilliant colors.

*Moslem Architecture.*—The spread of Mohammedanism through Asia and Africa, and even into Europe, was accompanied by the building of remarkable mosques and tombs. Among the earliest of the Mohammedan mosques was that of Amru, at Cairo, built in 642, and enlarged early in the 8th century; the mosque of Ibn Tulun, built 876 to 885, in Cairo, on the same plan as that of Amru, but had cantoned piers instead of parallel ranges of columns. Arabic architecture shows itself in the mosques of Kalaun (1484), Sultan Hassan (1356), El Muyyad (1415), and Kaid Bey (1463). It very curiously corresponds with the development of Gothic architecture in Europe. The characteristics of Arabic architecture are its beautiful domes and minarets, the pointed vaults and arches. The most magnificent example of Moorish architecture in Spain is the Alhambra, which was begun in 1248 and has been several times enlarged. The delicacy and richness of its ornamentation is its chief glory.

*Romanesque Architecture.*—Romanesque architecture has been divided into four broad divisions, called the Lombard, the Tuscan Romanesque, the Italo-Byzantine, and the Early Christian or Basilican. The Lombard monuments belong chiefly to the



11th and 12th centuries, and fine churches of this style are found in Milan, Pavia, Piacenza, Bologna, and Verona. Many of these churches had detached bell towers or campaniles; some of them were decorated with carvings of a grotesque character. The Tuscan Roman or Pisan architecture betrays the influence of Byzantine traditions. Many of the churches have alternate bands of white and colored marbles. The Duomo of Pisa, built from 1063-1118, is 312 feet long and 118 feet wide. The baptistery is circular and has a lofty central hall surrounded by an aisle. Here also is the famous leaning tower built in 1174. The Romanesque architecture of Western Europe has sometimes been called "the round arched Gothic." This style is shown in the great monasteries which rose in the 11th and 12th centuries.

*England.*—No style of architecture is better known in England and Scotland than the Norman, owing to the abundance of examples which remain. It is characterized by round-headed openings, by flat buttresses like pilasters, and by the richness and quaintness of the carving, especially so many of the doorways and chancel arches of even the smaller churches. In the cathedrals and large churches the pillars dividing the aisles from the nave are very massive. Among the many examples in England may be mentioned the cathedrals of Durham, Canterbury, Peterborough, and parts of Lincoln and Winchester. All the existing abbeys and cathedrals of the Normans had originally wooden ceilings. The stone vaults seen in some were supplied at a later day. Most of the elaboration which was given to the churches was lavished upon the doorways, and in nearly all the Norman churches the characteristic round arches were afterward changed to the pointed Norman arch. The church at Iffley is a good example of the original Norman façade.

*Gothic Architecture.*—The name "Gothic architecture" has been applied to the architectural styles developed in Western Europe during the third and fourth centuries preceding the year 1600. The name, however, has nothing whatever to do with the Goths. The style is simply a development of the Romanesque. Groined vaults were generally substituted for barrel vaults so that masses of masonry could be concentrated at isolated points of support. The piers or buttresses bearing the principal strain, immense windows could be supplied and were generally filled with magnificent stained glass. Another of the characteristic features of Gothic architecture was that of flying buttresses, where the thrusts of the vaulting were transmitted by half arches to internal buttresses. Fine examples of this are found in the cathedrals of Central and Northern France. The principles

of the concentration of strain and balanced thrusts are the structural basis of the Gothic style. The ribbed vaulting and the pointed arch are the characteristic outcome of the application of these principles. The Romanesque edifices were generally simple, low and massive; the Gothic generally higher and more slender, so that the interior aspect was much modified and the exterior was still more transformed. The towers, spires, pinnacles, great windows, triple portals, enormous rose windows in the gables, gave a light and airy appearance to these splendid edifices.

Gothic architecture has been divided historically into three periods, distinguished by the characteristic window tracery. These are called "the early pointed," from the middle of the 12th century till toward the end of the 13th century, "the middle pointed period," which covered the century from 1275-1375, and the "florid Gothic period," which came down through the first quarter of the 16th century. The choir of the Canterbury cathedral was the first example of a thoroughgoing application of Gothic principles to church buildings. This was rebuilt by William Sens sometime after 1170. As soon as the transition from the Norman to first pointed architecture was complete, the latter was characterized by its narrow pointed or "lancet" windows, without any, or with only very simple, tracery. Further distinguishing features are high gables and roofs, and slender pinnacles and spires. Buttresses are deep instead of shallow, as in the Norman, and shafts slender, whether they are simple or clustered. The capital is bell-shaped, either with plain moldings or with bold and graceful foliage, and the abacus in England is round instead of square. The moldings consist of projecting rounds and deep retiring hollows, which give strong light and shade. In England, Salisbury cathedral is wholly in this style; so are the nave and transept of Westminster Abbey. It gradually stiffened into what is called the "late pointed style" or "the florid Gothic period." This is easily distinguished from the previous style by the tracery of the windows, which is characterized by an upright and square tendency. Perpendicular lines prevail in the windows as well as in the ornamental paneling. The doorways have square heads over pointed arches. Gables and roofs are at a low angle. Clerestory windows are more frequently square-headed than arched. Only in this style do we find the depressed four-centered or Tudor arch, although arches with two centers are also used.

In Germany the development of Gothic architecture was less interesting than in France and England. The Germans were slow to give up the Romanesque, but when they once took hold of the new style they carried it to an extravagant height, as is



exemplified in the cathedrals at Ulm, Strasburg, Nuremberg, and elsewhere. Among the innovations was the raising of the side aisles to the same height as the central aisles.

After the Moors had been driven out of Spain and enormous wealth had been acquired, many great cathedrals were built at Salamanca, Toledo and other places. The largest church built during the Middle Ages in Europe is the cathedral of Seville, which measures 415 by 298 feet, comprising five aisles, the central one being 56 feet wide and 145 feet high. Many of the Italian cities built splendid cathedrals, for instance, at Siena, Arezzo, and Orvieto, the Duomo at Florence, the wonderfully decorated cathedral at Milan, the church at San Petronio and at Bologna. Instead of a spire the Italians preferred a square tower as is shown in the beautiful campanile at Florence, which is regarded as one of the finest examples of Italian Gothic art.

*The Renaissance.*—Roman or classic architecture may be said to have never entirely died out of Italy and when, in the 15th century the revival of classic literature and taste, stimulated by Dante, Petrarch and Boccaccio, took place, the ancient classic style of architecture naturally revived also. This is called the Renaissance. It has been attributed to the natural "protest of individual reason against the trammels of external and arbitrary authority." The new art had its origin in Florence and soon spread through nearly all the cities of Northern Italy. It has been divided into four periods. The Early Renaissance dating from 1420–1490; the High Renaissance, 1490–1550; the decline or Baroque, 1550–1600; and the Rococo, 1600–1700. It was not in great buildings, such as cathedrals and palaces, but in smaller works such as gateways, chapels, tombs, and fountains that the architects of the Early Renaissance succeeded in doing their most charming work. Some of the altars or pulpits are especially pleasing. Many of the palaces in Northern Italy, especially in Venice, were remarkable for their mixture of classic and Byzantine design. The greatest of the Renaissance churches was that of St. Peter's at Rome, which was begun from a design of Bramante in 1506 and was completed by Michael Angelo, who supplied a dome in 1546. It is 400 feet in diameter and rises to a height of 405 feet. The dimensions of the edifice are so vast that they dwarf the harmonious proportions of the whole. In 1606 the nave was enlarged and hides the dome from view as one approaches. The present façade was designed by the same architect, Maderna, who lengthened the nave. St. Peter's is the largest church in existence. The center hall is nearly 600 feet long. Its paneled and gilded vault is 83 feet high in span.

The type of church established by St. Peter's was widely imitated throughout Europe, especially in Italy. The period of formal classicism, developed in the latter part of the 16th century, was followed by what is called the Baroque style, which consisted of broken and contorted pediments, heavy moldings, and awkward sculptures, with a general disregard to dignity. This style prevailed in church architecture for almost two centuries. Many of the older and more dignified edifices were ruined by the application of this style.

*Renaissance Architecture in France.*—The French Renaissance has been divided into three periods: (a) that of the Valois, 1483 to 1589, divided into the transitional period which was characterized by a mixture of classic details with Gothic conception; (b) the style of Francis I., lasting from 1520 to 1547; the advanced Renaissance, comprising the years from 1547 to 1589; and (c) the Bourbon or classic period, from 1589 to 1715, and comprising the style of Henry IV. and Louis XIV. The most important of all the architectural enterprises of the reign of Francis I. was the Louvre, which was begun in 1546. It was not completed till late in the 19th century. The preëminence which the French obtained in the disposal of monumental masses, picturesqueness, and in mastery of design has been largely retained by them down to the present time.

*Renaissance Architecture in England.*—The Tudor style, which is a degenerate form of the Gothic, was largely used in England during the reign of Henry VII. and VIII., especially in the erection of country houses. Hampton Court, Haddon Hall and other show places of England arose at this time. Under the reign of Elizabeth down to the end of the 16th century, a new variation of architecture arose, which takes the name of Elizabethan. The pointed arch was no longer seen and the classic orders were often used in interior and exterior decoration. Inigo Jones, who flourished in the first half of the 17th century, copied largely from Palladio and other Italian masters of classic Italian architecture. One of his masterpieces is the Chapel Royal, intended as a banqueting hall, for a great palace in London, designed to measure 1,152 by 720 feet. He also built Wilton House, the villa at Chiswick, and St. Paul's at Covent Garden. Sir Christopher Wren was the architect of St. Paul's cathedral in London, which was begun in 1675, nine years after the destruction of the Gothic cathedral in the great fire. The church measures 480 feet in length and has transepts 250 feet long and a rotunda 108 feet in diameter. The dome is surmounted by a stone lantern and is 360 feet high. Wren also introduced what is called the English Renaissance type of steeple, which consists of the conical or



pyramidal spire added to a belfry on a square tower.

*Renaissance Architecture in Germany.*—The transformation of German architecture began after the middle of the 16th century. Many magnificent castles, town halls, and even private houses belong to the Renaissance style of architecture. The German modifications of this style went toward picturesque ornamentation and grouping of quaint and fantastic compositions.

*Renaissance Architecture in Spain.*—After the overthrow of the Moors and the discovery of America, when enormous riches poured into Spain, it was natural that architecture should have received a great impetus. The Flamboyant Gothic style was succeeded by a style of the Renaissance called Plateresque, because the sumptuous decorations lavished upon the jeweler's art were applied also to churches and palaces. This style was succeeded by what is called the Griego-Romano style, which was broadly classic but lacked originality and interest. The cathedral at Grenada, built in 1529, was one of the finest in Spain, and the churches at Malaga and Salamanca are interesting examples of the Plateresque system of decoration. Among the triumphs of the Griego-Romano style was the cathedral of Valladolid, built in the 16th century. The most interesting building of this period was the monastery of Escorial, begun in 1563, and not completed for nearly 150 years.

*Modern Architecture.*—Toward the close of the 18th century the Roman revival, which had planted many buildings with arcades and porticos copied from those of the Romans, was followed by what is called the Greek revival. With no regard for propriety, the Greek Doric and Ionic columns were applied to every kind of building. One of the first of these buildings was the Bank of England, built in 1788. The British Museum consists of a colonnade which Professor Hamlin says is "a mere frontispiece applied to the badly planned and commonplace building from which it cut off necessary light." This application of Greek forms was seen in many public buildings and in many country residences. Other examples of classic revivals, both Greek and Roman, are found in all parts of Europe, as, for instance, St. George's Hall at Liverpool, The Museum at Berlin, the Walhalla at Ratisbon, the Glyptotek at Munich, the Court Theater at Berlin, the Parliament House at Vienna, the Pantheon at Paris, and St. Isaac's Cathedral at St. Petersburg, and others. Many of the great cities have during the last few years been largely remodeled by the necessity of providing room for the rapidly increasing population, and vast increase of wealth concentrated in the hands of comparatively few has caused

enormous sums to be spent on public and private buildings. Whole blocks of commonplace architecture have been added to the cities of Berlin and Rome. The towns of Buda-Pest and Vienna have been largely rebuilt. Among the monuments of what has been called the Victorian Gothic style, which has come into vogue during the last 50 years, are the Parliament House at Westminster, the new Museum at Oxford, the Albert Memorial at London, and the Natural History Building at South Kensington.

*Architecture in the United States.*—Naturally enough, in the early periods of American architecture, the buildings were in imitation of those in England. Many of them, indeed, were made from materials brought from across the Atlantic. The so-called colonial style of architecture was a modification of the Queen Anne style of England, as shown in many interesting churches and a few large and important houses. The Old South Church at Boston, and Trinity Church at Newport, St. Paul's at New York, and Christ Church at Philadelphia, are among the best-known examples of this style. The colonial dwelling houses, many of which have been imitated in later times, show abundant examples of the broad and generous treatment of this style of architecture. Among the most interesting of these is the Craigie House at Cambridge, where the poet Longfellow spent the last part of his life. During the early republican period a few public buildings were erected, notably the State capitols, and the original capitol at Washington. The classic revival, which took place in Europe, was also echoed in the United States. The White House at Washington is an imitation of the English country house. The Boston and New York custom houses were in this classic style. During the last 30 years a revival of interest in architecture has taken place, and important public buildings, churches, and museums of commendable style and beauty have been erected. The aspect of the larger cities has been greatly changed by the erection of what have been called "sky-scrapers," enormous combinations of stone and metal, sometimes 20 or even 30 stories high. There is gradually growing a more dignified and artistic spirit and many monstrosities, which have been erected often at public expense by inexperienced and incompetent architects, are now regarded with disfavor. The tendency in architecture is toward a purer taste with practical adaptation of appropriate forms to new conditions.

A. D. F. HAMLIN.

**Architecture in the 19th Century.** The establishment on a firm basis of the present national government is nearly contemporaneous with the beginning of the 19th century, and before many years had elapsed the Federal buildings in Washington at-



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tracted the attention of historians. Congress met in Washington in November, 1800, as if with expressed determination to be in session there when the new century should begin. At that time, though the capital city has been for 10 years decided on and its exact location determined, the only buildings which the Federal government found ready for its use were a part of one wing of the Capitol and as yet incomplete buildings for the Treasury Department and War Department. The White House was not yet ready for its proposed use as a residence. Nor did these buildings make very good progress and when they were burned by the British army in 1813 but little loss was suffered.

After the war with Great Britain, the Capitol was rebuilt rapidly, and completed in its original form, as many men now living remember it, with a low central dome over what were then the wings occupied by the Senate and the House of Representatives. The White House also was finished in its present form, though the completion of the portico lingered for a time. The "Octagon House," now occupied by the American Institute of Architects, is reputed to have been used by the President during the building of the White House; the building is not octagonal, however, but of an ingenious and unusual plan well calculated to provide an agreeable residence.

Otherwise, throughout the United States there was but little change or development in the line of architectural art. The Georgian epoch of design had passed, except in the construction of dwelling houses. A Greek taste prevailed, and an ambition to produce Grecian architecture was uppermost in the minds of all who undertook public buildings. The lyceums or town halls throughout the country, the city halls and court houses, and State houses or capitols, were generally designed with colonnades. Of this nature is the principal building of the college designed under the auspices of Thomas Jefferson, if not by that statesman himself; of this character is the old custom house (now the Sub-Treasury) in New York, which is a very faithful copy of a hexastyle Doric temple; and of this character are the Nashville State house, the capitol at Montgomery, and a great number of buildings, large and small, in the North as well as in the South, erected at all periods up to the middle of the century. At the same time, however, the dwellings were much more commonly in the grave and decent style which we have generally called "Old Colonial architecture." In this respect New York city was peculiarly fortunate. Whole quarters of the city were thickly built up with houses of the most satisfactory style which has yet been employed in domestic architecture in

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the United States — or, at least, which has received general acceptance. Many single blocks or isolated buildings throughout that part of the city which lies S. of Bleecker street still remain in their original condition, and in these is to be seen the original American domestic architecture of the time before 1835. Of the same years are many interesting houses in the New England towns, as well as in Maryland and Virginia. These houses of the 19th century are often confused with the much older houses which are properly "Colonial," and, indeed, are distinguishable only by the student who will observe the architectural details with some care. The taste for Greek architecture is, it is true, traceable in them in the rather frequent appearance of a colonnade of four or six or, as in one well-known case in Farmington, Conn., of five columns — a nearly unique architectural device. At any time between 1820 and 1850, if a wealthy man wished to build himself a house of unusual stateliness, he would turn the simple domestic "piazza" into a portico of Greco-Roman dignity. Thus in Charleston the Ficken mansion has a hexastyle portico at least as dignified and nearly as large as that of the custom house, and a large mansion on South Battery has a Corinthian portico of four columns serving as its entrance porch. With the years beginning with 1835, the houses of the cities became more often large and handsome, with costly mahogany doors, large rooms divided by colonnades of white-painted wood, and very ample and easy staircases — all of them features known to the country mansions, but hardly to city life till that time. Here again New York city is the most important center of interest, for the houses of Washington square and those in West 8th street (Clinton place), 9th street (Brevoort place), and East 8th street (St. Mark's place) are very generally of this type, and never since that time have rows of street houses been so well handled or their interiors so well understood. The houses of Boston at this time were as good internally, and had certain peculiarities of plan recommending them to the student, such as the use of the alley passing through and under the house to the back yard, of the utility of which plan much might be said; but their exteriors were generally less noticeable. The narrow and crooked streets and something in the popular taste almost forbade external display or even elegance. In Philadelphia, on the other hand, severity was caused rather by the strong Quaker influence than by anything in the external character of the town, while the easy access to white marble in considerable quantities made this a favorite material. Hence arose the well-known type of the Philadelphia house, with walls of red brick, white



marble lintels, sills, and doorsteps, and, as the houses were built close to the sidewalk, without areas and with the entrance nearly on a level with the street, a display of solid white-painted wooden shutters which carried out the chromic effect to the full.

The cities of the South were less crowded, less busy, more decidedly marked by the distinction between elegant and humble dwellings. In Mobile, Charleston, Savannah, the characteristic dwelling was rather a more stately mansion standing free or nearly so, and having broad verandas or "galleries" which, however, were not turned toward the street, but sidewise upon gardens. Savannah, however, has a very unusual plan: a succession of square, open "places" from each of which four streets lead in four directions, giving a series of square corners and allowing of an irregularity of shape in the house-lots which is not known in our other cities. It is a matter of regret that this plan is not preserved in the newer quarters. The residences in Savannah commonly have windows along their sides opening upon a garden, which, if small, is private, made so by brick walls of sufficient height.

The Gothic revival made itself manifest in the United States at an early date. Few carefully designed buildings in the mediæval styles had been built even in England, when, in 1839, Richard Upjohn took charge of the work on Trinity Church in New York, his task there passing almost immediately into the designing of a wholly new structure, which was finished in 1846. At about the same time the Church of the Holy Trinity in Brooklyn, which still stands unaltered, was built by Lefevre, whose name is almost forgotten because of his death soon after the completion of this one important work. These buildings were carefully studied from the English Perpendicular style; and as English Gothic hardly included vaulting as a necessary feature, this was wholly omitted in the American examples, though unfortunate afterthought caused some poor imitations of vaulting in woodwork and plaster. Apart from this, the churches were solidly built and with attention to the archæological propriety of every part; the inevitable slips in this direction being caused by the lack of recorded and accessible knowledge in those pre-archæological days.

No form of Pointed style was in common use for any other buildings than churches; the same architects who did their best to build Gothic churches preferred to design private and business dwellings of different aspect, though there appeared a few buildings which, like Harvard College Library and Yale College Alumni Hall, were reminders of English collegiate Tudor architecture. Upjohn, apart from his Gothic proclivities,

was rather famous for his small Italian villas, some of which were of singular grace of design; and A. J. Downing, the landscape gardener, though he occasionally put pointed arches and a steep gable roof to a cottage, carried his Gothic efforts no further than this, and seems to have preferred Elizabethan or some other semi-classic style for the numerous country houses which he designed. The public buildings of the time just preceding the middle of the century (nearly always of pseudo-Greek style, as has been said above) were unimportant, and have been, in the main, replaced by more impressive structures. The country houses were also, as a general thing, without marked character, and the rows of street fronts in New York, Philadelphia, and Boston, and in the newer and rapidly growing cities of the West, were unmarked by architectural intelligence.

In a very few cases a larger house was designed with some faithfulness, preserving a little of the simplicity of the bygone Georgian period, or carefully studied from French Parisian building, or the more tranquil and simple city fronts of Italy. Still, the arrival of the year 1850 found no important architectural movement existing in the country; nor was this year followed by any very marked development. Two or three years later, J. Wrey Mould came from England and began to build the Unitarian Church in New York at the corner of 4th avenue and 20th street. His design included a lofty and slender campanile, which has never been built; and the church was marked by a character of architectural and sculptured detail and by a logical solidity of structure that are even now not very familiar to American designers. This, however, was Mould's only great chance; his other buildings were comparatively unimportant, and his work in the adornment of Central Park in New York is undistinguishable from that of other artists employed upon the same terraces and bridges. St. George's Church in New York was completed, except for the spires, in 1853, under the direction of Leopold Eidlitz, who succeeded to his former partner and, perhaps, the first designer of the church. This church has since been injured by fire, and altered; but the original scheme, with an undivided and unbroken interior, and a roof supported by carefully designed timber trusses of two patterns, alternating one with another, was one of the boldest and most satisfactory buildings in the United States. The spires were built by Mr. Eidlitz a few years later, and were remarkable as the only pierced spires of Romanesque design known to students; but, unfortunately, the poor quality of the stone caused their removal. The above-mentioned buildings had architectural character, but the greater part of even the respectable



and useful structures of the time were comparatively devoid of it. The Boston Athenæum, with its good plan and really excellent reading room; the New York Astor Library, the Boston Public Library on Boylston street, finished about 1858, and some smaller buildings which the Eastern cities managed to pay for during the decade from 1845 to 1855, were generally as devoid of individuality as were the stone-faced hotels and State houses of the time. During the years from 1845 to 1860 the building of the Southern cities and their immediate neighborhood was carried on much in their old lines—the lines of the Georgian architecture. What deviation there was from this was still rather in the direction of the supplying of obvious needs. Thus, the houses of Beaufort and of other seaside summer resorts were not unlike English Georgian manor houses, with this peculiarity, that they were large with a few spacious, open rooms and wide halls, giving the idea of small and simple English manor houses increased in scale—a scheme very appropriate to the low latitude and the steadily warm summer weather. New Orleans, most conservative of American cities, showed no change in its outward aspect. The Western cities had received the inoculation of the very evil system of irrational ornamentation which marked also the buildings of the East, as will be stated below.

About 1855, Richard Morris Hunt, having returned from Paris, where he had been a student and also assistant to a prominent Paris architect, built the Studio building in West 10th street, and the since-destroyed private house on the N. side of West 38th street, putting into these something of that French completeness of plan and of exterior disposition of parts which the country had hardly known before. Hunt also established an atelier on the Paris plan; and half a dozen of the architects most successful and most reputed between 1870 and the close of the century were for a time inmates of that studio. Experiments were tried in those days—experiments both in material and design—which it is sad to see were wholly abandoned during the years which followed. Thus, when Upjohn built Trinity Building in New York, a business building, a mere investment for Trinity parish, he used terracotta for the cornice, and by this means obtained a boldness of overhang which he would hardly have dared to give in stone. Terra-cotta had to be imported in those days, or, if not imported, then made by means of a special plant and fired in furnaces erected for the occasion. It is easy to see why the experiment had no immediate results. So in design the churches on 5th avenue—that of the Ascension, at the corner of 10th street, and the Presbyterian

Church 300 feet further N., together with the church at University place and 10th street—were all of about this period, and in them was more intelligent designing than generally in the civic buildings of the time; but there was room for more originality in the latter, and the buildings by Hunt above named and a bank in Wall street by Detlef Lienau held out more promise. Other business buildings of great importance date from this time; two of them were built by Eidlitz in the business section of New York, both of singular solidity and of thoughtful design, which cannot now be judged, as one has disappeared and the other has been altered out of recognition.

The war came, and while some important enterprises took form during those four years of excitement and rapid thought, but little of importance was brought to perfection. The conditions were peculiar; many of the architects and many of their possible employers were in the army; but those who were at home, although often for a short visit only, were full of ambition. So it happened that both industrially and artistically the years immediately following the war were very active. In the Eastern cities, the domain of business began to encroach rapidly upon that which had been the residence portion, and whole streets were built up with buildings of somewhat pretentious character as to their outsides, the masons and stone-cutters making fortunes out of the simpler work upon so many precisely similar fronts; the residence streets were lined with buildings of constantly increasing cost, and also the construction of country houses became an important employment for the builders in the smaller towns. A few years were still to elapse before the more important public and private buildings took shape; this was the epoch of much building of less pretension.

The result of the mingling of styles and the clashing of different tastes and fancies was very curious. Philadelphia buildings kept nearer to their old type of red brick and white marble and simple design; Boston buildings were far more often designed by architects employed, each one for a separate building by the owner of the soil. New York, following its unfortunately deeply rooted habit, built itself up in long rows of stores and houses, each for sale to any possible buyer, and therefore of necessity deprived of individual character. And yet the difference in architectural merit of the buildings in the three cities was not so great as might be assumed. The critical students of 1865 abhorred the New York brownstone front, with its high stoop and its exaggerated affectation of Corinthian elegance, and they envied Boston her intelligent Harvard graduates who owned lots and would build houses for themselves, and



who employed other Harvard graduates to design those houses. But Philadelphia and New York, sticking to their traditions, produced at least less that was monstrous and impossible than Boston. There was more intelligence in the Boston buildings, but there was also more whim. The dreadful heresy of eclecticism got hold of a few of the Boston men, and the Gothic buttress topped by an Ionic pilaster, a motive which passed into a proverb, was only an extreme case of what was a serious injury to architectural growth. The Gothic revival in the hands of Peter B. Wright, J. Cleveland Cady, Calvert Vaux, Frederick Clarke Withers, and John Sturgis, led to the erection of some important buildings; the Boston Museum of Fine Arts, fronting on Copley square, being the most florid of these, and embodying the English terracotta building of the day. The Academy of Design in New York was the only building ever erected in America in which a serious effort was made to design an abundant sculptural decoration on the principles of the more advanced preachers of the gospel of mediævalism. The labor and thought required for such work prevented any immediate following of this example, and it soon appeared that the taste for Gothic buildings was not deeply rooted among the architectural students of the time. Good buildings were designed by the men who have been named, and Richard Upjohn's admirable Trinity Chapel should be added to the list of Gothic churches deserving special praise; but the general effect of the taste for pointed windows and for the ornamentation supposed to belong to them was very unfortunate. It had much to do with what was certainly the most unsatisfactory epoch in American architectural designing. The years from 1865 to 1875 saw the erection by the hundred of the most insufferable country houses that could be imagined. All architectural sense seemed to have gone out of the designers. The posts of the verandas were cut into shapes suggested by nothing in the world except children's toys; window-heads of hitherto unknown form were put into woodwork, into cast-iron, and even into stone; a variety of roof known throughout the country as the French roof, and consisting of a lower slope so steep as to be almost a vertical wall, and an upper slope so flat as to be a mere "deck," produced the ugliest skylines conceivable. The country was full of carpenters and masons who thought themselves architects because they had purchased and studied some book containing plans and elevations of famous buildings. These men were trying for originality; but this search, difficult and dangerous even among men who have had previous training in artistic designing, becomes ruinous when followed by the men of an epoch and

a country as devoid of artistic sense as those which we are now considering. Buildings were planned without any artistic perception of the necessities of the plan; a room was thrust out to the E. and another to the S. and another to the W., these different wings having no relation to one another or to the central mass, which, indeed, they might entirely conceal or even destroy.

The same incongruity of design affected even the public buildings of the time. These were the days of Harvard Memorial Hall, of the first and accepted design for the capitol at Albany, of the United States government buildings, including the post-office and court rooms in the same huge mass, which were erected in many of the cities of the land, and of very numerous buildings which the designers, if now living, would with perfect propriety disclaim, classing them as the work of their salad days. Men who have since proved themselves capable of much better things produced the most unfortunate designs during those hurried years. The "Tribune" building in New York, the Boston city hall and court house, the earlier public buildings of Chicago, the Connecticut State house or capitol at Hartford, may all be named with those cited a few lines above as specimens of what ought not to be done in architecture, and yet as the buildings of men who have since proved themselves capable and dexterous. It is, indeed, true that a flood of bad taste covered the land, and that few detached monuments of some little architectural merit could be seen above it.

A more promising condition of things was seen to exist when the third quarter of the century was completed. In 1875 the older men who were still busy had learned a great deal by experience and by their own blunders; the younger men began to come in, more or less well taught in Paris—at all events certain of the fact that there was such a thing as 19th-century architecture and that as yet the United States had hardly achieved it. Henry Richardson was busy as early as 1875, and a very few years later he took up definitely that Romanesque style which he had studied in Central France—took it up, and built thereafter according to its doctrine, without forsaking it for a moment. Trinity Church in Boston, partly studied from Spanish models, was one of his Romanesque buildings—perhaps the earliest of them. Nearly contemporaneous with this were three important churches in Boston, one of them by Richardson himself, the others by the younger Upjohn and Cummings and Sears; and several large churches of considerable merit were built in different mediæval styles in New York. The older Upjohn, the designer of Trinity Church, 35 years before, made of St. Thomas's Church when



rebuilt on 5th avenue, his latest and crowning labor. The present writer built many college buildings between 1870 and 1880, and, in connection with George Fletcher Babb, Battell Chapel of Yale College and a bank building in Albany, each of these in a modified Gothic style. Other college buildings, by George B. Post for Princeton College, by H. H. Richardson for Harvard University, and J. Cleveland Cady in several parts of the country, assisted greatly the advance of style; and Trinity College, near Hartford, was begun on a great scale and in a consistent English Gothic style from the designs of William Burges of London. The admirable buildings of Columbia College at 49th street, New York, were built by C. C. Haight at a later time, and the same architect built theological seminaries and hospitals in and near New York, all in some form of English Collegiate Gothic. Of younger men, the firm of McKim, Mead & White, who had built the large and interesting buildings known as the Tiffany house and the Villard-Reid house in New York, designed also the Newport Casino, and in doing this helped much toward a development of country house architecture which, indeed, has constituted the most important artistic result of the quarter century. The American frame house, sheathed with clapboards or shingles, is, in the hands of architects of taste, the best thing we have yet to show. A few years later the firm of Carrère & Hastings designed the spirited Spanish-looking palaces used as hotels in St. Augustine. All these buildings had character; but there were still traces enough of the old unarchitectural designing, and this especially in the more important buildings, as is natural. The original designs for the Albany capitol and for the Philadelphia public buildings were nearly as devoid of architectural merit as if they had been built 40 years earlier.

Since 1885 there have been many more buildings of cost and of great pretension — many more buildings which in scale reached the standard set by the continental nations of Europe — than at any previous time. Club houses of great importance, dwellings of such cost and dignity that they are really and in every sense of the word palaces, and National and municipal buildings, into the design of which some architectural ambition has found its way, are now so common that even a bare list of them would fill more space than can here be given. If the progress of architecture since that time has not been all that could be hoped, this fact is to be ascribed to the rapid increase of new demands upon the architect's attention. New problems have developed themselves much more rapidly than the comparatively small number of intelligent architects could work them out.

The common use of the elevator made 10-story buildings as easy to administer as the 4-story buildings of old time, and the hotels and business buildings were at once changed in this radical way; whereupon it was found that the design which had served for a 4-story building was not capable of ready adaptation to the new conditions.

Hardly had this been realized and the problem fairly got in hand when the introduction of the steel-cage form of construction revolutionized half the building of the American world anew, and the 10-story front had to be reconsidered for 16, 18, or 20 stories. Moreover, while the 10-story building, like its predecessors, had been a structure of solid walls carrying iron-framed floors, the steel-cage building was felt to be a totally different construction. Here was a skeleton of uprights and horizontals, and no thoughtful architect could jacket such a structure with a thin stone-faced or brick-and-stone-faced wall without feeling that this was a mere simulacrum of building, and that the real secret of the new design had not yet been discovered. So, too, with the churches, although they were not required to be of unusual height, and although the steel-frame structure hardly suggested itself as fit for them, their condition was felt to be changed by the monstrous height of their neighbors, the insurance buildings, the hotels, the apartment houses. A church with a 200-foot steeple and a 70 foot high roof-ridge made but a poor show alongside of a tower-like mass as large horizontally at top as at bottom, and carrying a level cornice higher than the steeple-cross of the church. Moreover, the architects whose work was of such quality as to please greatly the more instructed part of the community, a community full of a kind of literary intelligence, but without much training in the arts which address themselves to the eye — those architects found themselves overwhelmed with work. It is not in human nature to refuse a \$20,000 or a \$40,000 commission; it is not in human nature to confess the impossibility of doing so much work and doing it well. The result is a general tendency toward a method of design which, in the best instances, is markedly controlled by good taste, by the abstention from incongruities and ill-considered details, but which may be almost devoid of the evidences of thought. The colonnade taken bodily from an ancient building, or a theoretical plate in an old book, the evenly spaced windows capped by a little delicate sculpture, the roof either invisible or of low pitch and masked by a balustrade copied from an Italian palazzo — these and other such architectural members are united without shock and without repulsive incongruity in buildings which do their appointed work quite well — which accom-



moderate a family or a congregation, or which prove to be paying investments — and the community is fairly well satisfied. The extreme rarity of anything novel in design goes with this abrupt explanation of our present state as an architectural community. Louis Sullivan of Chicago is left alone in his serious and repeated efforts to design the exteriors of lofty steel-framed buildings according to their nature and the requirement of the law and modern custom. A. Page Brown, recently dead, was alone in having a separate and little-known national style in which to build his California College buildings. Heins and La Farge are almost alone in having a large church (the Cathedral of St. John the Divine) put into their hands to be slowly elaborated and perfected in design, even as the preparatory work progresses. Shepley, Rutan, and Coolidge of Boston are almost alone in having a chance to build a costly and massive structure (the W. portal of Trinity Church), with an abundance of representative and ideal figure sculpture forming an essential part of the architectural design. Wilson Eyre has few to help him in his gallant effort to create a truly decorative system of sculpture for buildings which can have but little of it. Sculpture is, indeed, added to a few of our buildings of neo-classic design, just as mural painting is used within, but this without modifying the architectural character of the structure.

The conclusion seems to be that while the artistic mind of the country has well outgrown the period of callow haste and of ill-bred ugliness, it has hardly as yet entered upon a true architectural progress. The possibilities of such progress are evident; moreover, there are artists enough who feel the need of it; but whether the mind of the community, giving its best energies to money-making, will in the course of the next century apply itself with serious purpose to architectural art is, perhaps, as uncertain now as it was in 1850.

RUSSELL STURGIS.

**Architrave**, in architecture, the part of an entablature which rests immediately on the heads of the columns, being the lowest of its three principal divisions, the others being the frieze and the cornice.

**Archives**, the place in which records are kept; also the records and papers which are preserved, as evidence of facts.

**Archivolt**, in architecture, the ornamental band of moldings on the face of an arch and following its contour.

**Archons**, the chief magistrates of ancient Athens, chosen to superintend civil and religious concerns. They were nine in number; the first was properly the *archon*, or *archon eponymos*, by whose name the year

was distinguished in the public records; the second was called *archon basileus*, or king archon, who exercised the functions of high-priest; the third, *polemarchos*, or general of the forces. The other six were called *thesmothetai*, or legislators.

**Archytas**, an ancient Greek mathematician, statesman, and general, who flourished about 400 B. C., and belonged to Tarentum, in Southern Italy. The invention of the analytic method in mathematics is ascribed to him, as well as the solution of many geometrical and mechanical problems. He constructed various machines and automata, among the most celebrated of which was his flying pigeon. He was a Pythagorean in philosophy, and Plato and Aristotle are said to have been both indebted to him.

**Arc Light**. See ELECTRIC LIGHTING.

**Arçon, Jean Claude d'**, a French engineer and author; born in Pontarlier, in 1733. He was educated at the military school at Mézières. In the Seven Years' War he distinguished himself, especially in the defense of Cassel. His fame was increased by his invention of the floating batteries used without success at the siege of Gibraltar (1782). In 1793, under Dumouriez, he took Breda and other places in Holland. His chief work is "Considérations Militaires et Politiques sur les Fortifications" (1795). He died July 1, 1800.

**Arcot** (*Aru-Kadu*, "Six Deserts"), a city of British India, in the presidency of Madras, the capital of the district of North Arcot. It is situated on the right bank of the Palar, 5 miles from Arcot railway station, and 65 miles W. S. W. of Madras. Besides the military cantonment, which can accommodate three regiments of cavalry, Arcot contains some mosques in a tolerable state of repair, and the ruins of the Nawab's palace. In 1751 Clive, with 300 Sepoys and 200 Europeans, marched against Arcot, which was garrisoned by 1,100 men; and after having taken it, had in his turn to withstand a siege of 50 days. Arcot was afterward captured by the French, but retaken by Colonel Coote in 1760. It was taken and held for a time by Hyder Ali, but passed into the hands of the British in 1801. Pop. 12,000. The districts of North and South Arcot form a portion of the presidency of Madras. They are dependent on tanks in the dry season, and have suffered severely from famines. Area of North Arcot, 7,616 square miles; pop. (1891) 2,180,487; area of South Arcot, 5,217 square miles; pop. (1891) 2,162,851.

**Arctic**. (1) An adjective = bright, and (2) a substantive = a bear, so called either from his bright eyes or from his brilliant tawny fur. Before the Aryans had finally separated, *riksha* = bright, applied to the plow-like constellation, had become obsolete,



## Arctic Circle

and the substantive *bear* remained, whence the constellation came to be called *arktos* among the Greeks, *Ursa*, among the Latins, and *Bear* among ourselves.

1. Properly, pertaining to the constellation called by the Greeks *arktos* = bear, by the Romans, *Ursa*, and by ourselves *Ursa Major*, the Great Bear, the Plow, Charles' Wain, etc.

2. Pertaining to the North generally, or more especially to the region within the Arctic Circle.

**Arctic Circle**, a small circle of the globe, 23° 28' distant from the North Pole, which is its center. It is opposed to the Antarctic circle, which is at the same distance from the South Pole.

**Arctic Expeditions**, expeditions projected to explore the regions surrounding the North Pole. The object with which these enterprises were commenced by the English was to obtain a passage by way of the polar regions to India, Egypt being in Mohammedan hands, and fear, which now seems absolutely ludicrous, being felt that the Portuguese would successfully debar daring English seamen from using the route by the Cape of Good Hope. When the utter hopelessness of finding either a northwestern or a northeastern passage to India through the polar regions became apparent, it was felt that Arctic expeditions might still profitably be sent out for purely scientific exploration, one main object now being to make as near an approach as possible to the Pole. They have continued at intervals to our own times, and are not likely ever to cease. Two of the most notable events in their history which have hitherto occurred have been the discovery of the northwest passage by Captain McClure, of the "Investigator," on Oct. 26, 1850, and the tragic deaths of Sir John Franklin and his crew, about the year 1848, the catastrophe being rendered all the more impressive to the public mind by the uncertainty which long hung over the gallant explorers' fate.

In September, 1895, Lieut. Robert E. Peary, of the United States navy, returned from an Arctic expedition, after an absence of two years. He did not get so far north as some of his predecessors, but in scientific results his expedition surpassed all others of recent years. His surveys and maps extend our knowledge of the coast northward 2°. He started on another expedition in 1897. On Aug. 13, 1896, Dr. Fridtjof Nansen, of Norway, returned from an Arctic expedition, after an absence of more than three years. The most northerly point reached by him was 86° 14' N. latitude, or 200 miles nearer the Pole than ever reached before. He found no indications of land N. of 82° N. latitude, and in the higher latitudes no open sea, only narrow

## Arctic Regions

cracks in the ice. The lowest temperature recorded during the voyage was 62° F., and the highest 37½° F. See ABRUZZI.

The following are the farthest points of N. latitude reached by Arctic explorers:

| Year. | Explorers.                                | North Latitude. |
|-------|---|-----------------|
| 1607. | Hudson.....                               | 80° 23' 0"      |
| 1773. | Phipps.....                               | 80° 48' 0"      |
| 1806. | Scoresby.....                             | 81° 12' 42"     |
| 1827. | Parry.....                                | 82° 50' 0"      |
| 1874. | Meyer (on land).....                      | 82° 0' 0"       |
| 1875. | Markham and Parr<br>(Nares' expedition) . | 83° 20' 26"     |
| 1876. | Payer.....                                | 83° 07' 0"      |
| 1884. | Lockwood (Greely's<br>party) .....        | 83° 24' 0"      |
| 1896. | Nansen.....                               | 86° 14' 0"      |
| 1900. | Abruzzi.....                              | 86° 33' 0"      |
| 1906. | Peary.....                                | 87° 6' 0"       |
| 1909. | Peary.....                                | The Pole        |

**Arctic Ocean**, in its widest sense, that portion of the ocean which extends from the Arctic circle (lat. 66° 32' N.) to the North Pole, or more restrictedly from about lat. 70° N. Assuming the former limit, the Arctic Ocean is found entering deeply, in the form of gulfs, bays, etc., into the N. parts of the continents of Europe, Asia, and America. The principal of these indentations are the White Sea in Europe; Kara Sea, Gulfs of Obi and Yenisei in Siberia; and Baffin bay in North America. It is united to the Pacific by Bering Strait, and to the Atlantic by a wide stretch of sea extending from Greenland on the W. to Norway on the E. Among the principal islands of the Arctic Ocean are Greenland (at last proved to be an island) and E. of Greenland the extensive group known under the name of Spitzbergen, the small island of Jan Mayen, and Iceland. W. of Greenland, and divided from it by Davis Strait and Baffin bay, there are a considerable number of islands of great size but little interest. N. of Europe are the islands of Nova Zembla; and N. from these, Francis Joseph Land an archipelago as yet imperfectly known. The water of the Arctic Ocean is extremely pure, shells being distinctly visible at a great depth; it also presents rapid transitions of color, chiefly from ultramarine to olive-green, the latter variations of color being produced by myriads of minute animals, belonging for the most part, to the *Calenterata* and *Mollusca* classes.

**Arctic Regions**, the regions round the North Pole, and extending from the pole on all sides to the Arctic circle in lat. 66° 32' N. The Arctic or North Polar circle just touches the N. headlands of Iceland; cuts off the S. and narrowest portion of Greenland; crosses Fox Strait N. of Hudson bay, whence it goes over the American conti-



nent to Bering Strait. Thence it runs to Obdorsk at the mouth of the Obi; then, crossing Northern Russia, the White Sea, and the Scandinavian peninsula, returns to Iceland.

The most important facts now ascertained respecting the climate of the Arctic regions are, that the main line of extreme cold extends across the Polar Sea from the meridian of  $90^{\circ}$  W. to that of  $130^{\circ}$  E., reaching much farther on the Asiatic than on the American side, so that the winter temperature of Yakutsk (lat.  $62^{\circ} 2'$ ) is  $7^{\circ}$  F. lower than that of Rensselaer Harbor, in Smith Sound (lat.  $78^{\circ} 37'$ ). But the American limit of cold oscillates much less than the Asiatic, the summer temperature at Rensselaer Harbor being but  $62^{\circ}$ , while at Yakutsk it is  $95^{\circ}$  F. above that of winter. This difference is due to the absorption of summer heat by the comparatively dry plains of Siberia, while on the North American continent the numerous lakes and inlets moderate the climate throughout the year. To this it may, perhaps, be added that Greenland, owing to its peculiar constitution and position, is to North America a source of refrigeration which has no counterpart in the E. continent. This circumstance, and the humid atmosphere maintained by the numerous lakes, somewhat moderates the severity of the cold, but at the same time renders it somewhat more constant.

Many have adopted the belief in the existence of an open polar sea about the North Pole. But this belief is not supported by any positive evidence. Ice is nearly constant everywhere between Spitzbergen and the S. point of Greenland. This is called the main N. ice. E. of Spitzbergen and near Nova Zembla, the sea is always beset, if not completely barred, by ice. In Baffin bay, and thence W. to Bering Strait, numerous expeditions have had a perpetual struggle with ice. The expedition of 1875-1876 under Captain Nares, members of which reached a point 30 miles farther N. than had ever previously been attained, proceeding by way of Baffin bay and Smith Sound, found no indications of an open polar sea. On the contrary, the explorers found N. of  $82^{\circ} 27'$  a sea consisting of one unbroken sheet of old ice of immense thickness, which effectually barred the further progress of the vessels, while the ruggedness of the ice rendered it impossible to reach the pole by sledge. Nansen more recently found abundance of ice in the tract of sea crossed by him.

It seems certain that a current sets into the polar basin along the coasts of Norway and Lapland. It is probably the effect of prevalent S. W. winds, though some call it a branch of the Gulf Stream. There is also a strong current running in at Bering Strait. On the other hand, along the E.

coast of Greenland and in Baffin bay the movement is generally S. In the numerous channels between Baffin bay and Bering Strait the tides are regular but feeble; indeed, it seems possible to trace across Barrow Straits the line of neutralized or no tide, and this, there is reason to suspect, is also the line of comparatively permanent ice.

Valuable minerals, fossils, etc., have been discovered within the Arctic regions. In the archipelago N. of the American continent excellent coal frequently occurs. The mineral cryolite is mined in Greenland and carried to the United States. Among other fossils, the remains of large saurians are found in the Lias, which extends widely over the N. archipelago, and ammonites collected in abundance prove that in lat.  $73^{\circ}$  N. there was once a tropical temperature. The group of islands opposite the mouth of the Lena, in lat.  $73^{\circ}$ , are little more than accumulations of fossil remains carried down by the river, and are annually visited for the purpose of digging fossil ivory.

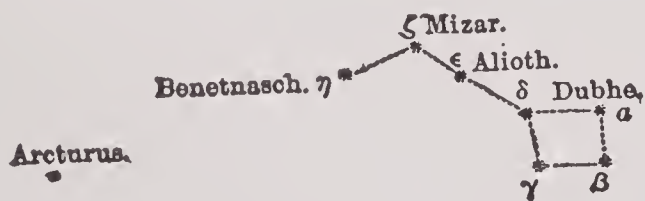
The only arborescent plants in Greenland are dwarf birches, willows, and berberies; thyme and angelica in sheltered spots alone give perfume. The English expedition of 1875-1876 found 20 or 30 species of phanerogamous plants between lat.  $82^{\circ}$  and  $83^{\circ}$ . From Churchill river on the W. side of Hudson bay (lat.  $53^{\circ}$ ), the line limiting the forest runs constantly to the N. of W. till it reaches Norton Sound, a little S. of Bering Strait, larch and poplar making their appearance as we go W. In Siberia, where the summer heat is greater, woods flourish to a much higher latitude within the polar circle. In the Scandinavian peninsula the red pine reaches lat.  $69^{\circ}$ , the Scotch fir  $70^{\circ}$ , the birch  $71^{\circ}$ . Animal life is by no means deficient within the polar circle. Species indeed are few, but the individuals extremely numerous. The proof of this is to be found in the immense number of skins of fur-bearing animals, eider ducks, seals, walrus, etc., annually supplied to commerce. Recent expeditions have found the usual arctic quadrupeds and birds as far N. as the land extended. How far N. the cetaceans reach is doubtful.

Notwithstanding this apparent abundance, the human being has in general a severe struggle for subsistence beyond the 64th parallel N. lat., though traces of Eskimos have been found as far N. as  $81^{\circ} 52'$ . The Eskimos who inhabit Greenland and the extreme N. of America have a hard life of it, often pressed, and not seldom cut off, by famine. Under their rigorous skies the resources derivable from the surrounding abundance of animal life can only support a handful of men. Even in Siberia, where the reindeer trained to the sledge, and the



great rivers from S. to N. frozen throughout the winter, add so greatly to the facilities of intercourse or emigration, whole communities are frequently cut off by famine or disease. Yet we see Europeans settled under the parallel of  $73^{\circ}$  at Upernivik in Greenland, of  $72^{\circ} 2'$  at Ustyarsk in Siberia, and of  $70^{\circ} 40'$  at Hammerfest in Norway, and Europeans have wintered far N. of this. The settlements in Greenland, Northern Siberia, Kamchatka, and the Hudson bay territories are all more or less connected by trade with S. countries, whence they derive their power of endurance; and from the constant care required in order to guard against the consequences of the severe climate it is evident that to man the support of life within the polar circle must ever be difficult and precarious. Nevertheless, owing to the abundance of lower animal life, men have visited these regions for centuries to gather the exceedingly rich harvests of furs and oil.

**Arcturus**, in astronomy, a fixed star of the first magnitude, called also Alpha Bootis. It is one of the very brightest stars in the northern heavens. In March, 1635, Morin saw it in the west for more than half an hour after sunrise. To find it, draw a line through the tail of the Bear four times the length of the distance between the stars Mizar and Benetnasch in the diagram below. The ancients considered it a red star. Piazzi could not find it had any parallax. Though nominally fixed, yet it has a proper angular motion of  $2.250'$ , equivalent to 53.32 miles in a second. In 752 years it altered its latitude  $5'$ , and in 20 centuries, according to Humboldt, it has moved  $2\frac{1}{2}$  times the diameter of the moon's disk. In 1803, Herschel found its diameter, seen through a fog, 2-10 of a second, from which he calculated its diameter to be not less than 8,000,000 leagues = 48,000,000 miles.



URSA MAJOR AND THE STAR ARCTURUS.

*The Arcturus of Scripture.*—Hebrew *Ash*, Job ix: 9; *Aish*, xxxviii: 32. Septuagint, *Arktouros*; Vulgate, *Arcturus*. Not the star now called Arcturus, which stands in solitary grandeur in the sky, unaccompanied by any of his "sons," *banekha*, mentioned in Job xxxviii: 32, but the Great Bear (Ursa Major). Hebrew, *Ash*, is formed by aphæresis from Hebrew *neash* = a bier or litter. In Arabic, *naasch*, cognate with the Hebrew *neash*, is the name of the four stars (Greek *Alpha*, *Beta*, *Gamma* and *Delta*), constituting the hinder portion of the Great Bear;

while the three in the tail (Greek *Epsilon*, *Zeta*, *Eta*), are called in Arabic *Banat-naasch* = daughters of the bier, meaning, the mourners followed the bier. The last of these (Greek *Eta*) is still designated by its Arabic name *Benetnasch*.

**Ardagh, Sir John Charles** (ar'dä), a British military officer, born in 1840; entered the Royal Engineers in 1859; and became major-general in 1898. He attended the Conference of Constantinople, Congress of Berlin, Bulgarian Boundary Commission, and the Peace Conference at The Hague, in 1899. He was for many years director of military intelligence in the British war office. He received many honors for his services. He died Oct. 1, 1907.

**Ardahan** (ar-dän'), a village of about 300 houses, in the portion of Turkish Armenia, ceded in 1878 to Russia, 35 miles N. W. of Kars. Its position gives it strategic importance. Its fortress was dismantled by the Russians in the war of 1854-1856; in 1878 the Berlin Congress sanctioned the cession to Russia of Ardahan, which had been captured early in the war. On account of the severity of the climate, the houses of Ardahan are mainly constructed underground.

**Ardalan** (ar-dal-an'), a province in the W. of Persia, embracing the basin of the Shirwan Rûd. It is generally mountainous, but the valleys are very fertile, and if well watered, yield cereals and fruits in abundance. Area, 6,000 square miles; est. pop. 150,000. Capital, Kermanshah.

**Ardebil**, a town of Persia, in the province of Azerbaijan, 110 miles E. of Tabriz, and some 5,000 feet above the sea. Pop. about 10,000.

**Ardeche** (ar-dāsh'), a Department in the South of France, takes its name from a tributary of the Rhone, and includes part of ancient Languedoc. It is almost wholly mountainous. In the N. W. of the Department, the Cevennes culminate in the volcanic Mont-Mezène, 5,752 feet in height. Numerous extinct volcanic peaks, deep craters, grottos, rock labyrinths, and basaltic columns give an extraordinarily picturesque appearance to the scenery. The upland, where winter reigns for six or eight months, is devoted to pasturage; but the valley of the Rhone produces wine, olives, chestnuts, figs, and almonds. Only a fourth of the area is cultivated. Iron, coal, antimony, lead, marble, and gypsum are wrought. There are manufactures of silk, paper, leather, cloth, and straw. Area, 2,136 square miles; pop. (1906), 347,140. The capital is Privas.

**Ardennes** (ar-dān'), an extensive hill-country and forest, occupying the S. E. corner of Belgium, between the Moselle and the Meuse, but extending also into France



## Ardennes

and Rhenish Prussia. It consists of a broken mass of hills, for the most part of no great elevation, which gradually slope toward the plains of Flanders. The average height of the hills is less than 1,600 feet; but in the E., they attain an elevation of about 2,100 feet. Large tracts of this region consist not of hills, but of gently undulating plateaus, in some districts densely covered with oak and beech forests, but for the most part heathy, marshy, and barren. The channel of the Meuse is in some places bound in by rugged and precipitous cliffs more than 600 feet high. The principal rocks of the Ardennes are clay-slate, graywacke, quartz rock, and various metamorphic rocks; besides which occur in various places extensive outcrops of crystalline limestone. The wealth of the region is its wood and its minerals. Enormous supplies of coal are found in the north, a very important element in Belgium's industrial wealth; iron, lead, antimony, copper, and manganese are also found. Multitudes of cattle and sheep are reared. The Arduenna Silva of the Romans extended over a still wider area.

**Ardennes**, a frontier Department of France, bordering on Belgium. It is named from the forest of Ardennes, and formed a part of the old province of Champagne. Length from N. to S., 63 miles; area, 2,020 square miles. The N. E. belongs to the basin of the Meuse; the S. W. is watered by the Aisne; these rivers being united by a canal. About two-fifths of the whole surface is hilly, and covered with forests and wide tracts of pasturage. In the N., marble is obtained; but the prevailing rock is limestone. South of this, and stretching across the department from E. to W., are great layers of slate. Only the valleys are fertile, and produce corn. The vine is cultivated in the S. W. Cattle and sheep are reared. Slate, marble, iron, clay, copper, and coal are found. Iron working is largely carried on; but the chief industry is cloth-making, especially in Sedan. There are also manufactures of clay pipes, glass, paper, sugar, and beer. The capital is Mézières, but the most important place is the great fortified city of Sedan. Pop. of department (1906), 317,505.

**Arditi, Luigi** (ar-dē'tē), an Italian musician and composer, born in Piedmont, July 16, 1822; studied music at the Conservatoire of Milan. Famous first as a violinist, then as a conductor, he went to London in 1857, and from that year till 1878 was musical director at Her Majesty's Theater. He had conducted Italian opera and concerts in places as remote from one another as New York and Constantinople; had published the operas "I Briganti" (1841), and "La Spia" (1856); and was known as author of

## Arenaceous Rocks

much popular music—songs, violin duets, and waltzes. He died May 1, 1903.

**Ardnamurchan** (-mur'kan) **Point**, the most westerly point of the Island of Great Britain, in Argyllshire, having a lighthouse, 180 feet above sea level, visible 18 to 20 miles off.

**Ardoch**, a parish in South Perthshire, celebrated for its Roman remains, one, a camp, being the most perfect existing in Scotland.

**Are**, the unit of the French land measure, equal to 100 square meters, or 1,076.44 square feet. A hectare is 100 ares, equal to 2.47 acres.

**Areca**, a genus of lofty palms with pinnated leaves, and a drupe-like fruit inclosed in a fibrous rind. *A. catechu*, of the Coromandel and Malabar coasts, is the common areca palm which yields areca or betel nuts, and also the astringent juice catechu. *A. oleracea* is the cabbage-tree, or cabbage-palm of the West Indies. With lime and the leaves of the betel pepper, the areca nuts, when green, form the celebrated masticatory of the East. They are an important article in Eastern trade.

**Arecibo** (ar-ā-sē'bo), an important commercial town of Porto Rico; on the N. coast; facing the Atlantic Ocean; 50 miles W. of San Juan. It is similar to all Spanish towns, with a plaza, surrounded by the church and other public buildings, in the center, and streets running from it in right angles, forming regular squares. The buildings are of wood and brick. The harbor is a very poor one, being exposed to the full force of the ocean, and having no natural or artificial protection. Imports and exports can be handled only by twice lightering. Tributary to the town is a district of about 30,000 inhabitants. Pop. (1910) 9,612.

**Arena**, the inclosed space in the central part of the Roman amphitheaters, in which took place the combats of gladiators or wild beasts. It was usually covered with sand or saw dust to prevent the gladiators from slipping, and to absorb the blood.

**Arenaceous Rocks**, rocks composed entirely, or to a large extent, of grains of quartz. Beds of loose sand occur extensively in the more recent deposits. The grains, either of quartz or flint, are generally water-worn and rounded; in some cases, however, they are more or less angular, or rounded and angular grains occur commingled. In older deposits, the grains of sand are bound together by siliceous, calcareous, argillaceous, or ferruginous cements. It is seldom that a rock is composed of quartzose materials alone; grains or particles of other mineral substances are frequently mingled with the grains of quartz.



Silvery flakes of mica are seldom absent; and they often occur in layers parallel to the planes of stratification, causing the rock to split into thin slabs, and exposing a glittering surface. These are called micaceous sandstones. When grains of feldspar occur, it is a feldspathic sandstone. Often large quantities of calcareous matter, either as cement or as distinct grains, occur; and these are called calcareous sandstones. In like manner we have siliceous and ferruginous sandstones, when silica and oxide of iron are conspicuously present as cementing or binding materials. Clay and carbonaceous matter, when plentifully diffused through the rock, give rise to argillaceous, carbonaceous, and bituminous sandstones. Greensand, or glauconitic sandstone, is a rock containing abundant grains of the dirty greenish mineral called glauconite. Arkose is a sandstone composed of disintegrated granite; volcanic sandstone, trappean sandstone, etc., being composed of disintegrated igneous rocks. The presence of lime can always be detected by the effervescence which takes place on the application of hydrochloric or other acid. A sandstone of homogeneous composition, which may be worked freely in any direction, is called freestone or liver rock. Flagstone is a sandstone which is capable of being split into thin beds or flags along the planes of deposition. When the sandstone is coarse-grained, it is usually called grit. If it contain, more or less abundantly, grains large enough to be called pebbles, the sandstone is said to be conglomeratic; and if the pebbles or stones be angular, the rock is described as a brecciform sandstone. Coarse-grained grits and pebbly or conglomeratic sandstones pass into conglomerate or puddingstone, which consists of a mass of various sized water-worn stones. Brecciform sandstones frequently pass into breccia, which is an aggregate of angular and subangular fragments. Graywacke is an argillaceous sandstone, more or less altered and sometimes semicrystalline, met with among palæozoic formations.

**Arends, Leopold** (är'ents), author of a widely popular system of stenography, born near Wilna, Russia, Dec. 1, 1817. Educated at Dorpat, in 1844, he settled in Berlin, where he wrote dramas, as well as books on popular natural history and ancient Hebrew music, but his name is best known through his "Rational Stenography," first published fully in 1860, in his "Vollständige Leitfaden." His is the youngest of the three great rival systems in Germany—the others being those of Gabelsberger and Stolze—but it is perhaps the most widely used, and it has been introduced into the Spanish, French, Hungarian, and Swedish languages. He died in Berlin, Dec. 22, 1882.

**Arene, Paul Auguste** (ä-rān'), a French author, born in Sisteron, June 26, 1843. At first engaged in teaching at Marseilles and in Paris; but from 1865 on he devoted himself to literature, and became favorably known through his brilliant descriptions of his Provençal home. Notable among various collections of stories are "The Perfumed Beggar Woman" (1876); "In the Kindly Sun" (1879); "The True Temptation of St. Anthony," and "Christmas Stories." He also wrote two novels, "John of the Figs" (1868), and "The Golden Goat" (1889); several comedies, partly in conjunction with others, especially Alphonse Daudet, whose collaborator he was in the "Letters From My Mill." Equally charming as his stories are the pictures of travel, "Twenty Days in Tunis" (1884), and "From the Alps to the Pyrenees" (1891). He died at Antibes, Dec. 16, 1896.

**Areolar Tissue**, a tissue widely diffused through the body, and composed of white and yellow fibers, the former imparting to it strength, and the latter elasticity. The two kinds of fibers interlace with each other again and again in the most complex manner. The interstices left between them are of very unequal size, and should not be called, as for a long time they were, cells. Areolar tissue protects from injury the parts of the body in which it occurs, and when placed in the interstices of other tissues it keeps the latter from moving as freely as otherwise they would. The *cutis vera*, or true skin, is composed of it, and it abounds in the exterior parts of the muscles and in the interstices between their fibers, beneath the skin, on the surface of the pharynx, and the œsophagus.

**Areometer** (ar-ē-om'ē-ter), an instrument designed to measure the specific gravity of liquids. The simpler areometers measure only the relative weights of liquids. They consist of a tube of glass, terminated in a ball at its lower part, and divided into equal portions through its whole length. Another ball filled with mercury is soldered below to keep it vertical. The depth to which it sinks in various liquids is in the inverse ratio of their relative specific gravities. In Fahrenheit's areometer, there is an adjustment by weights so that the volume of the part immersed is constant, and thus the absolute specific gravity of the liquid tested is ascertained, that of water being previously fixed.

**Areopagus** (ar-ē-op'ā-gus), the name of a hill or rocky eminence lying to the W. of the Acropolis at Athens, which was the meeting-place of the chief court of judicature of that city; hence called the Council of Areopagus. It was of very high antiquity, and existed as a criminal tribunal long before the time of Solon. Solon enlarged its sphere of jurisdiction, and gave



## Arequipa

it extensive powers of a censorial and political nature. He caused it to consist of exarchons who had creditably passed the scrutiny to which they were subjected at the termination of their period of office. As a court of justice, it took cognizance of capital crimes, as murder, arson, etc.; and it also exercised a certain control over the ordinary courts. Its censorial duties were of a very extensive and inquisitorial nature, for the preservation of order and decency. Religion also came within its jurisdiction, which punished impiety in whatsoever form. Pericles succeeded in greatly diminishing the power of this council, and deprived it of many of its old prerogatives. It still, however, seems to have retained a great degree of power; but in later times, when corruption of manners prevailed among the people, it lost its moral influence and authority; yet it continued to exist down to a very late period. Some say that the Apostle Paul was taken before this council; but the Scripture does not bear out this idea. It would seem, rather, that the Athenians had taken him to the hill in order to hear him expound his new doctrines.

**Arequipa** (ar-a-kē'pa), a city of Peru, capital of the Department of the same name; 40 miles from the Pacific Ocean, on the Chile river; altitude, 7,850 feet above sea level. It is a bishop's seat, has a college, several convents, and a cathedral. Its trade is large, and the adjacent country fertile. Gold and silver are mined in the vicinity. A great earthquake occurred, Aug. 13 and 14, 1868, which destroyed more than \$12,000,000 worth of property, and the lives of more than 500 persons. Its public buildings and dwellings are one or two stories high and constructed of stone. Near at hand Harvard University has an observatory, at an altitude of over 8,000 feet. Pop. 35,000.

**Ares** (ä'rēz), the Greek god of war, or more particularly of its horror and tumult, was the son of Zeus and Hera, and one of the favorites of Aphrodite. He is represented in Greek poetry as a most sanguinary divinity, delighting in war for its own sake, and in the destruction of men. Before him into battle goes his sister Eris (Strife); along with him are his sons and companions, Deimos (Horror) and Phobos (Fear). He does not always adhere to the same side, like the great Athena, but inspires now the one, now the other. Nor is he always victorious. Diomed, by the help of Athena, wounds him, and in his fall, says Homer, "he roared like nine or ten thousand warriors together." Such a representation would have been deemed blasphemous by the ancient Roman mind, imbued as it was with a solemn, Hebrew-like reverence for its gods. The worship of Ares was never very general in Greece; it is believed to have been

## Arezzo

imported from Thrace. There, and in Scythia, were its great seats, and there Ares was believed to have his chief home. He had, however, temples or shrines at Athens, Sparta, Olympia, and other places. On statues and reliefs he is represented as young and of great muscular power, either naked or clothed with the chlamys. The Romans identified their national war god Mars with the Greek Ares. (See MARS.)

**Aretæus** (ar-et-ē'us), a Greek physician of Cappadocia, who flourished about 100 A. D. He is considered to rank next to Hippocrates in the skill with which he treated diseases; was eclectic in his method; and in the diagnosis of disease is superior to most of the ancient physicians. The first four books of his great work, preserved nearly complete, treat of the causes and symptoms of diseases; the other four, of the cure of the same.

**Aretino, Pietro** (ä-rā-tē'nō), an Italian poet and dramatist, born at Arezzo, April 20, 1492. He had already won some fame as a writer of satires, when he settled in Rome in 1517, where his bent for witty effusions led to his banishment in 1524. Turning to Florence, he won the favor of John de Medici, and at Milan ingratiated himself with Francis I. of France, through whose



PIETRO ARETINO.

whose intercession he was allowed to return to Rome. Of his works only his five comedies in prose, and "Orazia," a tragedy in verse, numbering among the best in Italian literature, are of lasting merit. His "Letters" are a valuable contribution to the history of the times. He died in Venice, Oct. 21, 1556.

**Arezzo** (a-ret'sō, ancient Arretium), a city of Central Italy, capital of a Province of the same name in Tuscany, near the confluence of the Chiana with the Arno. It has a noble cathedral, containing some fine pictures and monuments; remains of an ancient amphitheater, etc. It was one of the 12 chief Etruscan towns, and in later times fought long against the Florentines, to whom it had finally to succumb. It is the birthplace of Mæcnas, Petrarch, Pietro Aretino, Redi, and Vasari. Pop. (1908), 44,316. The Province of Arezzo contains 1,273 square miles. Pop. (1909) 281,852.



## Argali

**Argali**, the name for some species of the genus *ovis*, or sheep. The Asiatic argan, *ovis ammon*, or *O. argali*, which is perhaps the *dishon* of the Pentateuch, inhabits the mountains and steppes of Northern Asia; the *O. pygargus*, perhaps only a variety of the former, is found in Northwestern America; while the *O. tragelaphus* is indigenous to Barbary. They are very keen-sighted, quick of hearing, and possess a delicate sense of smell. They attach themselves closely to one locality, and are noted for their great powers of leaping, even from heights of 20 or 30 feet. The Big-horn sheep of the Rocky Mountains are sometimes called American argali.

**Argall, Sir Samuel**, an early English adventurer in Virginia, born about 1572; planned and executed the abduction of Pocahontas, the daughter of the Indian chief Powhatan, in order to secure the ransom of English prisoners. He was Deputy Governor of Virginia (1617-1619), and was accused of many acts of rapacity and tyranny. In 1620 he served, as captain of a vessel of 24 guns, in an expedition under the command of Sir R. Mansell against Algiers, and was knighted by James I. By carrying on trade in violation of the law he managed to acquire a fortune, and was shielded from justice by the Earl of Warwick. On account of his enactment of exceedingly severe sumptuary laws and for the arbitrary manner in which he conducted the affairs of the colony he was disliked exceedingly by the colonists in America. He died in 1639.

**Argand Lamp**, a lamp named after its inventor, Aimé Argand, a Swiss chemist and physician (born 1755; died 1803), the distinctive feature of which is a burner forming a ring or hollow cylinder covered by a chimney, so that the flame receives a current of air both on the inside and on the outside, thus increasing the supply of oxygen and decreasing the waste of carbon.

**Argaum**, a village of Behar, India, celebrated for the victory of the Duke of Wellington over the Mahrattas commanded by Scindia and the Rajah of Behar, Nov. 29, 1803.

**Argelander, Friedrich Wilhelm August**, a German astronomer, born in Memel, Prussia, in 1799; went to the Königsberg University in 1817, and, attracted by the lectures of Bessel, entered the observatory as a regular assistant in 1820; in 1823 appointed to the directorship of the observatory at Abo, Finland, on Bessel's recommendation; in 1832 appointed Professor of Astronomy in the University of Helsingfors, and director of the new observatory there; and in 1837 recalled by the Prussian government to assume the directorship of the

## Argenson

new observatory to be built at Bonn, of which he remained at the head till his death in 1875. Among his most important works were the "Uranometria Nova," of all the naked-eye stars visible in European latitudes; the great "Durchmusterung," resulting in a catalogue and charts of all the stars to the ninth magnitude between  $-2^{\circ}$  and the North Pole, containing more than 324,000 stars; and the observation and discussion of the light variations of the variable stars, the model of all similar investigations since. His scale of magnitudes has never been improved on.

**Argemone** (ar-jem'ō-nē), a genus of plants belonging to the family *papaveraceæ*, or poppy-worts. It has three sepals and six petals. The *A. Mexicana*, believed, as its name imports, to have come from Mexico, is now common in India and other warm countries in the Old World, as well as in the New. It has conspicuous yellow flowers. From having its calyx prickly, it is often called Mexican thistle. The yellow juice, when reduced to consistence, resembles gamboge. It is detersive. The seeds are a more powerful narcotic than opium.

**Argens, Jean Baptiste de Boyer, Marquis de** (är-zhän'), a French miscellaneous writer, born in 1704. Choosing the profession of arms, he served a campaign in Germany, and then retired to Holland, where he wrote the "Chinese Letters," and other works. Being invited by Frederick the Great to the Prussian court, he was appointed director of the academy at Berlin. He died in 1771.

**Argensola, Bartolomeo Leonardo de** (är-hen-sō'lä), a Spanish poet and historian (1565-1631). His verse lacks native force, but shows considerable depth of sentiment, while in form it displays exquisite finish. His history of "The Conquest of the Moluccas" is esteemed a model of correct and idiomatic Spanish prose.

**Argensola, Lupercio Leonardo de**, a Spanish poet, born at Barbastro, Aragon, Dec. 14, 1559; brother of the preceding. His three tragedies, "Isabella," "Alexandra," and "Phyllis," brought him fame while still a young man; but his forte was lyric poetry, in which he won distinction. His ballads and songs are notable for vigor of thought and richness of pictorial fancy. Some of his "Sonnets" are masterpieces; and his "Epistles," both in substance and form, are models of that species of composition. He died at Naples in March, 1613.

**Argenson, Marc Pierre de Voyer, Comte d'** (är-zhan-sôn'), a French statesman, born in 1696. After holding a number of subordinate offices, he became Minister for Foreign Affairs, and succeeded in bringing about the Congress of Breda, which was the



## Argent

prelude to that of Aix-la-Chapelle. He was present at the battle of Fontenoy, and was exiled to his estate for some years through the machinations of Mme. Pompadour. His "Considérations sur le Gouvernement de la France," was a very advanced study on the possibility of combining with a monarchic form of government democratic principles and local self-government. "Les Essais, ou Loisirs d'un Ministre d'Etat," published in 1785, is a collection of characters and anecdotes in the style of Montaigne. He died in 1764.

**Argent**, in coats of arms, the heraldic term expressing silver; represented in engraving by a plain white surface.

**Argentina**, a common name of the ARGENTINE REPUBLIC (q. v.).

**Argentine**, a silvery-white slaty variety of calc-spar, containing a little silica with laminae usually undulated. It is found in primitive rocks and frequently in metallic veins. Argentine is also the name of a small British fish (*scopelus borcalis*), less than two inches long, and of a silvery color.

**Argentine Republic**, formerly called the United Provinces of La Plata, a vast country of South America; extreme length, 2,300 miles; average breadth a little over 500 miles; total area, 1,778,195 square miles. It is bounded on the N. by Bolivia; on the E. by Paraguay, Brazil, Uruguay, and the Atlantic; on the S. by the Antarctic Ocean; and on the W. by the Andes.

**Natural Divisions.**—It comprises four great natural divisions: (1) The Andine region, containing the provinces of Mendoza, San Juan, Rioja, Catamarca, Tucuman, Salta, and Jujuy. (2) The Pampas, containing the provinces of Santiago, Santa Fé, Cordova, San Luis, and Buenos Ayres; with the territories Formosa, Pampa, and Chaco. (3) The Argentine Mesopotamia, between the rivers Paraná and Uruguay, containing the provinces of Entre Rios and Corrientes, and the territory Misiones. (4) Patagonia, including the eastern half of Tierra del Fuego. With the exception of the N. W. where lateral branches of the Andes run into the plain for 150 or 200 miles, and the province of Entre Rios, which is hilly, the characteristic feature of the country is the great monotonous and level plains called pampas. In the N., these plains are partly forest-covered, but all the central and S. parts present vast treeless tracts, which afford pasture to immense herds of horses, oxen, and sheep, and are varied in some places by brackish swamps, in others by salt steppes.

**Water Courses.**—The great water course of the country is the Paraná, having a length of fully 2,000 miles from its source in the mountains of Goyaz, Brazil, to its junction with the Uruguay, where begins the

## Argentine Republic

estuary of La Plata. The Paraná is formed by the union of the Upper Paraná and Paraguay rivers, near the N. E. corner of the country. Important tributaries are the Pilcomayo, the Vermejo, and the Salado. The Paraná, Paraguay, and Uruguay are valuable for internal navigation. Many of the streams which tend eastward terminate in marshes and salt lakes, some of which are rather extensive. Not connected with the La Plata system are the Colorado and the Rio Negro, the latter formerly the S. boundary of the country, separating it from Patagonia. The source of the Negro is Lake Nahuel Huapi, in Patagonia (area, 1,200 square miles), in the midst of magnificent scenery. The level portions of the country are mostly of tertiary formation, and the river and coast regions consist mainly of alluvial soil of great fertility. In the pampas clay have been found the fossil remains of extinct mammalia, some of them of colossal size.

**Productions.**—European grains and fruits, including the vine, have been successfully introduced, and are cultivated to some extent in most parts of the republic, but the great wealth of the state lies in its countless herds of cattle and horses and flocks of sheep, which are pastured on the pampas, and which multiply there very rapidly. Gold, silver, nickel, copper, tin, lead, and iron, besides marble, jasper, precious stones, and bitumen, are found in the mountainous districts of the northwest, while petroleum wells have been discovered on the Rio Vermejo; but the development of this mineral wealth has hitherto been greatly retarded by the want of proper means of transport. As a whole, there are not extensive forests in the country, except in the region of the Gran Chaco (which extends also into Bolivia), where there is known to be 60,000 square miles of timber. Thousands of square miles are covered with thistles, which grow to a great height in their season. Cacti also form great thickets. Peach and apple trees are abundant in some districts. The native fauna includes the puma, the jaguar, the tapir, the llama, the alpaca, the vicuña, armadillos, the rhea or nandu, a species of ostrich, etc. The climate is agreeable and healthful, 97° being about the highest temperature experienced. Rain is less frequent than in the United Kingdom.

**People.**—As a whole, this vast country is very thinly inhabited, some parts of it as yet being very little known. The native Indians were never very numerous, and have given little trouble to the European settlers. Tribes of them yet in the savage state still inhabit the less known districts, and live by hunting and fishing. Some of the Gran Chaco tribes are said to be very fierce, and European travelers have been killed by them. The European element is strong in the re-



## Argentite

public, more than half the population being Europeans or of pure European descent. Large numbers of immigrants arrive from Southern Europe, the Italians having the preponderance among those of foreign birth. The typical inhabitants of the pampas are the Gauchos, a race of half-breed cattle-rearers and horse-breakers; they are almost continually on horseback, galloping over the plains, collecting their herds and droves, taming wild horses, or catching and slaughtering cattle. In such occupations they acquire a marvellous dexterity in the use of the lasso and bolas.

*History.*—The river La Plata was discovered in 1512 by the Spanish navigator Juan Diaz de Solis, and the La Plata territory had been brought into the possession of Spain by the end of the 16th century. In 1810 the territory cast off the Spanish rule, and in 1816 the independence of the United States of the Rio de la Plata was formally declared, but it was long before a settled government was established. The present constitution dates from 1853, being subsequently modified. The executive power is vested in a President, elected by the representatives of the 14 provinces for a term of six years. A National Congress of two chambers—a Senate and a House of Deputies—wields the legislative authority, and the republic is making rapid advances in social and political life. The revenue for 1899 was \$45,676,188 in gold, and \$61,419,090 in paper; the expenditure, \$21,481,378 in gold, and \$96,068,365 in paper; and the internal public debt, Jan. 1, 1897, was 189,162,500 pesos gold, and 45,838,067 pesos paper (one metal peso = 96½ cents in United States gold); and the national external debt, in July, 1898, was about \$310,000,000 (in United States gold), with a new issue of about \$50,000,000 in bonds authorized. In 1897 there were 9,270 miles of railway open. The external commerce is important, the chief exports being wool, skins, and hides, live animals, mutton, tallow, bones, corn, and flax. The imports are chiefly manufactured goods. Trade is largely with Great Britain and France, and is increasing rapidly, exports having advanced from \$45,000,000, in 1876, to \$189,917,531 (gold), in 1899. The latter year the imports were \$116,850,671 (gold). For the year 1899 the exports of wheat amounted to 1,713,490 tons; of corn, 1,116,276 tons; of flax, 217,713 tons; of flour, 59,464 tons. Buenos Ayres is the capital of the republic. Other towns are Cordova, Rosario, La Plata, Tucuman, Mendoza and Corrientes. The population of the republic was estimated in 1908 at 6,489,023. SENOR LOUIS F. DE OLIVEIRA CEZAR.

**Argentite**, sulphide of silver, a blackish or lead-gray mineral, a valuable ore of silver found in the crystalline rocks of many countries.

## Argolis

**Argillaceous Rocks** are rocks in which clay prevails (including shales and slates).

**Arginusæ** (ar-gin'ö-sē), a number of small islands, S. E. of the coast of Lesbos, a province of Asia Minor. In the vicinity of these islands the Athenians, under Conon, 406 B. C., defeated the Spartans under Callicratidos in a hard contested naval battle.

**Argives**, or **Argivi**, the inhabitants of Argos; used by Homer and other ancient authors as a generic appellation for all the Greeks.

**Argol**, a salt deposited by wine on the inside of bottles and barrels. It is dissolved more easily in water than in alcohol. It is mostly composed of potassic bitartrate,  $\text{KHC}_4\text{H}_4\text{O}_6$ , and contains varying quantities of calcic of tartrate, mucilaginous matter, and coloring. It may be purified in hot water, and clarified by adding clay, and recrystallizing. In repeating the process it becomes white and is called cream of tartar.

**Argolis** (ar'gō-lis), a peninsula of Greece; lies between the bays of Nauplia and Ægina, and now forms, with Corinth, a nomarchy or department. Argolis was the eastern region of Peloponnesus. The Greeks inhabiting it were often called Argives, or Argians. Hills and mountains alternate with fruitful plains and valleys. According to the monuments of Greek mythology, Argolis was peculiarly rich, and early cultivated. Inachus, about 1800, and Danaus, about 1500 years B. C., came hither with colonists from Egypt. Here reigned Pelops, an emigrant from Asia Minor, from whom the peninsula derives its name. It was afterward the seat of government of Atreus and Agamemnon, Adrastus, Eurystheus, and Diomedes. Here, Hercules was born. In the morass of Argolis he slew the Lernæan hydra, and in the cave of Nemea subdued the ferocious lion. In the earliest times it was divided into the small kingdoms of Argos, Mycenæ, Tirinthus, Trœzene, Hermione and Epidaurus, which afterward formed free States. The chief city, Argos, has retained its name since 1800 B. C. Its inhabitants were renowned for their love of the fine arts, particularly of music. Some vestiges remain of its ancient splendor, and it has at present about 9,000 inhabitants. Here, and in Delphi, statues were erected to the brothers Biton and Cleobis, who fell victims to their filial piety. Near this city lies the capital of Argolis, Nauplia, or Napoli di Romania, with an excellent harbor, and the most important fortress of the peninsula. On the site of the present village of Castri, on the Ægean Sea, formerly lay the city Hermione, with a grove dedicated to the Graces: opposite is the island of Hydra. Near the city of Epidaurus, the watering place of ancient Greece, on the Ægean Sea, Æsculapius had his temple. At Trœzene, now the village



of Damala, Theseus was born. Pop. of province of Argolis and Corinth (1896) 157,578.

**Argon**, a constituent gaseous element discovered in our atmosphere by Lord Rayleigh and Prof. Ramsay, in 1894. Argon has a characteristic spectrum. Its specific gravity ( $H=1$ ) is between 19 and 21. It is about  $2\frac{1}{2}$  times as soluble in water as nitrogen. Its critical temperature ( $-121^{\circ}\text{C.}$ ) and boiling point ( $-187^{\circ}\text{C.}$ ) are lower than those of oxygen. Prof. Olzewski succeeded in solidifying it to white crystals, melting it at  $-189.6^{\circ}\text{C.}$  It seems to be incapable of combining with anything. It has been found in cleveite and in a meteorite. There is still much doubt concerning its true status. It is separated by acting on air with red-hot copper filings to separate the oxygen. The residual gas is dried and passed over white-hot magnesium filings. The magnesium combines with the nitrogen, producing a solid nitride and leaving argon as a gas. The argon amounts in volume to about 4 per cent. of the nitrogen. The argon is treated repeatedly by a substantial duplication of the above process, some days being required to dispose of all the nitrogen. Another method of preparation is to pass electric sparks, preferably from platinum terminals, through the nitrogen mixed with oxygen. This gradually burns up the nitrogen. Its oxide can be absorbed by caustic alkali, leaving argon as a gas.

**Argonaut** (ar'gō-nāt), one of the heroes who accompanied Jason in the ship "Argo" when he sailed on his mythic voyage in quest of the golden fleece (generally used in the plural). The tales describing the return of the Argonauts differ very essentially. Several poets of antiquity have celebrated this adventurous undertaking, which is placed in the middle of the 13th century B. C. There are still preserved, under the name of "Orpheus," a poem on this subject; another in Greek by Apollonius of Rhodes; and one in Latin by Valerius Flaccus. The golden fleece was that of the ram on which Phryxus and Helle had escaped the persecutions of their stepmother Ino, after which Phryxus had sacrificed the ram and hung its fleece in a consecrated grove at Colchis. Jason's uncle had usurped the kingdom of Iolcos, and would only resign it on receiving the golden fleece from Jason. The latter was successful in his quest.

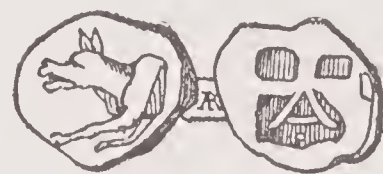
The word is also applied to a genus of cephalopod mollusks, the typical one of the family *argonautidæ*. The best known species is the argonaut, or paper sailor. The shell is thin and translucent. Aristotle supposed that it floated with the concave side up, the animal holding out its arms, after the manner of sails, to catch the breeze. Poets have ever since repeated the fable; but naturalists know that when the

argonaut floats the sail-shaped arms are applied closely to the sides of the shell, and when the animal crawls at the bottom the so-called boat is reversed like the shell of a snail. In 1875, Tate estimated the known species at four recent and two fossil, the latter being from the tertiary rocks.

**Argo-Navis**, the southern constellation of the Ship, containing 9 clusters, 3 nebulae, 13 double and 540 single stars, of which about 64 are visible.

**Argonne** (ar-gōn') a district of France, between the rivers Meuse, Marne and Aisne, celebrated for the campaign of Dumouriez against the Prussians in 1792, and for the military movements and actions which took place therein previous to the battle of Sedan, in 1870.

**Argos**, a town of Greece, in the N. E. of the Peloponnesus, between the gulfs of Ægina and Nauplia or Argos. This town and the surrounding territory of Argolis



COIN OF ARGOS.

were famous from the legendary period of Greek history onward, the territory containing, besides Argos, Mycenæ, where Agamemnon ruled, with a kind of sovereignty, over all the Peloponnesus.

**Argosy**, a poetical name for a large merchant vessel; derived from Ragusa, a port which was formerly more celebrated than now, and whose vessels did a considerable trade with England.

**Argot**, the jargon, slang or peculiar phraseology of a class or profession; originally the conventional slang of thieves and vagabonds, invented for the purpose of disguise and concealment.

**Arguelles**, **Augustin** (ar'gwel'yes), a Spanish statesman, born in Asturias, in 1776. On the outbreak of the War of Independence (1808), he attached himself to the patriotic party, and, as representative of his native province in the Cortes, gained a high reputation for eloquence (1812-1814). On the restoration of Ferdinand VII., Arguelles was arrested, and suffered 10 years' barbarous captivity, till the revolution of 1820 restored him to freedom. For a few months he was Minister of the Interior, but on the fall of the Constitution (1823) he fled to England, where he remained till the amnesty of 1832. On his return to Spain, being nominated to the Cortes, he was repeatedly made president and vice-president of the Chamber of Deputies, and always showed himself a moderate but unwavering reformer. He died at Madrid, March 23, 1844.

**Arguim**, or **Arguin** (ar-gwim'or ar-gwin'), a small island on the W. coast of Africa, not far from Cape Blanco, formerly a center



## Argument

of trade the possession of which was violently disputed between the Portuguese, Dutch, English and French, and is now claimed by France.

**Argument**, a term sometimes used as synonymous with the subject of a discourse, but more frequently appropriated to any kind of method employed for the purpose of confuting or at least silencing an opponent. Logicians have reduced arguments to a number of distinct heads, such as the *argumentum ad judicium*, which founds on solid proofs and addresses to the judgment; the *argumentum ad verccundiam*, which appeals to the modesty or bashfulness of an opponent by reminding him of the great names or authorities by whom the view disputed by him is supported; the *argumentum ad ignorantiam*, the employment of some logical fallacy toward persons likely to be deceived by it; and the *argumentum ad hominem*, an argument which presses a man with consequences drawn from his own principles and concessions, or his own conduct.

**Argus**. (1) In classical mythology, a son of Arestor, said to have had 100 eyes, of which only two slept at one time, the several pairs doing so in succession. When killed by Mercury, his eyes were put into the tail of the peacock, by direction of Juno, to whom this bird was sacred. Argus was deemed a highly appropriate name to give to a vigilant watch dog.

(2) In zoology, a genus of birds of the family *phasianidæ*, and the sub-family *phasianinæ*. It contains the argus, or argus pheasant (*argus giganteus*). The male measures between five and six feet from the tip of the bill to the extremity of the tail, and is an eminently beautiful bird, the quill-feathers of the wings, which often exceed three feet in length, being ornamented all along by a series of ocellated spots. The name Shetland argus is given to a starfish (*astrophyton scutatum*). It is called also the basket urchin or sea basket. The arms branch again and again dichotomously, so that their ultimate fibers are supposed to be about 80,000 in number.

**Argyle, Campbells of**, a historic Scottish family, raised to the peerage in the person of Sir Duncan Campbell of Lochow, in 1445. The more eminent members are: ARCHIBALD, second Earl, killed at the battle of Flodden, 1513. ARCHIBALD, fifth Earl, attached himself to the party of Mary of Guise, and was the means of averting a collision between the Reformers and the French troops in 1559; was commissioner of regency after Mary's abdication, but afterward commanded her troops at the battle of Langside; died 1575. ARCHIBALD, eighth Earl and Marquis, born 1598; a zealous partisan of the Covenanters; created a Marquis by Charles I. It was by his persuasion that Charles II. visited Scotland,

## Argyle

and was crowned at Scone in 1651. At the Restoration he was committed to the Tower, and afterward sent to Scotland, where he was tried for high treason, and beheaded in 1661. ARCHIBALD, ninth Earl, son of the preceding, served the King with great bravery at the battle of Dunbar, and was excluded from the general pardon by Cromwell in 1654. On the passing of the Test Act in 1681 he refused to take the required oath except with a reservation. For this he was tried and sentenced to death. He, however, escaped to Holland, from whence he returned with a view of aiding the Duke of Monmouth. His plan, however, failed, and he was taken and conveyed to Edinburgh, where he was beheaded in 1685. ARCHIBALD, tenth Earl and first Duke, son of the preceding, died 1703; took an active part in the Revolution of 1688-1689, which placed William and Mary on the throne, and was rewarded by several important appointments and the title of Duke. JOHN, second Duke and Duke of Greenwich, son of the above, born 1678, died 1743; served under Marlborough at the battles of Ramilies, Oudenarde, and Malplaquet, and assisted at the sieges of Lisle and Ghent.



JOHN, SECOND DUKE OF ARGYLE.

He incurred considerable odium in his own country for his efforts in promoting the union. In 1712 he had the military command in Scotland, and, in 1715, he fought an indecisive battle with the Earl of Mar's army at Sheriffmuir, near Dunblane, and forced the Pretender to quit the kingdom. He was long a supporter of Walpole, but his political career was full of intrigue. He is the Duke of Argyle in Scott's "Heart of Midlothian." GEORGE DOUGLASS CAMPBELL, eighth Duke, Baron Sundridge and Hamilton, was born in 1823. He early took a part in politics, especially in discussions regarding the Presbyterian Church of Scotland. In 1852 he became Lord Privy Seal



## Ariadne

under Lord Aberdeen, and again under Lord Palmerston, in 1859; Postmaster-General in 1860; Secretary for India from 1868 to 1874; again Lord Privy Seal in 1880, but retired, being unable to agree with his colleagues on their Irish policy. He was author of "The Reign of Law," "Scotland as It Was and as It Is," etc. He died April 24, 1900. His eldest son, the MARQUIS OF LORNE, married the Princess Louise, fourth daughter of Queen Victoria, in 1871.

**Ariadne** (ar-ē-ad'ne), a daughter of Minos, King of Crete, who, falling in love with Theseus, then shut up by her father in the labyrinth, gave him a clue by which he threaded his way out. Afterward she



ARIADNE.

was the wife of Bacchus, who gave her a crown, which ultimately became a constellation called by her name. Also an asteroid, the 43d found; discovered by Pogson, on April 15, 1857.

**Arian**, a follower of Arius, Presbyter of Alexandria in the 4th century A. D., or one holding the system of doctrine associated with his name. During the first three centuries of the Christian era, what was subsequently called the doctrine of the Trinity had become the subject of controversy, chiefly in one direction; it had been decided against Sabellius that there are in the Godhead three distinct persons, whereas Sabellius had in effect reduced the three to one. In the year 317, Alexander, Bishop of Alexandria, having publicly expressed his opinion that the Son of God is not only of the same dignity as the Father, but of the same essence (in Greek, *ousia*), Arius, one of the Presbyters, considered this view as leaning too much to Sabellianism, and, rushing to the other extreme, he declared that the Son of God was only the first and noblest of created beings, and though the universe had been brought into existence through His

instrumentality by the Eternal Father, yet to that Eternal Father He was inferior, not merely in dignity, but in essence. The views of Arius commended themselves to multitudes, while they were abhorrent to still more; fierce controversy respecting them broke out, and the whole Christian world was soon compelled to take sides in the struggle. Constantine, the first Christian emperor, was then the reigning sovereign, and after he had failed by private means to restore peace and unity, he summoned a council to meet at Nice, in Bithynia, which it did in A. D. 325. It was the first general council and the most celebrated of all. It declared Christ to be *homoousios*, i. e., of the same essence as the Father, whereas Arius regarded Him as only *homoiousios*, of similar essence. The erring Presbyter was deposed and exiled; but his numerous followers maintained his doctrine, and were at times so successful that each party had in turn the power, of which it had no scruple to avail itself, of using carnal as well as spiritual weapons against its adversaries; indeed, it is believed that Arius himself died by poison. It would occupy too much space to detail the vicissitudes of a highly checkered struggle; suffice it to say that the Arians greatly weakened themselves by splitting into sects, and the doctrines regarding the relation of the three Divine Personages authoritatively proclaimed at Nice were at last all but universally adopted. They may be found detailed in what are popularly termed the Nicene and the Athanasian Creeds. They were held almost without a dissentient voice through the Middle Ages, and were cordially accepted by the leading reformers. The Churches of Rome, England and Scotland are all at one with regard to the doctrine of the Trinity, as are also the most powerful bodies of English Non-conformists. Arianism has from time to time appeared in the churches, but as a rule its adherents have sooner or later gone back to orthodoxy or forward to Unitarianism.

**Arias Montanus, Benedictus**, a Roman Catholic divine and Orientalist, born in South Estremadura in 1527. Studied at Seville and Alcala, and became a Benedictine. He was present at the celebrated Council of Trent; and, in 1568, was sent by Philip II. to Antwerp, to superintend the publication of the famous edition of the Antwerp Polyglot Bible (8 vols. folio, 1569-1572). He became librarian at the Escorial, and died in 1598.

**Arica**, a seaport of Tacna, the most southerly department of Peru. It is one of the chief outlets of the trade of Bolivia, and has been connected since 1854, by rail, with Tacna, 38 miles inland. Its exports mostly consist of copper, silver, cascarilla and other barks, chinchilla skins, alpaca, and vicuña



## Ariege

wool. Arica has frequently suffered from earthquakes. It was almost wholly destroyed in 1832, but soon rebuilt. It suffered severely again in 1868, the earthquake being succeeded by fearful waves, one of them 40 feet high. In the time of the Spanish supremacy, Arica was a great commercial city with 30,000 inhabitants; its present population is about 4,000. It was stormed and taken by the Chileans in 1880. The treaty of 1883 provided that Arica and the department of Tacna were to be occupied by Chile for 10 years, and that a popular vote should then determine to which country they should belong. Owing to the failure of negotiations, this vote had not been taken at the end of 1910.

**Ariege** (ar-yāzh), a mountainous department of France, on the slopes of the Pyrenees, comprising the ancient countship of Foix and parts of Languedoc and Gascony. The principal rivers are the Ariège, Arize and Salat, tributaries of the Garonne. Sheep and cattle are reared; the arable land is small in quantity. Chief town, Foix. Area 1,890 square miles; pop. (1906) 205,684.

**Ariel**, the name of several personages mentioned in the Old Testament; in the demonology of the later Jews a spirit of the waters. In Shakespeare's "Tempest," Ariel was the "tricksy spirit" whom Prospero had in his service.



ARIES.

**Aries**, in astronomy, the constellation Aries, or the Ram, one of the ancient zodiacal constellations, and generally called the first sign of the zodiac; also the portion of the ecliptic between  $0^{\circ}$  and  $30^{\circ}$  longitude, which the sun enters on March 21st (the vernal equinox). The constellation Aries, from which the region derives its name, was once within its limits, but now, by the precession of the equinoxes, it has gradually moved into the space anciently assigned to Taurus. It is denoted by the Greek symbol,

## Arion

*Gamma*, which remotely resembles a ram's head. (Herschel's "Astronomy," §§ 380, 381.)

The first point of Aries is the spot in the heavens where the sun appears to stand at the vernal equinox. It is not marked by the presence of any star, but it is not very far from the third star of Pegasus, that called Algenib. It is the point from which the right ascension of the heavenly bodies are reckoned upon the equator and their longitudes upon the ecliptic.

**Aril**, or **Arillus**, in some plants, as in the nutmeg, an extra covering of the seed, outside of the true seed coats, proceeding from the placenta, partially investing the seed, and falling off spontaneously. It is either succulent or cartilaginous, colored, elastic, rough or knotted. In the nutmeg it is known as mace.

**Arimanes**, or **Ahriman**, the principle of evil in the Persian theology, which perpetually counteracts the designs of Ormuzd or Oromazdes, who denotes the principle of good.

**Arimaspians**, in ancient Greek traditions, a people who lived in the extreme N. E. of the ancient world. They were said to be one-eyed and to carry on a perpetual war with the gold-guarding griffins, whose gold they endeavored to steal.

**Arimathæa** (ar-ē-ma-thē'a), a town of Palestine, identified with the modern Ramleh, 22 miles W. N. W. of Jerusalem.

**Arion**, an ancient Greek poet and musician, born at Methymna, in Lesbos, flourished about B. C. 625. He lived at the court of Periander of Corinth, and afterward visited Sicily and Italy. Returning from Tarentum to Corinth with rich treasures, the avaricious sailors resolved to murder him. Apollo, however, having informed him in a dream of the impending danger, Arion in vain endeavored to soften the hearts of the crew by the power of his music. He then threw himself into the sea, when one of a shoal of dolphins, which had been attracted by his music, received him on his back and bore him to land. The sailors hav-



ARION.

ing returned to Corinth, were confronted by Arion, and convicted of their crime. The



lyre of Arion, and the dolphin which rescued him, became constellations in the heavens. A fragment of a hymn to Poseidon, ascribed to Arion, is extant.

**Ariosto, Ludovico** (ä-rē-ōs'tō), an Italian poet, born at Reggio, Sept. 8, 1474. Was one of the three great epic poets of Italy, and styled "The Divine" by his countrymen. He early abandoned the study of law for that of the classics. Having attracted attention through two comedies, he entered the service of Cardinal Ippolito d'Este, who intrusted him with several diplomatic missions; after whose death in 1520, he was employed by the reigning Duke of Ferrara, Alfonso, the Cardinal's brother, and for three years he served as governor of a province in the Apennines, where the people were largely brigands. His imperishable fame rests mainly on his great romantic heroic poem "Orlando Furioso;" of which Orlando's love for the fair Angelica, and his madness induced by her treachery, form the theme. It is really a continuation of Bojardo's "Orlando Innamorato," a knowledge of which is most helpful to a thorough appreciation of the "Furioso." Of his other poetical efforts the most noteworthy are his seven epistolary satires, conceived in the spirit of Horace, which contain sundry bits of autobiographical information and rank among the treasures of Italian literature. Ariosto exhibits a wonderful skill in interweaving his episodes, which he continually interrupts, and again takes up with an agreeable, and often imperceptible, art, and so entwines them with one another that it is difficult to give a connected sketch of the contents of his poems, especially "Orlando." He died in Ferrara, June 6, 1533.

**Arista, Don Mariano** (ar-is'ta), a Mexican statesman, born in 1803. Of Spanish descent, he at an early age entered the army, in which he attained to the rank of major-general. He served with distinction in the war against the United States, was, in 1848, appointed Minister of War, and, in 1850, President of the Republic. In the latter office he distinguished himself by the liberality of his political views, his leanings toward peace and progress, and his attention to the social and commercial development of the country. He was succeeded as President in 1852, by Don Juan Cebellos. He died in 1855.

**Aristæus** (ar-is-tē'us), son of Apollo and Cyrene, was brought up by the Nymphs. The introduction of the use of bees is ascribed to him (hence he is called Mellisæus), and gained for him divine honors.

**Aristarchus** (ar-is-tar'kus), a Greek grammarian, who criticised Homer's poems with the greatest severity, and established

a new text; for which reason, severe and just critics are often called Aristarchi. He was born in the island of Samothraee, and lived at Alexandria, about 750 B. C. Ptolemy Philometor, who highly esteemed him, confided to him the education of his children. After having spent his life in criticising Pindar, and other poets, especially Homer, he died at Cyprus, aged 72.

**Aristarchus of Samos**, a famous astronomer, born 267 B. C. First asserted the revolution of the earth about the sun. His work on the magnitude, and distance of the sun and moon, is still extant. He is also regarded as the inventor of the sun-dial.

**Aristeas** (ar-is'tē-as), a personage of ancient Greek legend, represented to have lived over many centuries, disappearing and re-appearing by turns.

**Aristides** (a-ris-tī'dēz), a statesman of ancient Greece, for his strict integrity surnamed "The Just." He was one of the 10 generals of the Athenians when they fought with the Persians at Marathon, B. C. 490. Next year he was eponymous archon, and in this office enjoyed such popularity that he excited the jealousy of Themistocles, who succeeded in procuring his banishment by the ostracism (about 483). Three years after, when Xerxes invaded Greece with a



ARISTIDES.

large army, the Athenians hastened to recall him, and Themistocles now admitted him to his confidence and councils. In the battle of Plataea (479) he commanded the Athenians, and had a great share in gain-



## Aristides

ing the victory. To defray the expenses of the Persian War he persuaded the Greeks to impose a tax, which should be paid into the hands of an officer appointed by the States collectively, and deposited at Delos. The confidence which was felt in his integrity appeared in their intrusting him with the office of apportioning the contribution. He died at an advanced age about B. C. 468, so poor that he was buried at the public expense.

**Aristides**, a 1st century Christian apologist, whose lost work was identified in 1890 with part of Barlaam and Josaphat.

**Aristippus** (ar-is-tip'us), a disciple of Socrates, and founder of a philosophical school among the Greeks, which was called the Cyrenaic, from his native city Cyrene, in Africa; flourished in 380 B. C. His moral philosophy differed widely from that of Socrates, and was a science of refined voluptuousness. His fundamental principles were—that all human sensations may be reduced to two, pleasure and pain. Pleasure is a gentle, and pain a violent, emotion. All living beings seek the former, and avoid the latter. Happiness is nothing but a continued pleasure, composed of separate gratifications; and as it is the object of all human exertions, we should abstain from no kind of pleasure. Still we should always be governed by taste and reason in our enjoyments. His doctrines were taught only by his daughter Arete, and by his grandson Aristippus the younger, by whom they were systematized. Other Cyrenaics compounded them into a particular doctrine of pleasure, and are hence called Hedonici. The time of his death is unknown. His writings are lost.

**Aristobulus** (ar-is-tō-bū'lus), name of several royal personages of Judea: ARISTOBULUS I., son of John Hyrcanus, high priest of the Jews; from 105–104 B. C. King of Judea. He is supposed to have been the first of the Hasmoneans to take the title of king. In the single year of his reign he conquered portions of Iturea and Trachonitis, and compelled the people to accept Judaism. ARISTOBULUS II., son of Alexander Jannæus, was named as high priest by his mother, Queen Regent Alexandra, while to Hyrcanus II., his elder brother, the throne was given. In a contest for the throne, he was defeated by Pompey in 63 B. C., and carried captive to Rome. He died about 48 B. C. ARISTOBULUS III., a grandson of Hyrcanus II.; his sister, Mariamne, was the wife of Herod I., who appointed him high priest, but, fearing his popularity, had him assassinated about 30 B. C. ARISTOBULUS III. was the last male of the Hasmonean family.

**Aristobulus**, an Alexandrian Jew and peripatetic philosopher, who lived about 170 B. C., was considered by the early fathers

## Aristolochiaceæ

as the founder of the Jewish philosophy in Alexandria. He is said to have been the author of an allegorical commentary on the books of Moses, which showed that the oldest Greek writers borrowed from the Hebrew Scriptures; but it is now admitted that this work was written by a much later writer.

**Aristocracy**, a form of government by which the wealthy and noble, or any small privileged class, rules over the rest of the citizens; now mostly applied to the nobility or chief persons in a State.

**Aristodemus**, a legendary hero and King of the Messenians, who killed his daughter, when a sacrifice to the gods was demanded by the oracle; and who afterward slew himself, in despair for his country.

**Aristogeiton** (-gī'ton), a citizen of Athens, whose name is rendered famous by a conspiracy (514 B. C.) formed in conjunction with his friend Harmodius against the tyrants Hippias and Hipparchus, the sons of Pisistratus. Both Aristogeiton and Harmodius lost their lives through their attempts to free the country, and were reckoned martyrs of liberty.

**Aristolochia** (-lō'kē-a), a genus of plants, the typical one of the order *aristolochiaceæ*, or birthworts. They have curiously inflated irregular flowers, in some cases of large size; these consist of a tubular colored calyx, no corolla, six stamens, one style, and a six-celled capsular fruit, with many seeds. One species, the *A. clematis*, or common birthwort, a plant with pale yellow tubular flowers, swollen at the base, is common among old ruins. Most of the aristolochias are emmenagogue, especially the European species, *A. rotunda*, *longa*, and *clematitis*, and the Indian *A. Indica*; the last-named species is also antarthritic. *A. bracteata* is anthelmintic; when bruised and mixed with castor-oil, it is used in cases of obstinate psora. *A. odoratissima*, of the West Indies, is alexipharmic. The *A. fragrantissima*, of Peru, is given in dysenteries, fevers, rheumatism, etc.; *A. serpentaria* (the Virginian snake root), besides being given in the worst forms of typhus fever, is deemed of use against snake-bite; as is also *A. trilobata*. (Lindley.) The "Treasury of Botany" points out that faith in the efficacy of some aristolochia or other as an antidote to the poison of serpents prevails in America, Egypt, and India, its existence in regions so remote from each other affording strong evidence of its truth.

**Aristolochiaceæ** (ar-is-tō-lō-kē-a'sē-ī), an order of plants placed by Lindley under his last or asaral alliance of pergynous exogens. It has hermaphrodite flowers, six to ten epigynous stamina, a three or six-celled inferior ovary, and wood without concentric zones. In 1846, Lindley estimated the known



## Aristomenes

species at 130. Many are climbing plants. In their qualities they are tonic and stimulating.

**Aristomenes** (ar-is-tom'ē-nēs), the great Messenian hero, who boldly, and for a long time successfully, resisted the Spartans in the third war. His history is so mixed with legend as to be in good part incredible. The story of his escape from a deep cavern, into which he had been thrown by the Spartans, by creeping through a fox hole, is extraordinary, but not well authenticated. Notwithstanding his boldness and heroic courage, he could not prevent the subjection of the Messenians.

**Aristophanes** (ar-is-tof'ē-nēs), the greatest of the Greek writers of comedy (B. c. 448?–380?), born at Athens. His comedy,

"The Knights," is said to have been put on the stage when the author was but 20 years old. Of his 44 plays, only 11 have come down to us. These are "The Knights," and "The Clouds" — prized by him above all the rest — wherein he ridicules the Sophists and with them Soerates; "The Wasps," in which the Athenians are lashed for their litigiousness; "The Acharnians," "The Peace," and "The



ARISTOPHANES.

"Lysistrata," arguments for concord among Grecian States; "The Birds," a satire against the "Greater Athens" idea; in "The Thesmophoriazuses" the Athenian women carry off to court the poet Euripides in punishment of his misogyny; "The Frogs," directed against Euripides, as the cause of the degeneration of dramatic art; in "The Ecclesiazuses," or "Ladies of Parliament," he reduces to absurdity the overweening expectation of the righting of all wrongs through political reforms; in the "Plutus," the blind god of wealth is made to see and the good old times come back again. Aristophanes first appeared as a poet in the fourth year of the Peloponnesian War (B. c. 427), and his sarcasms twice brought him to trial on charges of having unlawfully assumed the title of an Athenian citizen.

**Aristotle** (ar'is-totl), the most renowned of Greek philosophers, born at Stagira, Macedonia, 384 B. c.; was for 20 years a student of philosophy in the school of Plato at Athens, but at the same time a teacher, in the meantime mastering and digesting

## Aristotelianism

all the accessible results of philosophical and scientific research and speculation in his time. After Plato's death, he opened a school of philosophy at the court of Hermias, King of Atarneus, in Mysia, who had been his fellow

student in Plato's Academy, and whose adopted daughter he afterward married. At the invitation of Philip of Macedon, he undertook the education of his son, Alexander. When Alexander succeeded to the throne, the philosopher returned to Athens and



ARISTOTLE.

opened a school in the Lyceum, so called from the neighboring temple of the Lycean Apollo. From being held in the covered walk (*peripatos*) of the Lyceum, the school obtained the name of the Peripatetic. He taught in the Lyceum for 13 years, and to that period we owe the composition of most of his numerous writings. The number of his separate treatises is given by Diogenes Laertius as 146; only 46 separate works bearing the name of the philosopher have come down to our time. He died at Chaleis, Eubœa, in 322 B. c.

**Aristotelianism, or Peripateticism**, the doctrine of philosophy of Aristotle; one of those speculative systems which arose from the school of Soerates, and which, from the unity and grandeur of its founder's genius, took strong root in the Greek mind, and, since the revival of letters, also in Western Europe. Aristotle attempted to steer a medium course between the ultra-idealism of his master Plato, and the low sensationalism of the physical school of Elea. His genius was as wide as nature. He studied all things, and seemed to know everything better than all others. His knowledge was something amazing, and he extended the boundaries of science to almost an encyclopedical extent. Science, whether as abstract or physical, he was at home in. Aristotle keenly combated the ideal theory of Plato, or that which expounded the deity as holding in himself the archetypal ideas after which the world was fashioned, and which it was the business of reason and science to discover. But while denying these ideas of his master, he nevertheless agreed with him in the view that knowledge contains an element radically distinct from



sensation. He also differed from the Eleatics and the Epicureans, inasmuch as he denied that sensation could account for the whole of knowledge; but maintained, with them, that without this sensation, knowledge would be impossible. The celebrated maxim that "there is nothing in the intellect which was not previously in the sense," if not Aristotle's, at least well expresses a side of his doctrine; but, when he insists upon the distinction between the necessary and the contingent, the absolute and the relative, he rises altogether above the sphere of sensation, and takes emphatically his place with reason. Thus he steered a middle course between what he considered to be the Scylla and Charybdis of speculation — idealism and sensationalism; but in what precise line he moved is by no means clear. He in no place has expounded his doctrines, and he is very chary of definition; so that no two Aristotelians of to-day are agreed upon the details of his philosophy. Perhaps it may be best characterized when we say that it was a system of empiricism, or one based upon experience, often very considerably modified by the rationalism of Plato.

The language in which his philosophy is couched is brief, pregnant, and peculiar; and his system not only has afforded a test of the critical acumen of those who have taken to a study of his works, but it has afforded, besides, a nice test of advancement in the knowledge of the Greek language to read Aristotle with intelligence and promptitude. Philosophy, according to Aristotle, is properly science arising from the love of knowledge. There are two sorts of knowledge: mediate, and immediate. From immediate knowledge, which we gain through the experience of particulars, we derive mediate knowledge, by means of argumentation, whose theory it is the office of logic to properly expound. Logic is, therefore, the instrument of all science; but only *quoad formam*, for it is experience which supplies the matter to be worked upon. The formal part of reasoning he accordingly expounds better than any man either before or since his time. He, indeed, created logic, and this system stands erect through the changes of centuries like an Egyptian pyramid, which heat and moisture cannot wear away. He nowhere defines logic; but the book which contains it is ordinarily called the "Organon." His successors have only damaged when they have tried to improve his system of argumentation; and down to the period of Sir William Hamilton, it remained nearly destitute of a single modification or addition. He most profoundly bases his logic upon the laws of contradiction, and he even recognizes that of sufficient reason as a regulative principle in the evolution of truth. After logic, he took up all the sci-

ences, rational, empirical, and mixed, except one alone, viz., history.

He seems to have divided philosophy into logic, physics, and ethics, or into speculative and practical knowledge. (1) Speculative philosophy contemplates the real order of things, irrespective of human control; practical philosophy discusses affairs voluntary and accidental. Real substances are either invariable, or variable; while sublunary matters are variable, and perishable; the deity alone is imperishable, and unchangeable. Do men pursue the real in an abstract way? Then, metaphysics and mathematics emerge. Do they pursue knowledge as to its objects? Then physics, cosmology, psychology, theology emerge. (2) Practical philosophy again comprehends ethics, politics, and economy. A word or two on each of these heads; and first of speculative philosophy.

1. Physics, or natural philosophy. Nature is the sum of all existences, which are disclosed to us by our perceptive faculties. The knowledge of nature is properly the knowledge of the laws of bodies in motion. Nature, cause, accident, end, change, infinitude, space, time, and motion, are included in this science. The three elements of existence are matter, form, and privation; and change is possible as regards substance, quantity, quality, and place. Motion, like time, has neither beginning nor end; and the first thing to which motion was applied was the heavens. In his "Cosmology," Aristotle discusses astronomy, using that term in its widest signification. It appears to us moderns obscure and inconsistent, and is by no means satisfactory. Physiology is indebted to Aristotle for its first essay. The soul is, according to him, the active principle of organized life. It is distinct from the body, yet, considered as its form or entelechy, it is inseparable from it. Its faculties are production, nutrition, sensation, thought, and will or impulse. His remarks on the principle of common sense, on consciousness, on imagination, on memory, and on recollection nearly all of which he was the first to distinctly recognize, are very valuable, and will repay a careful perusal even at the present day. Metaphysics, or more properly, the first philosophy, according to Aristotle, is his attempt to sciencize being in the abstract. The leading characteristics of the latter existence he analyzes into the 10 categories of substance, quantity, quality, relation, time, place, situation, possession, action, passion. With this arrangement he connected the question of the first being, whose felicity is alone complete, and whose existence is alone immutable.

2. The ruling idea of his practical philosophy was that of a sovereign good, and final end or aim of action. This final end he denominated happiness, which is the re-



sult of the perfect energies of the soul, and is the highest of which our nature is capable. It arises from the perfect exercise of reason, and is ordinarily called virtue. This he describes as the mean between two extremes, which is the character of nearly the whole of his philosophy. He distinguishes the moral virtues into seven cardinal ones, of which justice, in a sense, embraces all the rest. Under the head of right, he distinguishes that belonging to a family from that belonging to a city. A perfect unity of plan prevails throughout his morals, politics and economics. Both of the latter have for their object to show how this perfect virtue, already described, may be attained in the civil and domestic relationships, through a good constitution of the state and the household. The principle of the science of politics is expediency, and its perfection consists of suitableness of means to the end proposed. By this principle Aristotle proves the legality of slavery; and all education he refers to the ultimate end of political society. Of Aristotle's successors, the only one deserving of mention is Theophrastus, author of the "Characteristics." This system long maintained its ground as distinct from that of Plato. In the Middle Ages it became degraded into a noxious system of barren formularies, which were ultimately swept away by the revival of Platonism. All except his logic, which will live forever, is now nearly forgotten, save by a few devoted students.

**Aristoxenus** (ar-is-tox'ē-nus), an ancient Greek musician and philosopher of Tarentum, born about B. C. 324. He studied music under his father Mnesias, and philosophy under Aristotle, whose successor he aspired to be. He endeavored to apply his musical knowledge to philosophy, and especially to the science of mind, but it only appears to have furnished him with far-fetched analogies and led him into a kind of materialism. We have a work on the "Elements of Harmony" by him.

**Arithmetic**, in its broadest sense, the science and art which treat of the properties of numbers. This definition, however, would include algebra, which is considered a distinct branch. Algebra deals with certain letters of the alphabet, such as  $x$ ,  $y$ ,  $z$ ,  $a$ ,  $b$ ,  $c$ , etc., standing as symbols for numbers; arithmetic operates on numbers themselves, as 1, 2, 3, 4, etc. Viewed as a science, arithmetic is a branch of mathematics; looked on as an art, its object is to carry out for practical purposes certain rules regarding numbers, without troubling itself to investigate the foundation on which those rules are based.

It is variously divided, as into integral and fractional arithmetic, the former treating of integers and the latter of fractions. Integral arithmetic is sometimes called

vulgar or common arithmetic; and from fractional arithmetic is sometimes separated decimal arithmetic, treating, as the name implies, of decimals. There are also logarithmic arithmetic for computation by logarithms, and instrumental arithmetic for calculation by means of instruments or machines. Another division is into theoretical arithmetic, treating of the science of numbers, and practical arithmetic, which points out the best method of practically working questions or sums. Political arithmetic is arithmetic applied to political economy, as is done in the statistical returns so continually presented to Parliament or Congress. Finally, universal arithmetic is a name sometimes applied to algebra. The chief subjects generally treated under the science or art of arithmetic are (1) numeration and notation; (2) addition; (3) subtraction; (4) multiplication; (5) division; (6) reduction; (7) compound addition; (8) compound subtraction; (9) compound multiplication; (10) compound division; (11) simple proportion (rule of three); (12) compound proportion; (13) vulgar fractions; (14) decimal fractions; (15) duodecimals; (16) involution; (17) evolution; (18) ratios, proportions and progressions; (19) fellowship or partnership; (20) simple interest; (21) compound interest, and (22) position. Of these, the most important are the simple processes of addition, subtraction, multiplication and division, the judicious use of which, singly or in combination, will solve the most complex arithmetical questions.

**Arithmetical Complement**, that which a number wants to make it reach the next highest decimal denomination. Thus the arithmetical complement of 4 is 6, for  $4+6$  are  $=10$ , and that of 642 is 358, because  $642+358$  are  $=1,000$ . The arithmetical complement of a logarithm is what it wants to make it reach 10.

**Arithmetical Mean**. (1) The number, whether it be an integer or a fraction, which is exactly intermediate between two others. Thus, 5 is the arithmetical mean between 2 and 8; for  $2+3$  are  $=5$ , and  $5+3$  are  $=8$ . To find such a mean add the numbers together and divide their sum by 2; thus,  $2+8=10$ , and  $10\div2=5$ . (2) Any one of several numbers in an arithmetical ratio interposed between two other numbers. Thus, if 6, 9 and 12 be interposed between 3 and 15, any one of them may be called an arithmetical mean between these two numbers.

**Arithmetical Progression**, a series of numbers increasing or diminishing uniformly by the same number. If they increase, the arithmetical progression is said to be ascending, and if they decrease, de-



scending. Thus the series 3, 6, 9, 12, 15 is an ascending arithmetical progression, mounting up by the continued addition of 3; and the series 8, 6, 4, 2, is a descending one, falling regularly by 2.

**Arithmetical Proportion**, the relation existing between four numbers, of which the first is as much greater or less than the second as the third is of the fourth; the equality of two differences or arithmetical ratios. In such cases the sum of the extremes is = that of the means.

**Ari Thorgilsson** (ä-rë tōr'gils-son), the father of Icelandic literature (1067-1148). He was the first Icelandic to use his mother tongue as a literary medium in writing his "Islendingabók," a concise history of Iceland from its settlement (about 870) until 1120.

**Arius.** See ARIAN.

**Arizona**, a Territory of the Western Division of the North American Union; bounded by Nevada, Utah, New Mexico, California and the Mexican State of Sonora; gross area, 113,956 square miles; organized Feb. 14, 1863; number of counties, 13; pop. (1900) 122,212; (1910) 204,354; capital, Phoenix. On June 10, 1910, Congress provided for the admission of the Territory to Statehood.

**Topography.**—The surface in general is a series of plateaus, ranging in altitude from 80 to 7,500 feet above sea level. It is traversed by the Northside, San Francisco, Black, Black Mesa, Gila, Dragon, Santa Ana, Zuni, Santa Catarina, Mogollon and Penaleño Mountains, with peaks stretching to an extreme height of 12,572 feet (Humphrey Peak). The watercourses are the Colorado river and its tributaries, the Little Colorado, Gila, Zuni, San Juan and several smaller streams. The principal rivers pass through cañons that are among the greatest wonders of the world. Dotting the plains are enormous mesas or tablelands, some with perpendicular sides more than 1,000 feet high. No part of the world has so rich a field for archaeological and ethnological investigation as Arizona. Long-buried dwellings and cities, with other ruins of an exceedingly ancient people, are being continually disclosed; and explorations by government geologists are yielding a vast and curious volume of information concerning the cliff-dwellers and other prehistoric races. Arizona to-day is a region of wonders and mysteries.

**Geology.**—The weird cañons are remarkable in that they exhibit all the geological formations of North America. Geologists declare that the Colorado river, in its whole course, has cut through strata representing a thickness of 25,000 feet, and exposed the gradations from the quarternary alluvial deposits through volcanic alterations to the

primary azoic rocks. Of this total exposed strata about 16,000 feet are in Arizona, and in this stretch are seen superficial deposits, alluvium, clay, sandstone, detritus and diluvium. The Grand Cañon of the Colorado alone shows upper carboniferous limestone, cross-stratified sandstone, red calcareous sandstone with gypsum, lower carboniferous limestone, shales, grits, Potsdam sandstone and granite and other formations. The plains are of quarternary and tertiary deposits; the bottom lands, calcareous sands and clays.

**Mineralogy.**—The Territory is a storehouse of mineral riches, the resources including anthracite and bituminous coal, carbonates and oxides of iron, gold, silver, copper, lead, platinum, quicksilver, tin, nickel, salt, sulphur, hydraulic lime, natural limestones, opals, onyx, garnets, malachite, sapphires, chaledony and countless medicinal springs. The most valuable productions in the calendar year 1898, were: Gold, 119,249 fine ounces, valued at \$2,465,100; silver, 2,246,800 fine ounces, coining value, \$2,904,954; copper, 111,158,246 pounds; clay products, all brick and tile, \$81,509, and dressed sandstone, \$57,444. Turquoise mining was carried on at Turquoise Mountain, in Cochise county, and at Mineral Park, in Mohave county, and an ancient mine was discovered near Globe, with many stone tools of the old workers.

**Soil.**—Of the total area, embracing over 72,500,000 acres, only a comparatively small portion, approximating 5,000,000 acres, is arable land, and of this part about 500,000 acres are under irrigation and highly productive. The construction of irrigating canals and water storage reservoirs is being steadily promoted and is daily adding largely to the agricultural area. The pine timber land covers an area of nearly 4,000,000 acres, giving the Territory resources for timber and building material unsurpassed anywhere in the country.

**Agriculture.**—The principal crops are wheat and hay, which, in 1898, yielded 770,532 bushels and 116,487 tons respectively. Within recent years much attention has been given to the cultivation of sugar beets, date palms, melons, cotton, tobacco, sugar cane and the canaigre plant, used in tanning. Almonds, peanuts, oranges, lemons, apricots, potatoes, corn, barley, oats and root products generally do well under irrigation. The value of all farm and ranch animals in 1898 was \$10,706,449, the most numerous being sheep and cattle. According to the census of 1890, the Territory had 1,426 farms, comprising 1,297,033 acres, and worth, with buildings and improvements, \$7,222,230.

**Manufactures.**—Natural conditions have made Arizona more of a mining and agri-













# ARIZONA



Indian Reservation Boundaries

Military Reservation Boundaries

|                          |              |
|--------------------------|--------------|
| State Capital            | County Seats |
| Places of 5,000 and over | TUCSON       |
| "                        | Prescott     |
| "                        | Flagstaff    |
| "                        | Mesa         |

Hammond's 8 x 11 Map of Arizona  
Copyright, 1904, by C.S. Hammond & Co., N.Y.







cultural region than a manufacturing one. In 1900 there were 314 manufacturing establishments reported, employing \$10,157,408 capital and 3,476 persons; paying \$2,636,575 for wages and \$8,464,410 for materials; and having a combined output valued at \$21,315,189. The chief productions were flour, grist, and lumber in various forms.

*Banking.*—In 1899 there were 5 National banks in operation, having \$400,000 in capital, \$116,528 in outstanding circulation and \$795,087 in reserve. There were also 3 Territorial banks, with \$229,700 in capital, \$1,368,007 in deposits, and \$1,671,768 in resources.

*Imports and Exports.*—For the year 1899 the imports of merchandise in the district of Arizona aggregated in value \$1,224,863 and the exports, \$1,992,423. There was also imported gold and silver to the value of \$2,818,352.

*Education.*—The Territory has no compulsory attendance law. In 1898 the public school enumeration was 18,802; enrollment in the public schools, 14,613, and average daily attendance, 9,011. There were 244 public school districts; 435 teachers; school property valued at \$472,108; receipts of the year, \$235,381, and expenditures, \$229,323. For higher instruction there were public high schools at Phoenix and Prescott, St. Joseph's Academy at Prescott, a public normal school at Tempe, and the University of Arizona at Tucson, opened in 1891. Schools for Indian youth are maintained at the Colorado river, Fort Apache, Navajo and San Carlos agencies, and at Phoenix, Sacaton, Supai, Hualapai and Hackberry.

*Churches.*—The strongest denominations numerically in the Territory are the Roman Catholic; Latter-Day Saints; Methodist Episcopal, South; Baptist; Presbyterian; Protestant Episcopal and Congregational. All denominations reported in 1890: Organizations, 131; churches and halls, 122; members, 26,972, and value of church property, \$270,816. In 1899 there were 81 evangelical Sunday schools, with 594 officers and teachers and 5,280 scholars.

*Railroads.*—The total length of railroads within the Territory Jan. 1, 1900, was 1,465.88 miles, of which 49.70 miles were constructed during the previous year. Of all railroad property, 999 miles were assessed at an average valuation of \$4,191 per mile, and 454 miles were exempt from taxation for a term of years under Territorial laws.

*Post-Offices and Periodicals.*—In 1899 there were about 200 post-offices of all grades and 52 periodicals, of which 10 were dailies and 40 weeklies.

*Finances.*—The assessed valuation of all taxable property in 1899 was \$32,509,520, an increase of more than \$1,000,000 in a

year, and the net bonded and floating debt, in 1900, was \$1,132,187, an increase occasioned by the issue of bonds with which to erect a capitol building.

*Government.*—The Governor is appointed by the President for a term of four years and receives a salary of \$2,600 per annum. Legislative sessions are held biennially and are limited to 60 days each. The legislature has 12 members in the Council and 24 in the House, each of whom receives \$4 per day and mileage. The Territory has a delegate to Congress. In politics, the Territorial government is that of the national administration. The Legislature in 1904 had a Democratic majority.

*History.*—The early history of the region now comprised within the limits of Arizona is yet to be discovered and written. There are abundant evidences that long before the region was known to white men, it was inhabited by a large and superior race. The country now included in Arizona and New Mexico was partly explored in 1539 by Marco de Nizan, in quest of the precious metals, and on his report Vasquez de Coronado organized an expedition in the following year and visited the Moqui villages and the New Mexican pueblos. About 1596 the first colony was established; in 1680 the Spaniards were driven out of the country; by 1695 they had recovered nearly all of it, and by 1720 Jesuit missionaries had established a number of missions, ranches and mining stations. There were serious Indian outbreaks in 1802 and 1827, and what is now Arizona and New Mexico was acquired by the United States in 1848 and 1853. N. O. MURPHY.

*Arizona, University of,* a co-educational institution in Tucson, chartered in 1885, opened in 1891; has grounds and buildings valued at over \$225,000; scientific apparatus, \$58,600; income, \$155,000; professors and instructors, 40; students, 200; volumes in the library, 14,000; value of the same, over \$27,000; number of graduates since opening, over 70.

*Arjish Dag* (ar'yēsh-dach'), the loftiest peak of the peninsula of Asia Minor, at the western extremity of the Anti-Taurus Range, 13,150 feet; an exhausted volcano; on the N. and N. E. slopes are extensive glaciers.

*Arjuna* (ar-yū'na), name of two heroes in Hindu mythology: (1) the third son of Purdu; he was one of the principal heroes of the Mahabharata. The sister of Krishna was one of his wives. After many wonderful exploits he withdrew from worldly affairs and went to the Himalayas. (2) Better known by the name Kartavirya. Because of his devout worship of Dattatreya, a divine being, in whom was incarnated a portion of Vishnu, Brahma and Shiva, he



## Ark

was given a golden chariot, a thousand arms, the power of checking wrong, etc. According to the Vishnupurana he rules 85,000 years.

**Ark**, a chest or coffer for the safe-keeping of any valuable thing; a depository. The large floating vessel in which Noah and his family were preserved during the deluge.

The Ark of the Covenant, in the synagogue of the Jews, was the chest or vessel in which the tables of the law were preserved. This was a small chest or coffer, three feet nine inches in length, two feet three inches in breadth and the same in height, in which were contained the various sacred articles. It was made of shittim wood, overlaid within and without with gold and was covered with the mercy seat, called also the propitiatory, as the Septuagint expresses it, that is, the lid or cover of propitiation; because, in the typical language of Scripture, those sins which are forgiven are said to be covered.

**Arkansas**, a State in the South Central Division of the North American Union; bounded by Missouri, Tennessee, Mississippi, Louisiana, Texas and the Indian Territory; gross area, 53,850 square miles; admitted into the Union, June 15, 1836; seceded, March 4, 1861; readmitted June 22, 1868; number of counties, 75; pop. (1890) 1,128,179; (1900) 1,311,564; (1910) 1,574,449. Capital, Little Rock.

*Topography.*—The surface presents the features of mountains, prairies, hills, valleys and swamps. The Ozark, Boston, Ouachita and other ranges, from 1,500 to 2,000 feet high, occupy the W. and N. W. parts, with numerous spurs and outlying hills of considerable altitude; the central part is rolling ground; and the E. part is low, with many lakes and swamps and is liable to overflows of the Mississippi. Drainage is by the Mississippi, Arkansas, St. Francis, Black, White, Ouachita, Saline and Red rivers. Compensation for the absence of a seacoast is had in the navigability of long stretches of the principal rivers, thus permitting a valuable water traffic with adjoining States.

*Geology.*—The upper mountainous, forest and mineral lands may be separated from the lowlands and alluvial plains by a line drawn across the State from N. E. to S. W. The principal formations are the lower silurian in the N.; the sub-carboniferous on the S.; the cretaceous in the S. W., and the tertiary, overlaid by quarternary sands and clays. Hot and mineral springs are numerous and some of them are widely known. The valley of the St. Francis in the N. E. is a continuous swamp covered with a heavy growth of cypress, gum, oak, hickory and sycamore, while in the higher land there is an abundance of white oak and hickory. In the Arkansas valley are

## Arkansas

red cedar, cottonwood, maple and several varieties of oak. Other forest growths of value are ash, walnut, elm, willow and papaw.

*Mineralogy.*—The State contains semi-anthracite, cannel, and bituminous coal; iron and zinc ores; galena, frequently bearing silver; manganese; gypsum, oil-stone of superior quality; marble; alabaster; rock crystal; copper; granite; kaolin; marl; mineral ochers, and salt. The most valuable production at present is coal, which, in the calendar year 1899, yielded 843,554 short tons, spot value \$989,383, a decrease in a year of over 361,000 tons. Quarrying (1898) had an output of limestone valued at \$54,373 and sandstone, \$24,825. Clay products yielded \$227,266 in brick and tile, and \$17,100 in pottery; and 2,662 long tons of manganese ores were mined, valued at \$26,035.

*Soil.*—The soil varies with the geological characteristics and surface conditions already described. Agriculturally, the most valuable soil is found in the river bottomlands, and as the surface rises from these bottoms the soil becomes less productive. There are large submerged tracts that only require proper drainage to make them valuable to the farmer. The uplands generally are well timbered and well watered.

*Agriculture.*—The most valuable production is cotton, of which 1,876,467 acres yielded 919,469 gross bales in the season of 1898–1899, valued at over \$25,000,000. Of cereals, corn had the largest yield in 1899, the total being 48,087,140 bushels, valued at \$18,273,113. The total value of the cereal, potato, and hay crop exceeded \$20,000,000. Farm and ranch animals of all kinds were valued at \$22,674,555, the most numerous being swine and cattle. According to the census of 1890 the State had 124,760 farms, comprising 14,891,356 acres, and worth, with buildings and improvements, \$118,574,422.

*Manufactures.*—In 1900 there were 4,794 manufacturing establishments reported, employing \$35,960,640 capital and 28,150 persons; paying \$9,937,387 for wages and \$23,963,768 for materials; and having a combined output valued at \$45,197,731. The principal articles were lumber, sawed and worked; flour and grist; cotton-seed oil and cake; foundry and machine shop products; and brick and tile. In the fiscal year 1898–1899, the collections of internal revenue on taxable manufactures aggregated \$269,936.

*Banking.*—In 1899 there were 7 National banks in operation, having \$1,070,000 in capital, \$242,548 in outstanding circulation, and \$881,030 in reserve. There were also 37 State banks, with \$1,152,914 in capital, \$3,730,329 in deposits, and \$5,712,601 in resources.

*Education.*—In 1898 the school population was 465,565; enrollment in the public







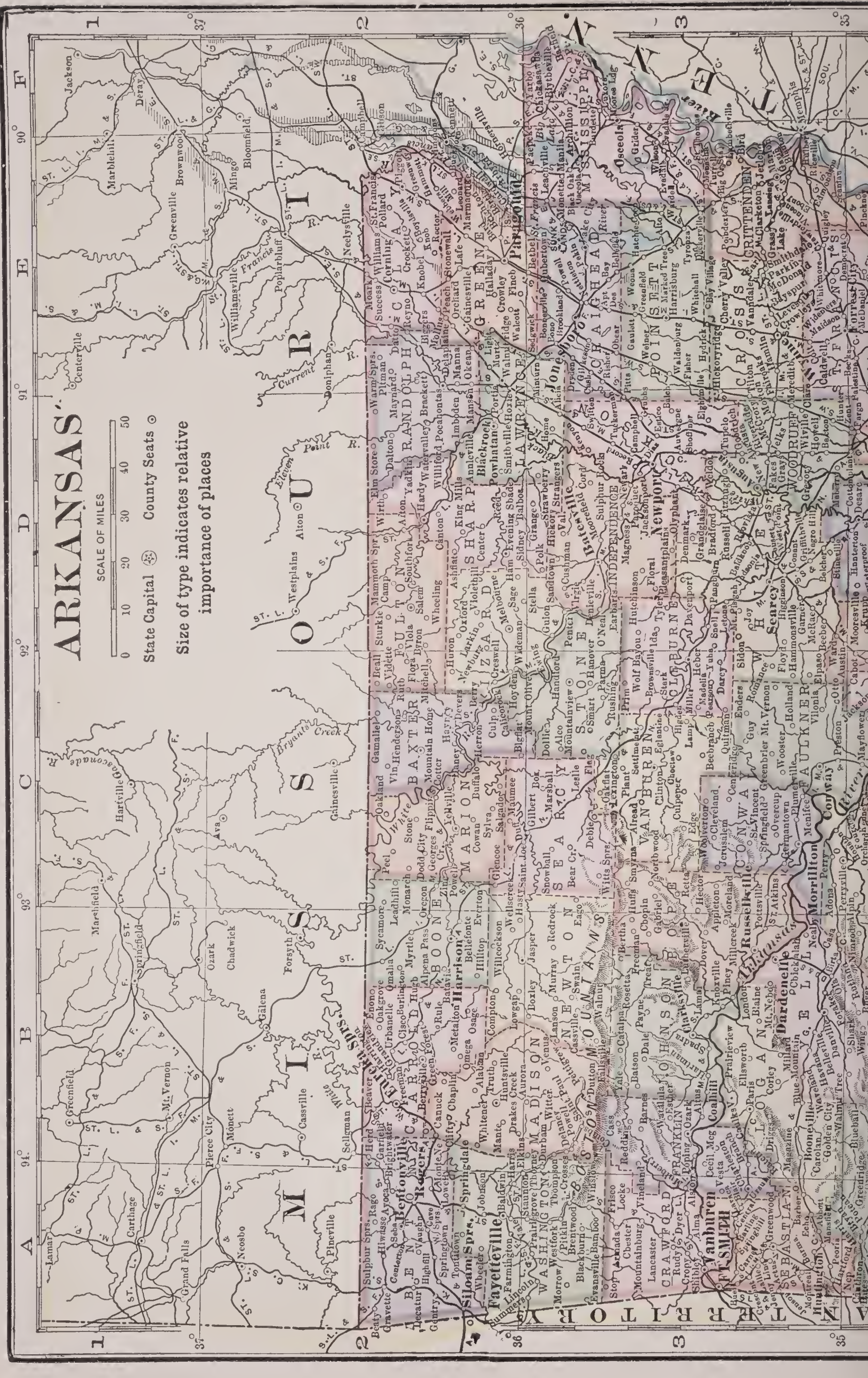
# ARKANSAS

SCALE OF MILES

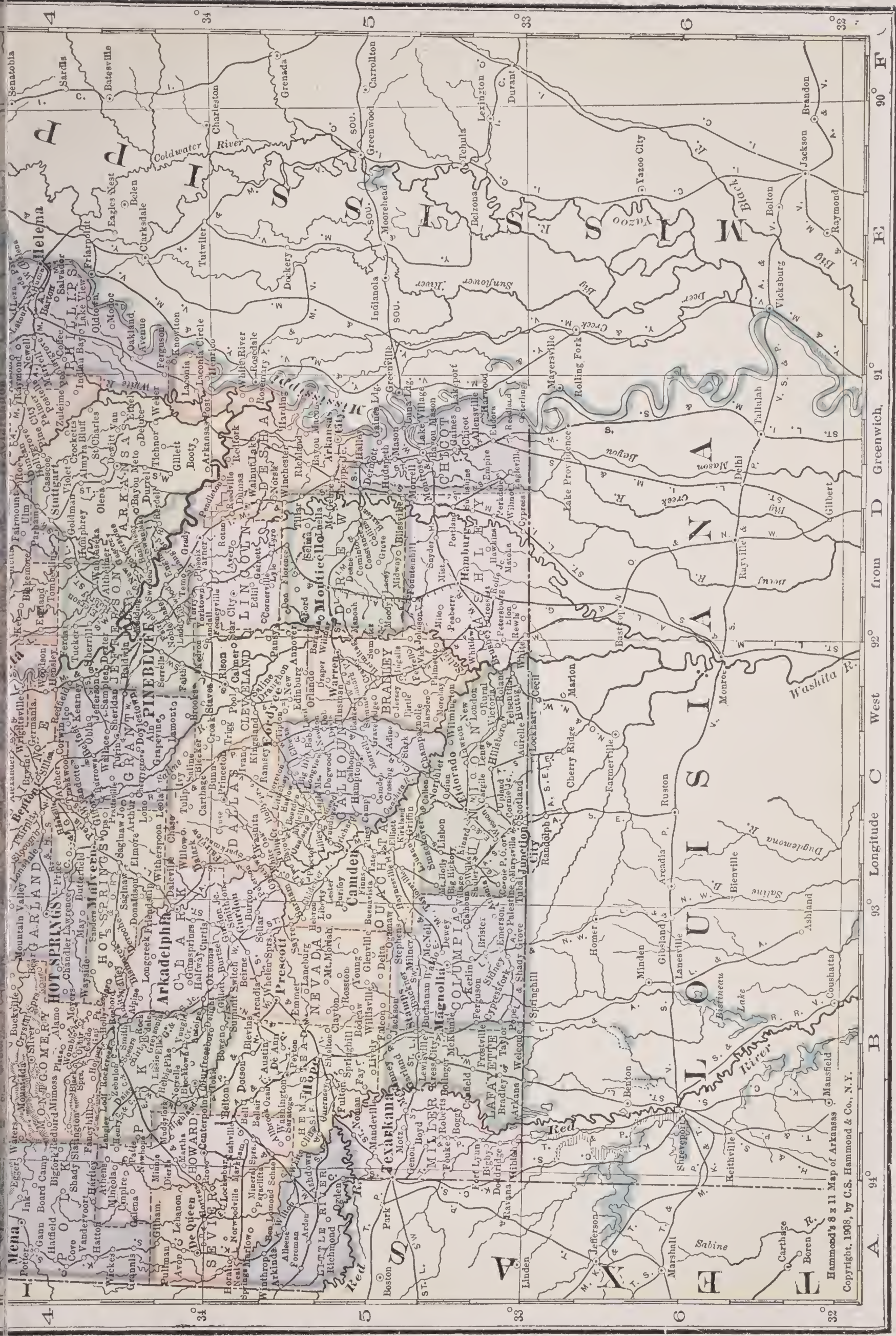
0 10 20 30 40 50

State Capital County Seats

Size of type indicates relative importance of places







Hammond's 8 x 11 Map of Arkansas  
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schools, 303,808; and average daily attendance, 191,447. There were 4,936 public schools; 7,073 teachers; public school property valued at \$2,294,397; receipts of the year, \$1,255,446; and expenditures, \$1,220,362. For higher instruction there were 48 public high schools; 24 private secondary schools; 1 public and 6 private normal schools; 8 universities and colleges for men and for both sexes; and the Central Baptist College for Women, at Conway. The principal universities and colleges are Arkansas College (opened 1872, Presb.); Arkansas Industrial University (1872, non-sect.); Philander Smith College (1877, Meth. Epis.); Hendrix College (1884, Meth. Epis. S.); Ouachita College (1886, Bapt.); Arkadelphia College (1890, Meth. Epis.); Arkansas Cumberland College (1891, Cumb. Presb.); and Mountain Home College (1893, Bapt.).

**Churches.**—The strongest denominations numerically in the State are the Methodist Episcopal, South; Regular Baptist, Colored; Regular Baptist, South; African Methodist Episcopal; Disciples of Christ, and the Methodist Episcopal. All denominations reported in 1890: Organizations, 4,874; churches and halls, 4,719; members, 296,208; and value of church property, \$3,266,663. In 1899 there were 2,050 evangelical Sunday-schools, with 13,962 officers and teachers, and 151,000 scholars.

**Railroads.**—The total length of railroads within the State, Jan. 1, 1900, was 3,092.77 miles, of which 269.48 miles were constructed during the previous year. The assessed valuation of railroad property, with that of telegraph and express companies, was about \$23,000,000.

**Post-Offices and Periodicals.**—In 1899 there were about 1,850 post-offices of all grades, and 259 periodicals, of which 21 were dailies and 212 weeklies.

**Finances.**—The assessed valuation of all taxable property in 1900 was \$189,999,045, of which \$62,936,142 was personal property. The recognized bonded debt and overdue interest, as reported in 1898, amounted to \$1,565,580; and the unrecognized debt all due in 1900, to \$8,706,773.

**State Government.**—The Governor is elected for a term of two years and receives a salary of \$3,500 per annum. Legislative sessions are held biennially, and are limited to 60 days each. The Legislature has 32 members in the Senate and 100 in the House, each of whom receives \$6 per day and mileage. There are 7 representatives in Congress. In politics the State is strongly Democratic.

**History.**—This portion of the original Territory of Louisiana, named after a tribe of Indians found there by the earliest explorers of record, was first settled by the French in 1670. It became a part of Louisiana Territory in 1803, of Missouri

Territory in 1812; was organized as Arkansas Territory, with the present Indian Territory and Oklahoma Territory in 1819; and was detached from Indian Territory and created a State in 1836. It was settled almost exclusively by people from the Southern States, and early became a battle ground in the Civil War. Following the seizure of Federal arsenals by the State authorities after the State had seceded, came the defeat of the Confederates in the battle of Pea Ridge, May 6–7, 1862, and in that of Prairie Grove, or Fayetteville, Dec. 7 following; the occupation by the Union forces of Helena; and the capture of Arkansas Post by a combined Union military and naval force, Jan. 11, 1863, and of Little Rock, Sept. 10, following. The State was adopted its present constitution in 1874.

D. W. JONES.

**Arkansas Post**, a village in Arkansas county, Ark.; on the Arkansas River; 117 miles S. E. of Little Rock. It is on a high bluff and was the site of the first settlement made within the present limits of Arkansas by French missionaries in 1685. Its elevated location gave it considerable military importance during the Civil War. The Confederates established strong works here, which were reduced by a combined assault of a portion of the United States army, under General McClernand, and a naval command under Admiral Porter, on Jan. 11, 1863.

**Arkansas Stone**, a name given to the oil-stones made from two grades of novaculite quarried in Hot Springs, Garland, and adjoining counties in Arkansas. The rocks cover a large area and yield the finest whetstones, and from them the highest grades of both whetstones and razor hones are made.

**Arkansas University of**, a co-educational institution organized in 1872, with academic and technical departments in Fayetteville, law and medical departments in Little Rock, and normal school for colored students in Pine Bluff; has grounds and buildings valued at over \$365,000; productive funds, \$130,000; income, about \$200,000; professors and instructors, 75; students, 1,400; volumes in the libraries, 15,000; value of the same, \$40,000; number of graduates since opening, over 550.

**Arklow**, a seaport of Wicklow, Ireland, 49 miles S. of Dublin, at the mouth of the Avoca river, which is crossed here by a bridge of 19 arches. Near it is Shelton Abbey, the seat of the Earl of Wicklow. There are ruins of the castle of the Ormonds, destroyed by Cromwell in 1649, and traces of an ancient monastery. In 1798, a bloody encounter took place here between the government troops and the United Irishmen.

**Arkona**, the N. E. promontory of the Island of Rügen, in the Baltic. Its chalk



## Arkwright

cliffs rise to a height of 177 feet, topped with a lighthouse, built in 1827, itself 78 feet high, from which the Danish Island of Möen, 33 miles N. W., can be seen. Here stood the famous fortification (Slavonie, *Urkan*) so long impregnable, and the temple of the Wend deity Swantewit, the most sacred sanctuary of the Slavs of Northern Germany. It was destroyed, after a long struggle, by King Waldemar I. of Denmark in 1168. The remains of the burg-ring or wall still stand on the land side of the promontory.

**Arkwright, Sir Richard**, an English inventor, born at Preston, in Lancashire, in 1732. The youngest of 13 children, he was bred to the trade of a barber. When about 35 years of age he gave himself up exclusively to the subject of inventions for spinning cotton. The thread spun by Hargreaves' jenny could not be used except as weft, being destitute of the firmness or hardness



SIR RICHARD ARKWRIGHT.

required in the longitudinal threads or warp. But Arkwright supplied this deficiency by the invention of the spinning frame, which spins a vast number of threads of any degree of fineness and hardness, leaving the operator merely to feed the machine with the cotton and to join the threads when they happen to break. His invention introduced the system of spinning by rollers, the carding, or roving, as it is technically termed (that is, the soft, loose strip of cotton), passing through one pair of rollers, and being received by a second pair, which are made to revolve with (as the case may be) three, four, or five times the velocity of the first pair. By this contrivance the roving is drawn out into a thread of the desired degree of tenuity and hardness. His inventions being brought into a quite advanced state, Arkwright removed to Nottingham in 1768 in order to avoid the attacks of the same lawless rabble that had driven Hargreaves out of Lancashire. Here his operations were at first greatly fettered by a want of capital; but two gentlemen of means having entered into partnership with him, the necessary funds were obtained, and Arkwright erected his first mill, which was driven by horses, at Nottingham, and took out a patent for spinning by rollers in 1769. As the mode of working the machinery by horse-power was found too expensive, he built a second factory on a much

larger scale at Cromford, in Derbyshire, in 1771, the machinery of which was turned by a water-wheel. Having made several additional discoveries and improvements in the processes of carding, roving, and spinning, he took out a fresh patent for the whole in 1775, and thus completed a series of the most ingenious and complicated machinery. Notwithstanding a series of lawsuits in defense of his patent rights, and the destruction of his property by mobs, he amassed a large fortune. He was knighted by George III. in 1786, and died in 1792.

**Arles** (ärl), a city of France, in the Department of Bouches-du-Rhone, on the Rhone, 44 miles W. N. W. of Marseilles. It is principally notable as having been an important town when Gaul was invaded by Cæsar. It afterward became a Roman colony, and was long a rich and prosperous city. The Roman amphitheater, capable of accommodating 30,000 spectators, yet remains, noble in its ruins. The great obelisk, and innumerable artistic remains, attest the former magnificence of this city. The Emperor Constantine embellished Arles, and his son Constantine II. was born here. In 855 it became the capital of the kingdom of Arelate, which was, in 933, united to that of Burgundy. Pop. (1901) 29,314.

**Arlincourt, Victor Vicomte d'**, (är-lan-kör'), a French poet and novelist (1789-1856). His chief poetical work is "Charlemagne, or the Caroleid" (1818), an epic; and of his novels the most successful was "Le Solitaire" (1821), which was translated into all European languages. Among several pamphlets, written in support of the Legitimist cause in 1848, one entitled "God Wills It" went through 64 editions.

**Arlington Heights**, a range of hills in Fairfax county, Va., on the Potomac, opposite Washington. They were strongly fortified during the Civil War. Gen. Robert E. Lee had a residence here. The place is now the site of a National Soldiers' Cemetery.

**Arm**, the upper limb in man, connected with the thorax or chest by means of the scapula or shoulder-blade, and the clavicle or collar-bone. It consists of three bones, the arm-bone (humerus), and the two bones of the forearm (radius and ulna), and it is connected with the bones of the hand by the carpus or wrist. The head or upper end of the arm-bone fits into the hollow called the glenoid cavity of the scapula, so as to form a joint of the ball-and-socket kind, allowing great freedom of movement to the limb. The lower end of the humerus is broadened out by a projection on both the outer and inner sides (the outer and inner condyles), and has a pulley-like surface for articulating with the fore-arm to form the elbow-joint. This joint somewhat resembles a hinge, allowing of movement only in one



direction. The ulna is the inner of the two bones of the fore-arm. It is largest at the upper end, where it has two processes, the coronoid and the olecranon, with a deep groove between to receive the humerus. The radius—the outer of the two bones—is small at the upper and expanded at the lower end, where it forms part of the wrist-joint. The muscles of the upper arm are either flexors or extensors, the former serving to bend the arm, the latter to straighten it by means of the elbow-joint. The main flexor is the biceps, the large muscle which may be seen standing out in front of the arm when a weight is raised. The chief opposing muscle of the biceps is the triceps. The muscles of the fore-arm are, besides flexors and extensors, pronators and supinators, the former turning the hand palm downward, the latter turning it upward. The same fundamental plan of structure exists in the limbs of all vertebrate animals.

**Armada**, a fleet of armed ships; a squadron; particularly applied to that great naval armament, which was called the Invincible Armada, fitted out in 1588, by Philip II. against Queen Elizabeth. It consisted of 129 ships, carrying about 20,000 soldiers and 8,000 sailors. The loss of the Marquis of Santa Cruz, their admiral, and a violent tempest, the day after they sailed, retarded for some time the operations of the Spaniards. They arrived on the coast of the Netherlands in July, were thrown into disorder by a stratagem of Lord Howard, and in this situation were attacked with such impetuosity that it became necessary to attempt to return. Contrary winds obliged the Spanish admiral, the Duke of Medina Sidonia, to make the circuit of Great Britain with the wreck of this magnificent armament. In passing the Orkneys, it was attacked by a violent storm, and only a feeble remnant returned to Spain.

**Armadillo**, the Spanish-American name, now imported into English, of various mammalia belonging to the order *edentata*, the family *dasypodidæ*, and its typical genus *dasypus*. The name armadillo, implying that they are in armor, is applied to these animals because the upper part of their body is covered with large, strong scales or plates, forming a helmet for their head, a buckler for their shoulders, transverse bands for their back, and in some species a series of rings for the protection of their tail. Another peculiarity is the great number of their molar teeth; these amount in one species to more than 90. There are five toes on the hinder feet, and four or five, according to the species, on the anterior ones. The fore feet are admirably adapted for digging, and the animal, when it sees danger, can extemporize a hole and vanish into it with wonderful rapidity. If actually captured,

it rolls itself into ball, withdrawing its head and feet under its strong armor. There are several species—such as the great armadillo, or tatu (*dasypus gigas*), the three-banded armadillo, or apara (*D. apar*), the six-banded armadillo (*D. sexcinctus*), and the hairy armadillo (*D. villosus*). They feed chiefly on ants and other insects and worms, and are peculiar to South America, where a giant animal of similar organization, the glyptodon, lived in tertiary times. Like all the animals belonging to this order, the armadillos are slow-motioned and harmless; sometimes they are troublesome in gardens, both from the destruction of plants and the number and extent of the excavations which they form.

It is also the name of a genus of crustaceans belonging to the order *isopoda*, and the family *oniscidæ*, the type of which is the well-known wood-loose. It is so called partly from its being covered with a certain feeble kind of armor; but chiefly from its rolling itself up into a ball after the fashion of the South American mammalian armadillos. Some species live in damp places, under stones, etc.

**Armageddon** (-ged'don), the great battlefield of the Old Testament, where the chief conflicts took place between the Israelites and their enemies—the tableland of Esdraelon in Galilee and Samaria, in the center of which stood the town Megiddo, on the site of the modern Lejjun; used figuratively in the Apocalypse to signify the place of “the battle of the great day of God.”

**Armagh** (ar-mag'), a city, and capital of Armagh county, Ireland; and the archiepiscopal seat of the Primate of all Ireland; 70 miles N. W. of Dub'in. It is said to have been founded by St. Patrick, A. D. 450. Pop. (1901) 7,588.

**Armagnac** (ar-man-yak), an ancient territory of France, in the province of Gascony, some of the counts of which hold prominent places in the history of France. BERNARD VII., son of John II., surnamed the Hunchback, succeeded his brother, John III., in 1391, and was called to court by Isabella of Bavaria, with the view of heading the Orleans in opposition to the Burgundian faction, where he no sooner gained the ascendancy than he compelled the Queen to appoint him Constable of France. He showed himself a merciless tyrant, and became so generally execrated that the Duke of Burgundy, to whom Isabella had turned for help, found little difficulty in gaining admission into Paris, and even seizing the person of Armagnac, who was cast into prison in 1418, when the exasperated populace burst in and killed him and his followers. JOHN V., grandson of the above, who succeeded in 1450, made himself notorious for his crimes. He was assassi-



nated in his castle of Lectoure in 1473 by an agent of Louis XI., against whom he was holding out.

**Armansberg, Count Joseph Ludwig von** (ar'mans-barg), a Bavarian statesman; born in 1787; was President of the Regency of Greece in 1833-1835, and Chancellor of State in 1835-1837. He died in 1853.

**Armatoles**, the warlike inhabitants, since the 15th century, of the mountain districts in Northern Greece, especially in Macedonia, Epirus and Thessaly. At one time, as robbers, they ravaged the neighboring country, at another time protected its wretched inhabitants from other robbers in consideration of blackmail. The Turkish pashas, unable to subdue them, made terms with them, and tried to metamorphose them into a sort of military police, intrusting to their care the safety of the public roads, and dividing the country into districts, each under the supervision of a chief of these militia. But, although the Armatoles frequently suppressed the brigandage of the Klephts, they still regarded them as brothers of common origin and faith, and shared with them their hatred for the Turkish yoke, however nominal it might be. The Turks, at last alarmed at this sympathy, tried to substitute for the Armatoles the Mohammedan Albanians, who were the implacable enemies of the Greeks. The moment the Greek insurrection broke out, in 1820, the Armatoles joined the insurgents 12,000 strong, and they at least gained some glory in the war.

**Armenia**, a mountainous country of Western Asia, not now politically existing, but of great historical interest. It varied in extent at different epochs, but it may be regarded as lying between lat.  $36^{\circ} 50'$  and  $41^{\circ} 41'$  N., and lon.  $36^{\circ} 20'$  and  $48^{\circ} 40'$  E. It was sometimes subdivided into First, Second, and Third Armenia, to which a Fourth was afterward added; but the division by which it was almost universally known was into Armenia Major and Armenia Minor, or the Greater and the Less Armenia. It would seem to have stretched from the Caspian Sea and the Persian province of Azerbaijan on the E. to Asia Minor on the W., and from the Kur or Cyrus river on the N. to Kurdistan and Mesopotamia on the S. Armenia Major comprised the larger and E. portion of this area, extending W. as far as the Euphrates and the Anti-Taurus, and having an area of about 84,000 square miles. Armenia Minor extended from the Euphrates to Asia Minor, and its area may be stated at about 53,000 square miles. The Euphrates thus intersects Armenia almost centrally, and forms the natural boundary between the two divisions now described. The territory of this kingdom is now partitioned among Turkey, Persia, and Russia, Turkey possessing the largest share.

The plateau of which Armenia chiefly consists is mountainous and volcanic. The ridges, of which there are four principal, are generally parallel to each other, running, with sundry deviations, E. and W., and between them are broad valleys and plateaux; that of the Aras, at Mount Ararat, being 2,890 feet, and many others 5,000 to 8,000 feet above the sea-level. The mountains are mainly composed of trachytic porphyry; with slate, limestone, etc., appearing on the sides of the chains, and sometimes rising up with the porphyry. Granite is also met with, but is not frequent; and in the N. Tertiary fossiliferous rocks are found. Its volcanoes are all quiescent, unless we except Ararat, of which an eruption took place in 1840, accompanied by a disastrous earthquake. A few mountains, as Ararat, Alaghez, and Bangöl-dagh, rise above the line of perpetual snow, but this is not generally the case; and there are no passes but such as can be crossed in a single day. Silver, lead, iron, and copper are found in the mountains; and the last two have to some extent been wrought in modern times. Rock salt is plentiful, and is exported in considerable quantities to Persia and elsewhere. Mineral waters abound, but little or nothing is known of their qualities.

Several important rivers take their rise in Armenia, namely the Kur or Cyrus, and its tributary the Aras or Araxes, flowing E. to the Caspian Sea; the Akampsis or Tchorak, and the Halys or Kizil-Irmak, flowing N. to the Black Sea; and the Tigris and Euphrates, which flow into the Persian Gulf. There are also several minor tributary streams. The only considerable lakes are those of Van, 70 miles in length and about 23 in breadth; Goukcha, Sevanga or Sevan, N. E. of Erivan, about 40 miles long by 15 broad; and Urumiyah.

The climate of Armenia is very severe, presenting quite a contrast to that of the warm regions of the Lower Euphrates, and to the mildness prevalent on the shores of the Black Sea. Any one, indeed, leaving the shores of the Pontus in April, and traveling rapidly S. may in one week experience the delights and discomforts of three seasons of the year. Winter in Armenia continues from October to May, spring and harvest a month each, and the change to summer is very rapid. The heat, especially in the valleys, during summer, is great, and rain seldom falls. In Erivan, which is a degree of lat. S. from Trebizond, the thermometer in winter falls  $36^{\circ}$  F. lower than it does in the latter; and in summer it rises  $24^{\circ}$  F. higher. On the plateaux of Erzeroom, Gumri, etc., the difference is still greater; indeed, in the town of Erzeroom the snow lies in the streets for eight months of the year. E. and S. E. winds in summer, W. winds in spring, and N. E. storm winds



in winter, are most prevalent. Though severe, the climate, is, however, esteemed healthy. The soil of Armenia is reckoned on the whole productive, though in many places it would be quite barren were it not for the great care taken to irrigate it; to such an extent indeed is the system of irrigation carried on, that in summer many considerable streams are wholly absorbed. Wheat, barley, tobacco, hemp, grapes, and cotton are raised; and in some of the valleys apricots, peaches, mulberries, and walnuts are grown. From the nature of the country the rearing of stock is carried on to a greater extent than agriculture. The horses are spirited, fleet, and fiery. Pines, birches, poplars, and beeches flourish, but there are no thick forests, except in the N. parts of the country. The flora is not so varied as might be expected in such an Alpine country; in several respects it resembles the vegetation of the Alps of Tyrol and Switzerland.

The inhabitants are chiefly of the genuine Armenian stock; but besides them, in consequence of the repeated subjugation of the country, various other races have obtained a footing. Of these the principal are the Turcomans, who still maintain their nomadic habits, and from whom the country has received the name of Turcomania. In the S. portion are the predatory Kurds and the Turks; on the Tchorak, Georgians; and throughout the whole country, Greeks, Jews, and Gypsies. The total number of Armenians has been estimated at 2,000,000, of whom probably one-half are in Armenia. The remainder, like the Jews, are scattered over various countries, and being strongly addicted to commerce, play an important part as merchants. They are found over all Western Asia; about 200,000 are in Constantinople and its vicinity; numbers are in Russia, Hungary, and Italy; some in Africa and America; and a large number in India, chiefly in the great marts, Bombay, Madras, and Calcutta. Everywhere they are engaged in banking and trading. Their eyes and hair are black, their look lively, noses aquiline, and their complexion somewhat swarthy. The women are remarkable for the delicacy and regularity of their features. Like the Jews, whom in many respects they resemble, their ruling passion appears to be an inordinate love of gain, but they are generally esteemed honest. Their mental capacity is good, and those who are educated are distinguished by superior cultivation and refined manners; but the mass of the people inhabiting their native country, in consequence of centuries of neglect, are grossly ignorant and superstitious.

*History.*—The legendary history of Armenia begins with Haïk, son of Togarmah, the great-grandson of Noah, mentioned in Gen. x: 3. He is said to have taken refuge

in Armenia from the tyranny of Belus, King of Babylon, who was slain in pursuit of him. The seventh king in descent from Haïk was killed in battle with Semiramis, and the country became tributary to Assyria. From Haïk the country derived the name Haikistan, and from Aram, his sixth successor, that of Armenia. Armenia continued subject to Assyria under its own princes till the revolt of the Medes and Babylonians against Sardanapalus, when Barbak, the King of Armenia, joined these powers and recovered his independence. Tigranes I. is said to have been the ally of Cyrus against Astyages, and to have built the city of Tigranocerta. His successor, Vhakin, the legendary hero of Armenia, was deified after his death. Vahi, the last of the dynasty of Haïk, was killed in fighting against Alexander as the ally or vassal of Darius. The duration of the dynasty was about 1,800 years. Armenia was now incorporated with the kingdom of Syria. It recovered its independence under Ardvates (B. C. 317), during the dissension among the successors of Alexander, but on his death submitted to the Seleucidæ. About B. C. 190 Artaxias and Zariadres, two Armenian nobles, freed themselves from the dominion of Antiochus the Great and established the kingdoms of Armenia Major and Armenia Minor. Armenia Major was reconquered from Artaxias II. by Antiochus Epiphanes. About 149 B. C. Mithridates, or Arsaces VI., King of Parthia, whose dominion extended over Media, Persia, and Babylonia, placed his brother Wagherashag or Valarsaces on the throne of Armenia, and introduced the dynasty of the Arsacidæ into the country. He built cities and organized the defenses of the country. His great-grandson Tigranes II., whose long reign appears to have begun about 96 B. C., conquered Artenes, King of Sophene or Armenia Minor, and united all Armenia under his sway. He was successful in war against the Parthians, and made himself master of the whole Syrian monarchy. He is also said to have founded or built Tigranocerta, the origin of which is likewise attributed to his probably mythical predecessor. Being the son-in-law of Mithridates, King of Pontus, while Mithridates was preparing to renew his war with the Romans after the death of Sulla he invaded Cappadocia at his instigation and carried away much spoil and many prisoners. Mithridates, after his defeat, took refuge with Tigranes, who does not seem to have been disposed to render him active assistance; but Lucullus made a peremptory demand through Appius Clodius for his surrender, which left Tigranes no alternative but a declaration of war (69 B. C.). Disregarding an invasion of Cilicia, Lucullus at once carried the war into Armenia, defeated the numerous forces of Tigranes, and captured Tigranocerta. Antiochus Eu-



## Armenia

sebes was reinstated on the throne of Syria, and other dependents of Tigranes revolted. Tigranes in the meantime, with the assistance of Mithridates, collected another army which was again defeated by Lucullus (68 B. C.). Favored by disaffection among the Roman troops, however, Tigranes recovered the greater part of Armenia, and defeated Fannius, the lieutenant of Lucullus. Pompey, who arrived in 66 B. C., after overthrowing Mithridates, who had also recovered his dominions, advanced to Armenia, which was at the same time invaded by the Parthians, instigated by the revolted son of Tigranes. The Parthians speedily withdrew, and young Tigranes fled to Pompey. At this critical juncture the elder Tigranes hastened to make his submission to the Roman general, who left him in possession of his kingdom, but deprived him of the provinces of Sophene and Gordyene, which he erected into a kingdom for the younger Tigranes. The elder Tigranes continued faithful to the Roman alliance, and Gordyene, which had been seized by the Parthians, was soon after restored to him. Tigranes died about 55 B. C. His son Artavasdes was made prisoner by Antony in 34 B. C., and carried to Egypt, where he was put to death by Cleopatra in 30 B. C. Armenia continued subject to the Romans, who appointed its princes from the family of the Arsacidæ till the time of Trajan, who made it a province. It was given up by Hadrian and again ruled by the Arsacidæ. Chosroes defended it during a long reign against the power of Persia, which had recently reestablished its monarchy on the ruins of the Parthian empire; but about A. D. 258-259 Sapor, King of Persia, unable to subdue Chosroes by force of arms, caused him to be assassinated, and his son Tigranes being an infant, took possession of the country. Tigranes was restored by the Romans in 286, the third year of Diocletian. At the beginning of his reign he persecuted the Christians, who were numerous in Armenia, but was himself converted to Christianity, it is said, by Gregory the Illuminator. Armenia was thus the first country which officially embraced Christianity. On the defeat of Galerius by the Persians in 296 Tiridates, who fought valiantly as the ally of the Romans, was compelled to follow the retreat of his protectors; but the succeeding campaign restored him, and his dominions were extended in the peace with Persia which followed. By the treaty into which Jovian, the successor of Julius, entered with Sapor II. (A. D. 363), the Romans were compelled to abandon the protection of Armenia. It was speedily reduced to a Persian province, but after the death of Sapor (380) its independence was restored in a new treaty of peace made with Theodosius in 384. The country, long oppressed by the contentions between the Romans and Persians, soon fell

## Armenia

into division through the attraction of these rival powers. A Persian king or governor, Chosroes, was set up over the E., and a Roman, Arsaces, over the W. portion of the country, both being of the royal house of Armenia. On the death of Arsaces the Romans suppressed the form of royalty, and annexed their portion of the country to the empire under the military command of a count of the Armenian frontier. This occurred in the reign of Theodosius II. On the death of Artasires or Ardashir, the successor of Chosroes, Bahram V. of Persia (about 431) annexed the Persian portion under the name of Persarmenia. The Persians exerted themselves to extirpate Christianity, but failed to do so; and on the fall of the Sassanidæ (632) the country was united again under the Greek empire. It now became the scene of incessant struggles between the declining empire and the rising Mohammedan power, and as it was persecuted by the emperors for its adoption of the Monophysite heresy its sympathies were not always with the former. The dynasty of the Pagratids or Bagratidæ was established by the arms and influence of the caliphs. It was a family of Jewish origin, and appears to have risen gradually to influence in the country. The date of its elevation to royalty is usually given as 885, but a much earlier date is sometimes assigned. It lasted till 1079, when the country again became dependent on the Greek empire. During this period several other dynasties which it is not necessary specifically to notice reigned simultaneously in different parts of the country. On the fall of the Pagratidæ a relative of the last king founded a small kingdom in the N. of Cilicia, which gradually extended to the Mediterranean, and was known as Lesser Armenia. It was overthrown by the Mamelukes in 1375. Armenia formed part of the empires of Genghis Khan and Tamerlane, and a great part of it was conquered by Selim II. in 1522. Henceforth it was shared between the Turks and Persians, the former having the greater part of it. In 1828 Russia obtained a considerable portion of it, and this was greatly augmented by the treaty of Berlin (1878). Russian Armenia includes the governments of Erivan and Elizabethpol, the territory of Kars, etc., with the important towns of Tiflis, Kars, and Erivan. At the time of the Berlin treaty Turkey made promises of better treatment for her Armenian subjects, but these have been disregarded and in 1895-1896 many thousands of the Armenians in different localities were massacred and atrocious cruelties perpetrated upon them by the Turks, with full approval, it would seem, of the Sultan and his advisers.

*Armenian Church.*—The Armenians received Christianity as early as the 3d century. During the Monophysitic disputes,



being dissatisfied with the decisions of the Council of Chalcedon (451), they separated from the Greek Church in the year 536. The Popes have at different times attempted to gain them over to the Roman Catholic faith, but have not been able to unite them permanently and generally with the Roman Church. There are, however, small numbers here and there of United Armenians, who acknowledge the spiritual supremacy of the Pope, agree in their doctrines with the Catholics, but retain their peculiar ceremonies and discipline. At different times force has been used to make them conform to the religion of Mohammed; but the far greater part are yet Monophysites, and have remained faithful to their old religion and worship. Their doctrine differs from the orthodox chiefly in their admitting only one nature in Christ, and believing the Holy Spirit to issue from the Father alone. In their seven sacraments, which they call mysteries, there are these peculiarities, that in baptism they sprinkle thrice and dip thrice, and this is immediately followed by confirmation; that in the Lord's Supper they mix no water with the wine, and use leavened bread, which they distribute dipped in wine; and that they allow extreme unction only to divines immediately after their death. They adore saints and their images, but do not believe in purgatory. In fasting they surpass the Greeks. Their feasts are fewer than those of the Greeks, but they celebrate them more devoutly. They worship, in Turkey, mostly in the night time; the mass is said in the ancient Armenian, the sermon is preached in the modern. Their hierarchy differs little from that of the Greeks. The *catholicus* or head of the church has his seat at Etchmiadzin, a monastery near Erivan, the capital of the Russian Armenia, on Mount Ararat. The holy oil, which he prepares and sells to the clergy, and the frequent pilgrimages of the Armenians to Etchmiadzin, supply him with means for the support of a magnificent style of worship and of establishments for education. He maintains in his residence a seminary for the education of divines. There is here also a printing press. The patriarchs, bishops, and archbishops of the Armenians are invested by him, and every three years confirmed in their offices or recalled. The remainder of the clergy resemble the priests of the orthodox church in rank and duties. The monks follow the rule of St. Basil. The *vartabets*, who live like monks, cultivate the sciences, take degrees, which may be compared with the usual academical honors, and are the vicars of the bishops, form a class of divines peculiar to the Armenian Church. The secular priests must be married once, but are not allowed to take a second wife. Both monks and clergy in general are ignorant and superstitious.

*Language and Literature.*—The Armenian

language belongs to the great Indo-European family of languages, and is most closely connected with the Iranic group. The Old Armenian or Haikan language, which is still the literary and ecclesiastical language, is distinguished from the New Armenian, the ordinary spoken language, which contains a large intermixture of Persian and Turkish elements. The most learned Armenian antiquaries do not pretend to trace their literature further back than about 150 years before the Christian era, when Marbas Catina wrote a history of Armenia, and earned for himself the title of the Armenian Herodotus. He was followed by some half dozen historians and mythologists, but all these early productions are lost, though they have not been quite valueless, inasmuch as they were the sources whence later Armenian writers compiled works still extant. The authors who lived in the 4th century of the Christian era are the first whose writings have been preserved. Christianity then prevailed in Armenia, and her authors were princes and prelates. The 5th century was the golden age of Haikan literature. This century was fruitful in authors, and was further distinguished by two events important to the progress of learning. The Armenians till then had had no alphabet of their own, indifferently using Greek, Syriac, and Persian characters. Early in the 5th century Mesrop Masdoty invented a Haikan alphabet of 38 letters, still called, in honor of the inventor, Mesropian, and now employed as capitals, since others of more convenient form have supplanted them in common use. About the same time schools were instituted throughout Armenia, and the scholars there trained exerted themselves in producing Haikan versions of the Bible, and of the masterpieces of Greece and Rome. One of the most distinguished authors who now appeared was Archbishop Moses Chorenensis or Chorenabyi. Besides innumerable translations, he wrote a history of Armenia, a treatise on rhetoric, and a treatise on geography—all of which, together with some homilies, have been preserved, as well as some hymns still habitually sung in the Armenian Church service. His "History of Armenia" was published in 1736, with a Latin translation, by the celebrated W. Whiston and his son George. In the 6th century Haikan literature first remained stationary, and then began to decline. This decline continued down to the 16th century. During this period authors abounded, but in a literary sense their productions were worthless. A few histories, however, national, Tatar, Arab, etc., some of them in verse, deserve esteem for the information they contain. In the 17th century Armenian schools and colleges arose in the East and in the West, Armenian printing presses were set up in various towns, and Armenian



## Arminianism

literature began to revive. In the 18th century the revival was complete, very much owing to the zealous and judicious exertions of Petro Meehitar, a Catholic Armenian, who in 1701 founded a religious society at Constantinople for the purpose of elevating the Armenians by diffusing among them a knowledge of their ancient literature and language. Being persecuted by the opposite sect he fled with his adherents to the Morea, then under the Venetians, and established a monastery and academy at Modon. The Morea reverting to the Ottoman scepter, Meehitar transferred his institution to the small island of San Lazaro at Venice, where it has ever since remained and prospered. Abbot Meehitar, during the remainder of his life (he died in 1749), successfully exerted himself to render his monastic college the chief seat of Armenian erudition and education. The best Armenian press extant is the Mechitarist, from which issues a newspaper that circulates widely in the Levant. Here many of the classical works of England, France, Italy, and Germany have been translated into Armenian. There is also a Mechitarist college in Vienna, and a branch in Munich. Wherever any extensive community of Armenians have settled they have set up a printing press (as in Amsterdam, Leghorn, Moscow, Venice, Astrakhan, Constantinople, Smyrna, Tiflis, St. Petersburg, Madras, Calcutta, etc., and at several of these places periodicals are published. The best Armenian dictionaries for foreigners are the Armenian-French one published at Venice in 1812; the Armenian-Italian of Emmanuel Tchaktchak (Venice, 1837); the Armenian-English of Aucher as improved by Bedrossian (Venice, 1868-1879; both Armenian-English and English-Armenian); and the French-Armenian of Norayr (Constantinople, 1884).

**Arminianism**, the doctrine of Arminius, a Protestant divine, who maintained that God had predestinated the salvation or condemnation of individuals only from having foreseen who would and who would not accept of offered mercy. His chief opponent was Gomar, who, with the Calvinists, asserted that God had from all eternity, of His free good pleasure, elected some to everlasting life, while He had left others to unbelief and consequent perdition. After the death of Arminius his followers rapidly increased, and were vehemently attacked by the Calvinists. In 1610 they addressed a petition to the States of Holland for protection, from which they got the name of Remonstrants. The Calvinists put forth a counter remonstrance, and, in 1614, the States issued an edict granting full toleration to both parties. This displeased the Calvinists, who continued their persecutions, and at length, in 1619, the doctrines of the Arminians were condemned by the

## Arminius

Synod of Dort, and their clergy were driven from their churches, and forbidden the exercise of their ministry in public. Owing to this step, many left the country, and found refuge in France, England, and other places. The views of the Arminians are summed up in the following five articles: (1) That God had, from all eternity, determined to save all who, He foresaw, would persevere in the faith, and to condemn all who should continue in unbelief. (2) That Christ died for all men; but that only those who believe are really saved by His death. (3) That man is of himself incapable of true faith, and must, therefore, be born again, of God, through Christ, by the Holy Spirit. (4) That all good works are to be attributed to the grace of the Holy Spirit, which, however, does not force a man against his own inclination. (5) That God gives to the truly faithful the power to resist sin. With respect to the possibility of a fall from the state of grace, Arminius and his immediate disciples were undecided; but his followers came afterward to the belief that it was possible. After 1630 the Arminians were again tolerated in Holland; but from that time their opinions underwent a considerable change. They have inclined more and more to freedom of thought, and the rejection of creeds and confessions. They chiefly build on the necessity of moral duties and good works, and allow each one to interpret the Holy Scriptures for himself. They reject many articles of faith, and do away almost entirely with the necessity of succor from the Holy Spirit. The Arminians have, however, dwindled down to a very small body; but their tenets, more especially regarding predestination, have been adopted by various other denominations, as the Wesleyan Methodists, as well as by numerous individual members of other churches.

**Arminius**, or **Hermann**, who by his intrepidity and success acquired the title of "the Deliverer of Germany," was the son of Segimer, a chief of the Cherusei. Having been sent to Rome as a hostage, he was there educated, served in the Roman army and for his valor was raised to citizenship and knighted. But his attachment to his native country induced him to revolt, and he became one of the most powerful leaders of the discontented German nations. He drew Varus, the Roman commander on the Rhine, into that ambushade in which he and nearly all his troops were slain, and completely baffled Germanicus; but, after having for years withstood the vast power of Rome, Arminius was assassinated by one of his own countrymen, in the 37th year of his age, A. D. 19.

**Arminius, Jacobus**, a Protestant divine, born at Oudewater, Holland, 1560; founder of the sect of the Arminians. In his pub-



## Armistice

lic and private life Arminius has been admired for his moderation: and though many



JACOBUS ARMINIUS

died, 1609. His writings were all on controversial and theological subjects.

**Armistice**, the term given to a truce or suspension of hostilities between two armies or nations at war, by mutual consent. It sometimes occurs owing to the exhaustion of both parties; at other times it is had recourse to with a view to arrange terms of peace. It may be either general or partial; the former, between two countries, the latter, limited to particular places, as between two armies or between a besieged fortress and its assailants. The former ordinarily requires ratification, but the latter is in the power of the commanders of the respective troops.

**Armitage, Edward**, an English historical and mural painter, born in London, May 20, 1817; studied in Paris, where in 1842 he exhibited his first independent work. In the following year his "Landing of Cæsar" gained a prize of \$1,500 in London; and in 1845 and 1847 he carried off prizes of \$1,000 and \$2,500. After a year's study at Rome, he visited the Crimea during the war, and on his return produced two spirited battle-pieces. He was made an associate in 1867, and, in 1872, a fellow, of the Royal Academy, to which, in 1875, he was appointed lecturer on painting. Most of his contributions to the academy exhibitions have been scriptural subjects; all have been marked by powerful composition, and by a breadth and boldness that largely atone for a want of warmth in the coloring. His mural paintings include a series of noble figures of Christ and the apostles in a Roman Catholic church in London. Died in 1896.

**Armitage, Thomas**, an American clergyman; born at Pontefract, England, Aug. 2, 1819; was an important influence in the Baptist Church in New York city, and the prime mover in the establishment of the American Bible Union in 1850. He was president of that body from 1856 to 1875.

gross insinuations have been thrown against him, yet his memory has been fully vindicated by the ablest pens. A life of perpetual labor and vexation of mind at last brought on a sickness, of which he

## Armor

Among his works are: "Jesus, His Self-Introspection;" and "History of the Baptists" (1887). He died in Yonkers, N. Y., Jan. 21, 1896.

**Armor**, a word formerly applied to all such contrivances as served to defend the body from wounds or to annoy the enemy.

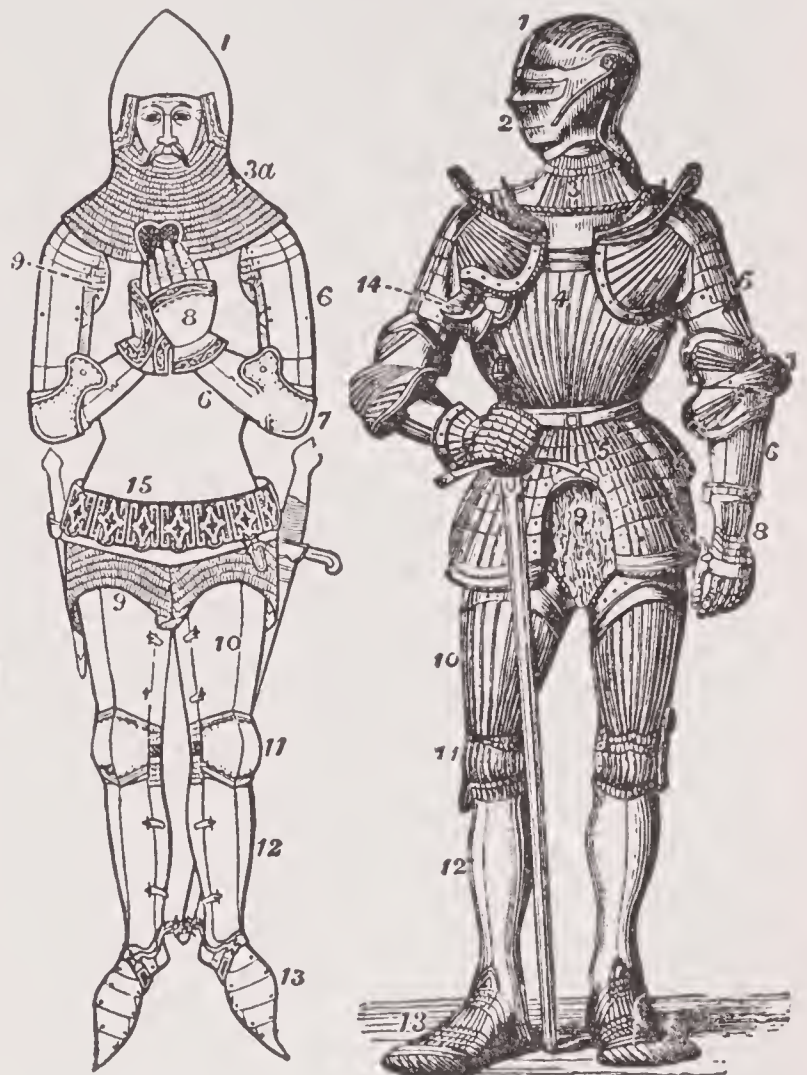


Fig. 1.  
(From brass of Sir John de St. Quintin, 1397.)

Fig. 2.  
(Complete suit of plate armor, beginning of 16th century.)

1, helmet; 2, visor; 3 gorget; 3a, camail; 4, breast-plate; 5, skirt; 6, arm-pieces; 7, elbow-piece; 8, gauntlet; 9, hauberk; 10, thigh-piece; 11, knee-piece; 12, greaves; 13, sollerets; 14, lance-rest; 5, belt.

Hence it was divided into two kinds, defensive and offensive. A complete suit of defensive armor anciently consisted of a casque or helm, a gorget, cuirass, gauntlets, tasses, brassets, cuishes and covers for the legs, to which the spurs were fastened. This was called armor *cap-a-pie*, and was worn by cavaliers and men-at-arms. The infantry had only part of it, viz., a pot or head-piece, a cuirass and tasses; all of them made light. The horses had armor which covered the head and neck. Of all this equipment of war, scarcely anything is now retained except, in a few cases, the cuirass.

The word is now applied to the metal protection given to ships of war, usually consisting of super-carbonized steel or nickel steel. See ARMOR PLATES.



## Armored Train

**Armored Train**, one of the modern instruments of war that received severe tests in the American operations against Filipino insurgents in 1898-1899, and in those of the British against the Boers in 1899-1900. Credit has been given to Admiral Fisher of the British navy for the first use of the armored train in war, when, in 1882, he covered a locomotive with boiler plate and equipped cars, similarly protected, with field guns and put them to effective practical use. But the germ of the idea goes back further than 1882. When the Germans closed their vise-like grip upon Paris, the French made frequent sorties from the city, and in many of these attacks they were assisted by field guns mounted on wagons and carriages. Later they were mounted on railroad cars, which were protected in their vital points against the enemy's guns.

Since 1882 most of the military powers of Europe have been experimenting with armored trains. Great Britain has now probably the most complete and efficient armored trains in the world. The best that the British army possesses is the engine and train of the First Sussex Artillery Volunteers, and this is far superior to the hastily constructed trains that have previously been in service. The model design was made from special designs for war purposes. The protected engine carries a Maxim gun, and the protected cars have heavy field guns, operated by machinery, so that any part of the surrounding country can quickly be covered. Arrangements are made to compensate for the recoil, and also to give steadiness and stability to the cars. This latter is accomplished by an arrangement for clamping the truck to the rails by strong screw clips whenever the gun is fired. There are also several steel-plated vans accompanying the train, in which horses and soldiers can be safely conveyed.

This type of movable fortress performed notable achievements in South Africa, and in the sorties from Ladysmith and Kimberly it was the chief implement that forced the Boers back. With machine guns and field pieces the moving train becomes a valuable offensive apparatus, being able to move up close to the enemy's lines or retreat to a point beyond the range of small arms. The rapidity with which the train can change its base of action renders it a difficult object for the batteries of an enemy to hit, and almost the only way to defeat its operations is to wreck or derail it; then it becomes a helpless target for long-range guns.

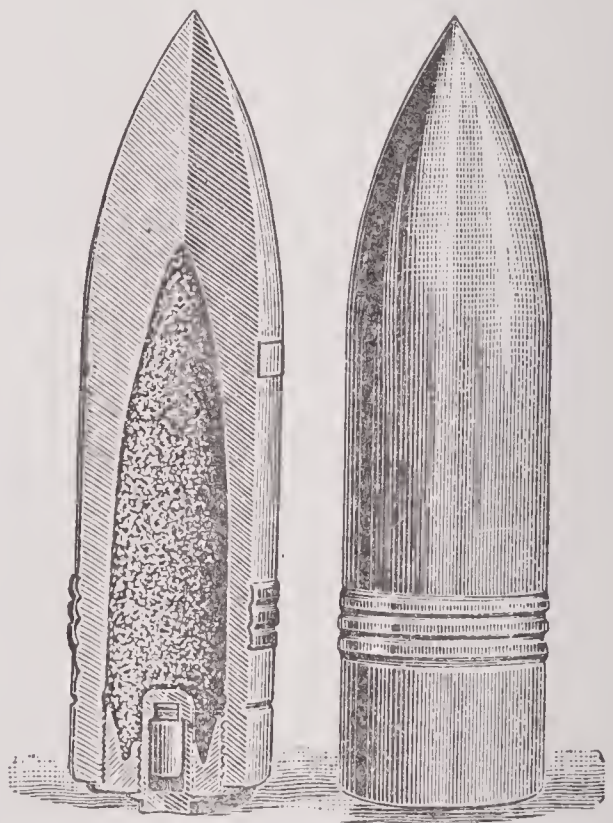
Probably the first attempt in the United States to provide an armored car was that made by the Michigan Central Railroad Company, on the order of the American Express Company, for the purpose of protect-

## Armor-Piercing Shells

ing the valuable articles carried on its special express trains. These armored or "arsenal cars" were so constructed as to make the center of them with its steel plating a thoroughly bullet-proof room, with apertures so disposed as to enable the guards within to resist an attack by thieves from any quarter.

During the remarkable dash of the American troops in the Philippines into the northern part of the island of Luzon, in search of the fugitive insurgent leader Aguinaldo, in 1899, much effective work was accomplished by an improvised armored train.

**Armor-Piercing Shells**, projectiles so constructed as to bore through the metallic plates with which modern ships of war are coated. Each advance in manufacturing tougher and more tenacious material for armor has been met by a corresponding improvement in velocity and penetrating power. It has been stated as an axiom that any armor-plate which may be carried on a ship may be penetrated. A Kruppized



ARMOR-PIERCING SHELL.

plate, eight inches thick, resisted a shell striking it with a velocity of 2,300 feet a second, but a capped ball moving at the rate of 2,500 feet pierced it. A Harveyized plate has been pierced to the depth of 14 inches by a six-inch projectile. The so-called Johnson cap is made of soft steel filled with graphite. The flat front of the projectile serves to heat the plate and destroy its temper. The hard point of the rapidly revolving shell, lubricated by the graphite, forces itself through the steel or bronze. The shell, which contains some powerful explosive, is blown to pieces either by the heat caused by the impact or by a time



## Armor Plates

fuse. The raw material for armor-piercing shells is still partly hardened. After the steel bar is cut to the right size and heated to the right temperature, it is subjected to pressure under a hydraulic mandrel which squeezes it into a conical form. Another press punches a hole in the center of the thicker end. After several other similar processes it is turned and trued in lathes. A rifling band of copper is welded on near the base. Around the nose of the full armor-piercing projectile, a short distance from the point, a groove is cut. This is for a soft steel cap, which is put on by the government when the shells are loaded. The cap serves to prevent the shell from glancing when it strikes obliquely and also acts as a lubricant, enhancing its penetrating power.

In the tempering of the shells, the government requirements are such that it is seemingly necessary to work for two ends that lie in exactly opposite directions. They must be both tough and brittle. A certain number are selected at random from each lot for testing. One-half of these are fired at an armor-plate target and must pierce it without receiving any damage (often they come through it with hardly a scratch); the other half are loaded and exploded in a pit, and the requirement is that they shall be literally blown to pieces. If, in the first test, a shell is broken or flattened or badly injured in any way, or if in the second test the explosion simply rips the shell open or rends it apart, the whole lot is rejected.

**Armor Plates**, slabs of metal with which the sides of war vessels are covered for the purpose of rendering them shot-proof. For many years they were also used on land fortifications, but in the United States this application of them has been abandoned for the more satisfactory earth and concrete emplacements. The idea of using slabs of iron or steel for protection against missiles is not a recent invention. The first attempt to use armor-plate on the sides of ships was made by John Stevens, of Hoboken, in 1812. He built a vessel shaped somewhat similar to the later vessels of the "Monitor" type, and sheathed it along the water line with laminated iron plates. His vessel was offered to the United States Government but was not accepted. It is also said that in 1845 a man named Balmano, in New York, proposed that warships be clad with several thicknesses of iron  $\frac{3}{4}$ -inch thick, riveted upon one another. The French were the first to adopt armor-plating. In 1854 they sent floating batteries to the Black Sea, sheathed with  $4\frac{3}{4}$  inches of laminated iron, which was proof against the fire of the 68-pounders, then the most powerful guns. The British admiralty, following this example, sent out very slow and unmanageable iron-clad batteries in 1855-

## Armor Plates

1856. These batteries protected the ships very well against round balls from the unrifled cannon of the day. It was not, however, till the American Civil War that armor plating came into general use. The Confederate ram "Merrimac" was the first practical armor-plated vessel in the United States, her sheathing consisting of railroad rails. Her successful opponent, the "Monitor," was heavily sheathed with laminated iron plates extending several feet below the water line. The famous contest between these pioneer ironclads revolutionized naval warfare and naval equipment, and since the American Civil War all maritime countries have been concerned in obtaining guns and projectiles of the greatest range and penetration, and a sheathing for their ships of the most impenetrable material. Hence, the improvements in armor-plate and in ordnance have about kept equal pace.

It was early found that laminated plates were more effective than solid ones; later, iron plates were built up in layers, heated to a white heat, and welded together, forming a very substantial armor. The iron was shortly replaced with steel, and it was discovered that the addition of  $3\frac{1}{4}$  per cent. of nickel gave the steel greater elasticity and greater resistance to cracking than ordinary steel. Harvey introduced the process of carbonizing the face of armor-plate, greatly increasing its hardness. The plate, having been placed in a furnace, is covered with a layer of carbonizing material about a foot thick, over which is laid a covering of brick to exclude the flame and air from the carbonizing material. The doors of the furnace are bricked up and a high heat maintained for about 100 hours. The plate is removed, and its surface cleared when cold, it is then reheated, and sprayed with cold water, producing an exceedingly hard surface. This Harveyized steel was used for nearly all the American and foreign men-of-war, until, in 1895, a process was discovered at the iron works of Krupp, at Essen, by which the face of the plate was made so hard that it cut glass like a diamond, while the back remained so tough that it would suffer no injury from cracks when struck by a projectile. The Krupp process is somewhat similar to, and an improvement on, the Harvey process. In this process a hydrocarbon gas is used instead of solid carbonaceous matter for the super-carburization of the plate. The Kruppized steel has 30 per cent. greater resisting power than the nickel steel. When armor-plates have to be bent or curved, this operation is performed after carbonizing and before the final heating for hardening. The plates as a general thing are not more than 98 inches wide and 16 feet long.

So great has been the advance in the design and manufacture of guns and projec-



## Armour

tiles that it is stated as an axiom that any armor-plate that may be carried on a ship may be perforated. The maximum velocity hitherto for testing a Kruppized plate 8 inches thick with 8-inch projectile, was 2,000 feet per second, and the plate withstood it, but with the same velocity a capped projectile pierced the plate. A Harveyized plate has been pierced to a depth of 14 inches by a 6-inch soft cap projectile, so that the cap showed on the back. The Krupp armor is perforated, but not cracked, by a projectile with a velocity exceeding 2,500 feet per second. The Harvey plate is cracked but rarely perforated at a velocity of less than 2,000 feet per second. The projectiles used for testing purposes vary from 100 pounds to 850 pounds in weight. Tests of armor-plates are of small value, however, in indicating the outcome of a battle at sea, because war vessels present so many angles of direction and such fluctuating targets to projectile discharges at sea that nearly all calculations of velocity and penetration become nugatory. Armor tests, on the other hand, are made with a fixed target, a steady gun, and a straight sight. The advantage of the new process of making steel has been that one could use thinner plates which were not so heavy, so that the ships could carry larger cannon and travel with greater rapidity. Armor-plates are manufactured in Sheffield, England; at the Creusot and St. Chamond works in France; by Krupp, at Essen, and at the Dillingen and Gruson works in Germany; and in the United States, at Pittsburg and Bethlehem, Pa. Each of the last plants, besides their work for the United States Navy, have filled large orders from foreign governments, especially Russia.

MAUNSEL WHITE.

**Armour, Philip Danforth**, an American philanthropist, born in Stockbridge, N. Y., May 16, 1832; received a common school education; was a miner in California in 1852-1856; in the commission business in Milwaukee in 1856-1863; and later became the head of a large meat-packing concern in Chicago. He founded the Armour Mission and the Armour Institute of Technology, both in Chicago; the former at a cost of about \$250,000, and the latter with an endowment of \$1,500,000, subsequently increased. He died Jan. 6, 1901.

**Armour Institute of Technology**, a co-educational (non-sectarian) institution, founded in Chicago, Ill., by Philip D. Armour, in 1893; has grounds and buildings valued at over \$700,000; endowments, \$1,750,000; income, about \$190,000; professors and instructors, about 70; students, 1,600; volumes in the library, 25,000; graduates since opening, over 450.

**Arms**, a term applied to weapons of offense, which are divisible into two distinct sections — firearms, and arms used without

## Arms

gunpowder or other explosive substance. The first arms of offense would probably be wooden clubs, then would follow wooden weapons made more deadly by means of stone or bone, stone axes, slings, bows and arrows, with heads of flint or bone, and afterward various weapons of bronze. Subsequently a variety of arms of iron and steel were introduced, which comprised the sword, javelin, pike, spear or lance, dagger, axe, mace, chariot scythe, etc.; with a rude artillery consisting of catapults, ballistæ, and battering-rams. From the descriptions of Homer, we know that almost all the Grecian armor, defensive and offensive, in his time was of bronze, though iron was sometimes used. The lance, spear, and javelin were the principal weapons of this age among the Greeks. The bow is not often mentioned. Among ancient nations, the Egyptians seem to have been most accustomed to the use of the bow, which was the principal weapon of the Egyptian infantry. Peculiar to the Egyptians was a defensive weapon intended to catch and break the sword of the enemy. With the Assyrians the bow was a favorite weapon; but with them lances, spears, and javelins were in more common use than with the Egyptians. Most of the large engines of war, chariots with scythes projecting at each side from the axle, catapults, and ballistæ, seem to have been of Assyrian origin. During the historical age of Greece the characteristic weapon was a heavy spear from 21 to 24 feet in length. The sword used by the Greeks was short, and was worn on the right side. The Roman sword was from 22 to 24 inches in length, straight, two-edged, and obtusely pointed, and, as by the Greeks, was worn on the right side. It was used principally as a stabbing weapon. It was originally of bronze. The most characteristic weapon of the Roman legionary soldier, however, was the pilum, which was a kind of pike or javelin, some 6 feet or more in length. The pilum was sometimes used at close quarters, but more commonly it was thrown. The favorite weapons of the ancient Germanic races were the battle-axe, the lance, or dart, and the sword. The weapons of the Anglo-Saxons were spears, axes, swords, knives, and maces or clubs. The Normans had similar weapons, and were well furnished with archers and cavalry. The cross-bow was a comparatively late invention introduced by the Normans. Gunpowder was not used in Europe to discharge projectiles till the beginning of the 14th century. Cannon are first mentioned in England in 1338, and there seems to be no doubt that they were used by the English at the siege of Cambrai in 1339. The projectiles first used for cannon were of stone. Hand firearms date from the 15th century. At first they required two men to serve



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them, and it was necessary to rest the muzzle on a stand in aiming and firing. The first improvement was the invention of the match-lock, about 1476; this was followed by the wheel-lock, and about the middle of the 17th century by the flint-lock, which was in universal use until it was superseded by the percussion-lock, the invention of a Scotch clergyman early in the 19th century. The needle-gun dates from 1827. The only important weapon not a firearm that has been invented since the introduction of gunpowder, is the bayonet, which is believed to have been invented about 1650. The principal weapons used in modern warfare will be found under their respective names.

**Arms, Coat of, or Armorial Bearings,** a collective name for the devices borne on shields, banners, etc., as marks of dignity and distinction, and, in the case of family and feudal arms, descending from father to son. They were first employed by the crusaders, and became hereditary in families at the close of the 12th century. They took their rise from the knights painting their banners or shields each with a figure or figures proper to himself, to enable him to be distinguished in battle when clad in armor.

**Arms, Stand of,** the set of arms necessary for the equipment of a single soldier.

**Armstrong, Sir Alexander,** an English physician, born in Ireland about 1820; was educated at Trinity College, Dublin, and at the University of Edinburgh; and became widely known as an explorer. He entered the British navy at an early age, and served in many parts of the world. He took part in an expedition to Xanthus in Syria; spent five consecutive years in the Arctic regions, searching for Sir John Franklin; and circumnavigated the American continent, in which voyage he became one of the discoverers of the Northwest Passage. For several years he was Director-General of the Medical Department of the British navy. His publications include "A Personal Narrative of the Discovery of the Northwest Passage," and "Observations on Naval Hygiene, Particularly in Connection with Polar Service." He died July 5, 1899.

**Armstrong, John,** an American author and soldier; born at Carlisle, Pa., Nov. 25, 1758; served in the War of the Revolution on the staff of General Gates; was United States Minister to France, 1804-1810, afterward to Spain; and Secretary of War, 1813-1814. Author of "Newburg Letters," begun in camp, 1783, anonymously, and intended to arouse Congress to redress army grievances. They gave General Washington displeasure. He also wrote "Notices of the War of 1812" (1836). He died at Red Hook, N. Y., April 1, 1843.

## Armstrong

**Armstrong, Samuel Chapman,** an American educator, born in Hawaii in 1839, a son of Richard Armstrong, an American missionary to the Sandwich Islands. In 1860 he came to the United States; in 1862 was graduated at Williams College; and in June of the same year he organized a company for the 125th Regiment of New York Infantry, and with it was assigned to the Army of the Potomac. At Harper's Ferry he was captured and held prisoner for three months. After the close of the war he was mustered out of the volunteer service with the rank of brigadier-general. During his service he volunteered for the command of a regiment of colored troops, with whom he served two years. In 1866 he took up the work of the Freedman's Bureau and at first had the oversight of the colored people in 10 counties of Virginia. After two years in this work he procured help from the American Missionary Association and personal friends in the North and founded a school which afterward became famous as the Hampton Normal and Agricultural Institute. The United States Government, recognizing the great value of his work for colored youth here, began sending Indian youth to the institute in 1878, and since then the two races have been educated together. General Armstrong served as president of the Institute till his death, May 11, 1893.

**Armstrong, William George, Lord,** an English inventor, born in 1810 at Newcastle, where his father was a merchant. He was articled to a solicitor, and became a partner in the firm; but the bent of his mind lay in other directions. In 1840 he produced a much improved hydraulic engine, and in 1845 the hydraulic crane. In 1842 he brought to perfection an apparatus for producing electricity from steam. He was elected a member of the Royal Society in 1846; and shortly afterward commenced the Elswick Engine Works, in the suburbs of his native city. This large establishment was at first chiefly employed in producing hydraulic cranes, engines, accumulators, and bridges, but was soon to be famous for the production of ordnance. During the Crimean War, Armstrong was employed by the War Office to make explosive apparatus for blowing up the ships sunk at Sebastopol. This led him soon afterward to consider improvements in ordnance, and he devised the form of cannon that bears his name. The essential feature of the Armstrong gun, whether rifled or smooth bore, breech-loading or muzzle-loading, is that the barrel is built up of successive coils of wrought-iron, welded round a mandrel into a homogeneous mass of great tenacity, the breech being especially strengthened on similar principles. The actual results obtained by these guns, even



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of the earlier patterns, were almost incredible. An ordinary 32-pounder weighed 5,700 pounds; Armstrong's 32-pounder weighed 2,600 pounds. The former required 10 pounds of powder as a charge; for the latter 5 pounds sufficed. The former would send a shot or shell 3,000 yards; the range of the latter exceeded 9,000 yards. In 1858 the rifle-cannon committee recommended the adoption of the Armstrong gun for special service; and the government proposed to secure the result of these experiments for the nation. Armstrong offered to the government all his inventions; and, till 1863, there existed a kind of partnership between the government and the Elswick firm, Armstrong being knighted in 1858, and appointed chief-engineer of rifled ordnance. The Elswick firm has supplied many foreign governments with guns. The great reputation and commercial success of Armstrong depended, however, largely on his skill as a constructor of hydraulic machinery. Already a member of many scientific societies, he was in 1863 President of the British Association. Cambridge and Oxford conferred honorary degrees on Armstrong, who was raised to the peerage as Baron Armstrong in 1887. He died Dec. 27, 1900.

**Army**, the national militia of a country. The organization of an army is of two kinds—tactical and administrative. The former enables the leader of an army to transmit his orders to three or four subordinate commanders, who pass them on to three or four others under them, until, through a regular chain of responsibility, the original impulse is communicated to the private soldier. The latter deals with the paying, feeding, clothing, arming and transportation of the military forces.

**Ancient Armies.**—The earliest regular military organization is attributed to Sesostris, who flourished in Egypt about 16 centuries B. C. This extraordinary conqueror divided Egypt into 36 military provinces, and established a sort of militia or warrior caste. With this army he overran Asia as far as India, and from the Ganges to the Caspian. After him little further progress was made in military art until the Persian empire rose. Its soldiers introduced the mass formation, with cavalry in intervals of squares; but the most important feature of the Persian organization was the establishment of what was practically a standing army, apportioned as garrisons throughout the conquered provinces, and under the control of military governors distinct from the satraps. In time of war this standing army was augmented by a general levy, which included the tributary nations, and, therefore, resulted in a heterogeneous collection of barbarous and undisciplined peoples; a source

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of weakness which caused the defeat of Xerxes' numerically powerful army. In Greece it was not a standing army, but a sort of national militia, that gained Marathon, Plataea, and Mycale. The leading men in each State paid attention to organization and tactics in a way never before seen. The Lacæmonians invented the famous phalanx, a particular mass formation for foot-soldiers; and to this the Athenians added lighter troops to cover the front and harass the enemy in march. Their cavalry also were efficient and alert. The charge of the Athenian army at Marathon showed the crowning excellence of their rapid system of attack; and Miltiades, their leader, is said to have invented the double-step, to increase the momentum of a phalanx when rushing on the enemy. The Thebans introduced the column formation, which, being deeper and narrower than the phalanx, was intended to pierce the enemy's line at some point and throw them into confusion. Philip, the father of Alexander the Great, established, in Macedonia, the world's second standing army; and, as a further change, made the phalanx deeper and more massive than it had been among the Lacæmonians. He brought into use the Macedonian pike, a formidable weapon 24 feet in length. The Romans initiated changes in army matters which have had a widespread influence throughout the civilized world. About 200 B. C. every Roman from the age of 17 to 46 was liable to be called upon to serve as a soldier; the younger men being preferred, but all were available up to the middle time of life. The Roman legion, in its best days, excelled all other troops alike in discipline and in *esprit*. So long as none but freemen were enlisted the position of a legionary was one of honor. With a gradual laxity in discipline the decline of the Roman power commenced.

**Mediæval Armies.**—With the decline of the Roman power all that remained of scientific warfare was lost for a time. The Northern invaders made little use of tactics, but relied chiefly on their personal bravery and on the impetuosity and weight of their attack in column. The conquerors of the Roman Empire at first recognized no superior save the community, of which all conquests were the property. What all had aided to acquire all demanded equally to share. Hence arose a division of the conquered territory, individual chiefs rewarding their own followers with gifts of the land they had helped to conquer. The growth of a feeling that such gifts could be revoked, and that they implied an obligation to future service, marks the beginning of the feudal system, under which national armies disappeared, and each baron had a small army composed of his own retainers, available for battle at short notice. The contests



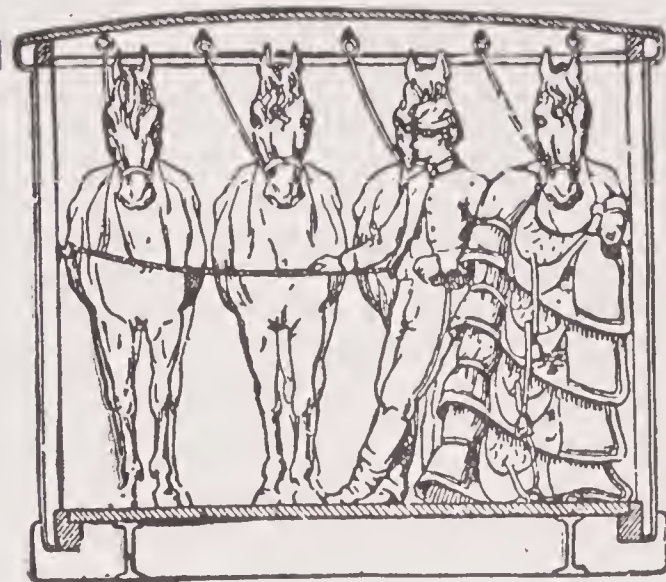
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of these small armies, sometimes combined and sometimes isolated, make up the greater part of the military annals of the Middle Ages. Of military tactics or strategy there was very little; the campaigns were desultory and indecisive, and the battles were gained more by individual valor than by any well concerted plan. From this period dates the modern recognition of the importance of an army which under the franchise extended to the towns, and the superiority of which, since the overthrow of the Burgundian chivalry by Swiss infantry, in the three disastrous battles of 1476-1477, has never been disputed. The invention of gunpowder effected much less change during the Middle Ages than is generally supposed. When men could fight at a greater distance than before, and on a system which brought mechanism to the aid of valor, everything connected with the military art underwent a revolution. Historically, however, this great change was not very apparent until after this period. The art of making good cannon and hand-guns grew up gradually, like other arts; and armies long continued to depend principally on the older weapons, spears, darts, arrows, axes, maces, swords and daggers. As to army formation, there was still little that could deserve the name; there was no particular order of battle. No attempt was made until toward the close of the 15th century to embody a system of tactics and maneuvers for cavalry; and even that attempt was of the most primitive kind. Nor was it far otherwise with the foot soldiers; they were gradually becoming acquainted with the use of fire-arms; but midway, as it were, between two systems, they observed neither completely; and the armies in which they served presented very little definite organization.

*Modern Armies.*—The Turkish Janizaries, the earliest standing army in Europe, were fully organized in 1632; but the formation of standing armies among Western Powers, which may be said to have introduced the modern military system, dates from the establishment of *compagnies d'ordonnance* by Charles VII., of France, nearly a century later. These companies of men-at-arms amounted, with their attendants, to 9,000 men; to whom the King afterward added 16,000 franc-archers, largely recruited from the mercenaries which growing wealth and luxury had developed. The superiority of such a force over militia forced its adoption on the surrounding States. Between the beginning of the 16th and the end of the 18th centuries the proportion of musketeers gradually increased; the pike was abandoned for the bayonet, and even cavalry was taught to rely more on their fire than on the effect of their charge. The improvement in weapons naturally effected the formation. During the Thirty Years' War (1618-1648)

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Gustavus Adolphus and Wallenstein adopted opposite modes of dealing with masses of infantry; the former spread them out to a great width, and only six ranks in depth, whereas the latter adopted a narrower front with a depth of 20 or 30 ranks. In Louis



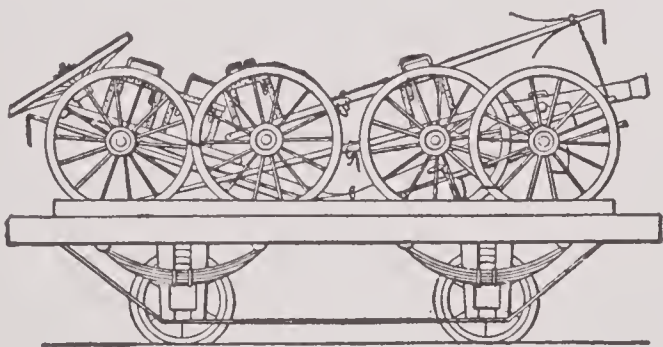
CAVALRY CAR.

XIV.'s reign the prolonged wars introduced the larger grouping in brigades and divisions. Frederick the Great, in the next century, reduced the depth of his infantry formation to three ranks, and introduced a most rigid and exact system of tactics and drill, so that when able to manœuvre he nearly always won his battles; but when the result depended on bold and unexpected onslaughts he was more frequently a loser than a winner. He, however, greatly improved the cavalry tactics, and restored to this arm a reliance on the effect of a rapid charge, while the introduction of horse artillery added to its power. The French Revolution effected almost as great changes in the military as in the political organization of Europe. The struggle from which France emerged victorious in 1797 had exhausted even the enormous levies which had fed her armies for the previous five years; and, in 1798, a law was passed establishing compulsory military service. Every citizen was liable to five years' service, and all between the ages of 20 and 25 were enrolled. The immense advantage which this terrible power gave Napoleon compelled other nations to follow the example of France, and in Europe voluntary enlistment has since survived in England alone. Restricted under the Treaty of Tilsit (1807) to 43,000 men with the colors, the Prussian strength was, nevertheless, annually added to by Scharnhorst, who first developed the idea of sending the trained soldiers back to their homes at the end of the year and replacing them with fresh recruits; and thus, while keeping the establishment within the required limits, producing a powerful and steadily growing reserve. In spite of the strength which Prussia mustered under



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Blücher, however, the teaching of Sadowa and the events of 1870 and 1871 were required to induce the other Powers to follow her example. Now, in most nations, will be found an army of reserve, intended to augment the standing army from a peace to a war strength, and consisting of two classes—those waiting an immediate call to arms, if required, and those constituting the militia—the entire effective military power of the State. It may be interesting here to mention certain distinctions in the application of the word army. A covering army is encamped for the protection of the different passes or roads which lead to the town or other place to be protected. A siege army is ranged around or in front of a fortified place, to capture it by a regular process of besieging. A blockading army, either independent of, or auxiliary to, a siege army, is intended to prevent all ingress and egress at the streets or gates of a besieged place. An army of observation takes up an advanced position, and by celerity of movement keeps a close watch on all the manœuvres of the enemy. An army of reconnaissance has a more special duty at a particular time and place, to ascertain the strength and position of the enemy's forces. A flying column is a small army carrying all its supplies with it, so as to be able to operate quickly and in any direction, independently of its original base of operations.



TRANSPORTING ARTILLERY.

**ARMIES OF THE WORLD.**—The following shows the armed strength of the military nations of the world as reported in 1900:

*Argentine Republic.*—Regular army, 945 officers and 312,073 men; national guard, 480,000 officers and men.

*Austria-Hungary.*—Peace footing, 24,583 officers and 333,628 men; war footing, 45,238 officers and 1,826,940 men; levy in mass, over 4,000,000.

*Belgium.*—Peace footing, 3,419 officers and 48,014 men; war footing, 4,466 officers and 143,628 men; Garde Civique, 42,827 officers and men.

*Bolivia.*—Peace footing, 1,021 officers and 2,000 men; war footing, 82,000 officers and men.

*Brazil.*—Peace footing 4,000 officers and 24,160 men; gendarmerie 20,000,

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*British Empire.*—Regular army, 8,109 commissioned officers, 1,087 warrant officers, 17,100 sergeants, 3,941 musicians, and 150,267 rank and file; reserves, regular, first and second classes, 83,000 officers and men, militia, 138,961, yeomanry, 11,891, volunteers, 263,963; total home and colonial forces, 669,259; regular forces on Indian establishments, 73,162; grand total, 742,421 officers and men, of whom 664,189 were classed as effectives. Owing to the war in South Africa these numbers were increased considerably during the early part of the year.

*Chile.*—Regular army, 623 officers and 29,282 men; national guard, 512,700.

*China.*—The Eight Banners, about 300,000 officers and men; Ying Ping (national army) from 540,000 to 600,000 men; active armies of the Center, Manchuria, and Turkestan, number unknown; total land army on peace footing about 300,000; on war footing, about 1,000,000.

*Columbia.*—Peace footing fixed at 1,000, in 1898; war footing fixed by Congress as circumstances may require.

*Costa Rica.*—Peace footing, 600 officers and men, and 12,000 militia; war footing, 34,000.

*Denmark.*—Peace footing, 800 officers and 9,000 men; war footing, 1,350 officers and 58,600 men.

*Ecuador.*—Peace footing, 3,341 officers and men; war footing, 30,000.

*Egypt.*—Regular, about 100 English officers and 18,000 men. The English army of occupation numbers 5,553 officers and men.

*France.*—Peace footing, 26,849 officers and 520,666 men, with 140,912 horses; in Algeria 2,195 officers and 55,122 men; in Tunis, 560 officers and 13,455 men. Active army and its reserve, 2,350,000; territorial army, 900,000, territorial reserve, 1,100,000; total, 4,350,000 men of whom about 2,500,000 were effectives.

*German Empire.*—Peace footing, 23,176 officers and 562,277 men, with 98,038 horses; war footing, strength not officially published, but estimated at over 3,000,000 trained officers and men. There are 494 field batteries, of which 47 are mounted.

*Greece.*—Peace footing, 1,880 officers and 23,453 men; war footing, about 82,000 men; territorial army, about 96,000 men.

*Guatemala.*—Peace footing, about 7,000 officers and men; war footing 56,900 men.

*Haiti.*—Peace footing, 6,828 officers and men, and special guard of 10 officers and 650 men.

*Honduras.*—Peace footing, 500 officers and men; with 20,000 militia.

*Italy.*—Permanent army, under arms, 14,324 officers and 237,660 men; on unlimited leave, 556,984 officers and men; mobile militia, 475,972 officers and men; territorial militia, 10,793 officers and 2,003,474 men; total officers and men, 3,299,439.



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*Japan.*—Imperial Guard, 370 officers and 10,843 men; 6 divisions, 2,745 officers and 73,606 men; reserves, 696 officers and 82,384 men; Yezo militia, 95 officers and 4,482 men; the gendarmerie, 51 officers and 1,011 men; territorial army, 357 officers and 104,597 men; total strength, 4,760 officers and 279,981 men, with about 29,000 horses.

*Kongo Free State.*—Peace footing, 234 European officers and 173 sergeants, and 15,580 native troops.

*Korea.*—An army of 5,000 officers and men.

*Madagascar.*—An army of 191 officers and 5,508 men.

*Mexico.*—Peace footing, 2,068 officers and 30,095 men; war footing, including reserves, 151,500 officers and men.

*Montenegro.*—No standing army; all males physically able are liable to military service; there are about 100,000 rifles in the country.

*Morocco.*—Peace footing, about 12,000 officers and men, and 18,000 militia; war footing, in addition, about 40,000.

*Netherlands.*—Peace footing, 1,466 officers and 40,195 sub-officers and soldiers; war footing, indefinite.

*Nicaragua.*—Peace footing, 2,000 officers and men; war footing, in addition, 10,000 reserve and national guard 5,000.

*Norway.*—Troops of the line and reserves, 900 officers and 30,000 men; not over 18,000 troops can be put under arms, even in war, without consent of the Storting.

*Orange Free State.*—Standing army, 150 officers and men, and 550 artillerymen as a reserve; available war strength, 17,381.

*Paraguay.*—Standing army, 82 officers and 1,345 men; every male 20 to 35 years old is liable to war service.

*Persia.*—Standing army, 24,500, nominal, 105,500; liable to service 53,520.

*Peru.*—Peace footing, 3,157 officers and men with a police force of from 2,000 to 3,000.

*Portugal.*—Peace footing, 35,337 officers and men; war footing, 160,000; colonial forces, 9,478 officers and men, the greater number being native troops.

*Rumania.*—Peace footing, 3,478 officers, 448 employes, and 56,489 men, 12,675 horses, and 390 guns; territorial army 75,000 men, and 8,050 horses; war footing, indefinite.

*Russia.*—Peace footing, 36,000 officers and 860,000 men; war footing 63,000 officers and 3,440,000 men.

*Salvador.*—Standing army 4,000 officers and men; militia, 18,000.

*Santo Domingo.*—Small army and reserve at the capital of each province, every physically able male liable to service.

*Servia.*—Standing army, 160,751 officers and men; war footing, 353,366 officers and men.

*Siam.*—Standing army, 12,000; no armed militia; all males liable for war service.

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*South African Republic.*—No standing army; males liable for war service, 26,299.

*Spain.*—Peace footing, 128,559 officers and men; war footing 183,972 officers and men.

*Sweden.*—Standing army, 1,946 officers and 37,175 men.

*Switzerland.*—No standing army; war effective, Elite, 147,191 officers and men; Landerwehr, 83,283; Landstrum, 271,780.

*Turkey.*—Standing army, 700,620 officers and men; war footing, 900,000.

*United States.*—Standing army, 9,196 officers and 105,166 men. Males are liable to service from 18 to 45 years. Congress created a General Staff in 1903.

*Uruguay.*—Permanent army, 233 officers and 3,222 men; armed police force 3,200; national guard, 20,000.

*Venezuela.*—Standing army, 3,600 officers and men; national militia (males 18 to 45 years old), 60,000 men.

**Army Corps**, one of the largest divisions of an army in the field, comprising all arms, and commanded by a general officer; subdivided into divisions, which may or may not comprise all arms.

**Army Hospital Train**, a railway contrivance for military purposes, introduced by the Surgeon-General of the United States Army during the war with Spain, in 1898, for the purpose of conveying sick and wounded soldiers, on their arrival from Cuba, at Florida ports, to the various military hospitals in the United States. This train had a full staff of physicians, surgeons and trained nurses, and was completely equipped with everything necessary for the medical and surgical treatment of the soldiers. It is believed to have been the first train service completely organized for such purpose.

**Army Register**, an annual publication of the United States Government, giving personal, regimental and other details of the regular army, corresponding to the British "Army List."

**Army Reserve**, in most European armies, a force consisting of a first and second class army reserve and a militia reserve. The first class army reserve consists: (1) Of men who have completed their period of seven years in the active army, and of men who, after having served not less than three years in the active army, have been transferred to the reserve to complete the term of their engagement; and (2) of soldiers who have purchased their discharge and have enrolled themselves in the reserve for five years. In time of war or when the country is threatened, the men of this class become liable for the same services as the active army. The second class army reserve is made up of enrolled pensioners, and is liable only for service at home. The militia reserve is composed of men belonging to the militia who voluntarily enroll themselves in



this reserve for a period of six years, thus rendering themselves liable to be drafted into the regular army in case of war.

In the United States there is no Federal army reserve, but each State maintains a militia force under the command of the Governor, principally to aid the legal authorities in maintaining peace within its limits. In emergencies threatening the whole country, and where the regular army is insufficient, the President calls for volunteers, apportions the number needed among the several States, and asks the Governors to supply the determined quotas. The bulk of the volunteer army is thus drawn from the militia of the States.

**Army War College**, a department of the United States military educational establishment authorized by Congress in 1900. Brig.-Gen. William Ludlow was made chief of the board which drafted the regulations. The general purpose behind the plan is the unification of the systems of instruction at the four existing service institutions; the development of these systems; and the most advanced professional study of military problems. The officers of the college exercise a general supervision over the course of study in each of the present service schools. This supervision extends to all civil institutions to which the government details an officer for military instruction. The faculty of the college study the military organization of the United States with an eye to a complete understanding of its practical efficiency of operations, and constitute an advisory board to which the Secretary of War can turn at any time for details and recommendations as to any point in the mechanism of the whole military service. The study of plans of campaigns by the college and the accumulation of military information make the inauguration of a campaign, in case of war, only a matter of the issuing of the necessary orders by the Secretary, as all the requirements will have been carefully studied out beforehand.

**Army Worm**, the very destructive larva of the moth *heliophila* or *leucania unipuncta*, so called from its habit of marching in compact bodies of enormous number, devouring almost every green thing it meets. It is about 1½ inches long, greenish in color, with black stripes, and is found in various parts of the world, but is particularly destructive in North America. The larva of *sciara militaris*, a European two-winged fly, is also called army worm.

**Arnaboldi, Alessandro** (är-nä-bol'di), an Italian poet, born in Milan, Dec. 19, 1827; studied law in Pavia and entered the government service, but resigned in 1873 owing to an optic infirmity, and afterward lived in retirement near Milan. On the publication of a volume of "Verses" (1872), he was

hailed by his countrymen as the peer of Manzoni and Leopardi, while Dall' Ongaro even styled him the greatest living poet of Italy. A second collection of his poems appeared as "New Verses" (1888). He died in 1898.

**Arnason, Jon** (är'nä-son), an Icelandic writer, born at Hof, Akagaströnd, Nov. 13, 1819; was for many years librarian of the national library, and devoted himself assiduously to the collection of Icelandic folktales. He has hence been called the "Grimm of Iceland." His principal literary work is "Popular Legends and Tales of Iceland" (1862-1864). He died at Reykjavik, Aug. 17, 1888.

**Arnaud, Henri** (ar-nō), the pastor and military leader of the Vaudois of Piedmont; born in 1641. At the head of his people he successfully withstood the united forces of France and Savoy, and afterward did good service against France in the War of the Spanish Succession. He had to retire from his country, and was followed by a number of his people, to whom he discharged the duties of pastor till his death, which occurred in 1721.

**Arnaud, Jacques Achille Leroy De Saint**, Marshal of France; born in Bordeaux, Aug. 20, 1796; after studying at the Lycée entered the army in 1816. Having been dismissed the service he led a rather checkered life for about 10 years, but in 1831 was readmitted into the army. In 1836 he went to Africa. He highly distinguished himself at the storming of Constantine. From that time he was regarded as one of the most rising officers in the African army. He was present at the taking of Djelli in 1839 and at the capture of the Arab fortresses at Monsaja. In 1841 he entered the newly-formed corps of Zouaves as *chef de bataillon*. In 1844 he was promoted to the rank of colonel of the Zouaves. The revolution of 1848 and the fall of Louis Philippe had no effect upon St. Arnaud; he continued to acquire fresh reputation until he received the rank of general of division in 1851. On Oct. 26 in that year he was called by Louis Napoleon from the command of a division of the army of Paris to the cabinet, and was created minister of war. In March, 1854, he was appointed to the command of the French army which was engaged in the war against Russia. He died Sept. 29 following.

**Arnauld**, the name of a French family, several members of which greatly distinguished themselves. ANTOINE, an eminent French advocate, was born 1560, died 1619. Distinguished as a zealous defender of the cause of Henry IV., and for his powerful and successful defense of the University of Paris against the Jesuits in 1594. His family formed the nucleus of the sect of the



Jansenists in France. His son ANTOINE, called the Great Arnault, was born Feb. 6, 1612, at Paris; died Aug. 9, 1694, at Brussels. He devoted himself to theology, and was received, in 1641, among the doctors of the Sorbonne. He engaged in all the quarrels of the French Jansenists with the Jesuits, the clergy, and the government, was the chief Jansenist writer, and was considered their head. Excluded from the Sorbonne, he retired to Port Royal, where he wrote, in conjunction with his friend Nicole, a celebrated system of logic (hence called the "Port Royal Logic"). On account of persecution he fled, in 1679, to the Netherlands. His works, which are mainly controversies with the Jesuits or the Calvinists, are very voluminous. His brother ROBERT, born in 1588, died in 1674, was a person of influence at the French court, but latterly retired to Port Royal, where he wrote a translation of "Josephus" and other works. Robert's daughter ANGELIQUE, born in 1624, died in 1684, was eminent in the religious world, and was subjected to prosecution on account of her unflinching adherence to Jansenism.

**Arnault, Antoine Vincent** (är-nō), a French poet and dramatist (1766-1834). He came into public notice through his tragedy "Marius at Minturnæ" (1791); but more especially deserves remembrance for his satirical fables, in which he guarded successfully against imitation of Lafontaine, and for his graceful poems, of which "The Leaf" has become most widely known. His "Souvenirs of a Sexagenarian" (1833) contain excellent delineations of character, and many interesting disclosures about the history of the time up to 1804.

**Arndt, Ernst Moritz**, a German writer and patriot, born at Schoritz, Isle of Rügen, Dec. 29, 1769. On the publication, in 1806, of the first series of his "Spirit of the Times," which kindled patriotic enthusiasm throughout the German lands, he was compelled to take refuge in Sweden. Some years later he was the editor at Cologne of a political journal, "The Watchman." In 1848, a member of the National Assembly, he belonged to the so-called imperial party, advocating the union of Germany under the leadership of Prussia. On his 90th birthday (1859) the whole nation united in paying him homage. His influence was due to his devotion to the national cause. Many of his poems have become national lyrics, intimately linked with the stirring events to which they owe their origin. Among them are "What is the German's Fatherland?" and "The Song of the Field Marshal." He died in Bonn, Jan. 29, 1860.

**Arndt, Johann**, a German Lutheran clergyman, born at Ballenstedt, Anhalt, in 1555. His "True Christianity" was translated into most European languages, and is yet

popular in Germany. Its object is edification — the promotion of practical religion; and it is written with great warmth and unction, and in a strain of piety bordering on mysticism. It has been called the Protestant "Imitatio," and its author the Fénelon of the Protestant Church. There are two English translations—by Boehm (1720), and by Jaques (1815). He died at Celle, Hanover, in 1621.

**Arne, Thomas Augustine**, an English musical composer, born in London, March 12, 1710. He from an early age became a devoted enthusiast in the musical art, and indulged his passion by the production of operas, oratorios, etc., some of which, as his "Rosamond," "Zara," "Judith," and "Artaxerxes," established his reputation, during that epoch, as a musical composer of the highest class. He also wrote the music for the revival of Milton's "Masque of Comus," in which first appeared the song of "Rule Britannia," since acknowledged as the national air of England. He died in 1778. His son MICHAEL, also a composer, is principally known for his opera of "Cymon," produced in 1767.

**Arnee**, one of the numerous Indian varieties of the buffalo (*bubalus arni*), remarkable as being the largest animal of the ox kind known. It measured about 7 feet high at the shoulders, and from 9 to 10½ feet long from the muzzle to the root of the tail. It is found chiefly in the forests at the base of the Himalayas.

**Arneth, Alfred von** (är'net), an Austrian historian, born in Vienna, July 10, 1819; was member of the House of Lords after 1869, and president of the Academy of Sciences after 1879. His life of "Prince Eugene of Savoy" (1858-1859), is noteworthy as the first authoritative work on that great leader. Next in importance is the "History of Maria Theresa" (1863-1879). He died in Vienna, July 31, 1897.

**Arnhem** (ar'nem), or **Arnheim**, a town in Holland, province of Gelderland, 18 miles S. W. of Zutphen, on the right bank of the Rhine. Pleasantly situated, it is a favorite residential resort, and it contains many interesting public buildings; manufactures cabinet wares, mirrors, carriages, mathematical instruments, etc.; has paper-mills, and its trade is important. In 1795 it was stormed by the French, who were driven from it by the Prussians in 1813. Pop. (1908) 63,987.

**Arnhem Land**, a portion of the northern territory of South Australia, lying W. of the Gulf of Carpentaria, and forming a sort of peninsula.

**Arnica**, a genus of plants belonging to the order *asteraceæ*, or composites; also the English name of plants belonging to the above-mentioned genus, and especially of the



## Arnim

*A. montana*, the mountain arnica, or German leopard's-bane. It is common in the alpine parts of Germany, Sweden, Lapland, and Switzerland. It is a



ARNICA.

perennial, of a slightly fetid odor, and a bitterish, acrid taste. Given in large quantities it produces deleterious effects, but the powdered leaves, in moderate doses, of five to 10 grains, have been found serviceable in paralysis, convulsions, amaurosis, chlorosis, gout, and rheumatism. As an outward application, arnica is in constant use as a remedy for sores, wounds, bruises, and ailments of a similar kind. Its use in all such cases has very largely increased in later years. Surgeons, and especially

army surgeons, set great store by it. It is also employed as an internal medicine.

**Arnim, Achim von**, a German poet and novelist, born in Berlin, Jan. 26, 1781. He is the main representative of the younger generation of the romantic school. Settling at Heidelberg in 1806, after extensive travels, he formed a close friendship with Clemens Brentano, and edited with him "The Boy's Wonder-Horn," a collection of old German legends and songs, which was received with much favor. In 1811 he married Brentano's sister Bettina, and thereafter lived alternately in Berlin, and on his estate, Wiepersdorf, in the province of Brandenburg. He was at his best as a story teller. His principal works are "Poverty, Riches, Guilt, and Penitence of Countess Dolores," a novel (1810); and "The Crown Guardians," a fantastic historical romance (1817), a glowing picture of life toward the wane of the 15th century. Among his short stories, published mostly in collections, the following deserve mention: "The Mad Invalid at Fort Ratonneau," "The Three Loving Sisters and the Happy Dyer," and "Prince All-God and Singer Demi-God." His complete works, with an introduction by W. Grimm, were edited by his wife (1839-1846). He died at Wiepersdorf, Jan. 31, 1831.

**Arnim, Elizabeth von**, better known as BETTINA, wife of the German novelist Louis Achim von Arnim, and sister of the poet Clemens Brentano; born in Frankfort-on-the-Main, April 4, 1785. Her warmth of sympathy led her, especially after she became acquainted with the Canoness Gündert, into a fantastic worship of nature, and latterly into a real sickliness of feeling. The suicide of this lady, which was caused

## Arnold

by an unhappy attachment to the philologist Creuzer, made a deep and lasting impression upon her, and her enthusiastic love of nature now became transformed into a kind of Platonic, child-like, and even affected love toward the poet Goethe. The poet, then about 60 years of age, did not reciprocate her feelings farther than by a tender forbearance for the wayward creature. After her marriage, in 1811, she lived partly at Berlin, partly at her husband's seat of Wiepersdorf. It was not till after her husband's death that she appeared as an author. In 1835 she published "Goethe's Briefwechsel mit einem Kinde" ("Goethe's Correspondence with a Child"), containing, among others, the letters that she alleged to have passed between her and Goethe. It has been generally stated that Goethe turned some of her letters into sonnets. Her later writings were politico-social. She died in Berlin, Jan. 20, 1859.

**Arnim, Harry, Graf von**, a German diplomatist, born in Pomerania, in 1824; from 1864 to 1870, was Prussian ambassador at Rome, where he supported the anti-infallibilists during the Vatican Council. He was rewarded with the title of Graf, but, as German ambassador to France (1872-1874), he fell into Prince Bismarck's disfavor, and, on a charge of purloining State documents, was sentenced to three months', to six months', and to five years' imprisonment. He had, however, retired into exile, and died at Nice, May 19, 1881.

**Arno**, a river of Italy, which rises in the Etruscan Apennines, makes a sweep to the South and then trends westward, divides Florence into two parts, washes Pisa, and falls, 4 miles below it, into the Tuscan Sea, after a course of 130 miles.

**Arnobus, Afer**, an early Christian writer, was a teacher of rhetoric at Sicca Veneria, in Numidia, and in 303 became a Christian. He wrote seven books of "Disputationes Adversus Gentes," in which he refuted the objections of the heathens against Christianity. This work betrays a defective knowledge of Christianity, but is rich in materials for the understanding of Greek and Roman mythology. He died about 326.

**Arnold, Abraham Kerns**, an American military officer, born in 1837; was graduated at the United States Military Academy in 1859; entered the cavalry branch of the army; served through the Civil War and received a Congressional medal of honor for gallantry in action; and after the war, served against the Indians on the frontier. In 1898, he was commissioned a Brigadier-General and served in the field during the war with Spain; and in 1899 became commander of the 2d Division, 7th Army Corps, on duty in Cuba. He died Nov. 23, 1901.



**Arnold, Sir Arthur**, an English statesman and author, born in 1833. He acted as assistant commissioner to administer the Public Works Acts during the cotton famine, 1863-1866. Afterward he wrote "The History of the Cotton Famine." Other literary productions have been "From the Levant" (1868); "Through Persia by Caravan;" "Social Politics," and "Free Land." He sat as a Liberal member for Salford, 1880-1885. He established and was president of the Free Land League from 1885 to 1895; Chairman London County Council, 1895 and 1896; knighted in 1895.

**Arnold, Benedict**, an American military officer, born in Norwich, Conn., Jan. 14, 1741. He was settled in extensive business at New Haven when the War of Independence broke out. After the news of the battle of Lexington, he raised a body of volunteers, and received a colonel's commission. After



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commanding, for a short time, a small fleet upon Lake Champlain, he was with General Montgomery, charged with the difficult duty of leading a force of 1,100 men across the wilds of the country to Quebec, to stir up rebellion there, and displace the British garrison. In this unsuccessful attempt Montgomery was killed and Arnold severely wounded. After this, we find him in various important commands, but as often involved in quarrels with Congress and his fellow-officers. It would be of little interest now to enter into a detail of his grievances. He seems to have been a singularly brave, but reckless and unprincipled, man. Washington valued him for his acts of daring, and would gladly have overlooked his faults; but Congress and his brother-officers regarded him with dislike, and sought every possible means to humble and annoy

him. After many disputes about the honor that was due to him for his services, he was invested with the government of Philadelphia. There his imprudence was most marked; indeed, it would be difficult to clear him from the charge of actual dishonesty. He was brought before a court-martial; four charges were urged against him; two of these were found proven, and he was sentenced to be reprimanded by the commander-in-chief. Arnold could not bear the affront, nor longer endure the difficulties into which he had brought himself. He, accordingly, formed the disgraceful design of deserting to the ranks of the enemy, and put himself in communication with Sir Henry Clinton, the British commander. Major André was sent by Sir Henry to negotiate with Arnold, and they had an interview near West Point, which fortress Arnold had offered to surrender to the enemy. On his way to the British camp, however, the young officer fell into the hands of the Americans, and the whole plot was of course discovered. The news of André's capture reached Arnold just in time to enable him to make his escape and reach the British camp in safety. There he retained his rank of brigadier-general, and fought with as much daring against the cause of American independence as he had before fought against the royal forces. He took command in an expedition against Virginia, and again in an incursion into his native State. Afterward he served in Nova Scotia and the West Indies, and at last settled in London, England, where he died, June 14, 1801.

**Arnold, Sir Edwin**, an English poet and journalist, born in Rochester, June 10, 1832. He graduated from Oxford in 1854; taught for a while in Birmingham; and became principal of the Sanskrit College at Poona, in the Bombay Presidency, where he rendered important service to the government during the great rebellion in India. Returning to London in 1861, he joined the editorial staff of the "Daily Telegraph." He has twice visited the United States on lecture tours. Of his original poetry, inspired by Oriental themes and legends, the most famous work is "The Light of Asia, a Poetic Presentation of the Life and Teaching of Gautama" (1876). "Indian Idylls" (1883); "Pearls of the Faith," "Sa'di in the Garden," "The Light of the World," "Potiphar's Wife and Other Poems," "India Revisited," "Japonica," and "The Tenth Muse and Other Poems," are among his many works. He died March 24, 1904.

**Arnold, Edwin Lester**, an English author, son of Sir Edwin Arnold. He has written "A Summer Holiday in Scandinavia" (1877); "On the Indian Hills, or Coffee Planting in Southern India" (1881); "Bird Life in England" (1887); "Eng-



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land as *She Seems*" (1888); the novels "*Phra, the Phœnician*" (1890), and "*The Story of Ulla*" (1895).

**Arnold, George**, an American poet, born in New York, June 24, 1834; author of "*McArone Papers*," contributed to "*Vanity Fair*" (1860-1865). His poetry is of merit: "*Drift and Other Poems*" (1866), and "*Poems Grave and Gay*" (1867). Collected edition, with memoir, by William Winter (new edition, 1889). He died at Strawberry Farms, N. J., Nov. 3, 1865.

**Arnold, Hans**, pseudonym of BERTHA VON BULOW, a German story writer, born at Warmbrunn, Silesia, Sept. 30, 1850. Among her stories which enjoy great popularity are "*Merry Tales*" (1891), and "*Once in May and Other Stories*" (1892). She also wrote some good comedies, viz.: "*Theory and Practice*" (1890), and "*Two Peaceful Ones*" (1892).

**Arnold, Isaac Newton**, an American lawyer, politician, and author, born at Hartwick, N. Y., Nov. 30, 1815; was a member of Congress from 1861 to 1865. His works are "*Life of Abraham Lincoln*" (1866); "*Life of Benedict Arnold*" (1880), and "*Recollections of the Early Chicago and Illinois Bar*" (1880). He died in Chicago, Ill., April 24, 1884.

**Arnold, Johann Georg Daniel**, an Alsatian dialect poet, born in Strasburg, Feb. 18, 1780. His lyrics (in High German) are meritorious, but he is at his best in "*Pentecost Monday*" (1816), a comedy in Strasburg dialect and rhymed Alexandrine verse, pronounced by Goethe "an incomparable monument of ancient Strasburg custom and language, a work which in clearness and completeness of intuition and ingenious delineation of detail can scarcely be equaled." He died in Strasburg, Feb. 18, 1829.



MATTHEW ARNOLD.

**Arnold, Matthew**, an English poet, critic, and essayist, born at Laleham, Dec. 24, 1822; graduated at Oxford in 1844, and was Professor of Poetry there from 1857 to 1867. The degree of Doctor of Laws was conferred by the University of Edinburgh in 1869, and by

Oxford in 1870. He was government inspector of schools from 1851, and repeatedly visited the Continent to inquire into and

## Arnold of Winkelried

report upon systems of education. In 1883-1884 he made a lecturing tour through the United States. His works include "*The Strayed Reveler and Other Poems*" (1848); "*Empedocles on Etna*" (1853); "*Merope*," a tragedy (1857), and "*New Poems*" (1868). His prose writings comprise "*Essays in Criticism*" (1865, 2d series, 1888); "*Lectures on the Study of Celtic Literature*" (1867); "*Culture and Anarchy*" (1869); "*Friendship's Garland*" (1871), a humorous work; "*Literature and Dogma*" (1873); "*Last Essays on Church and Religion*" (1877); "*Mixed Essays*" (1879); "*Irish Essays*" (1882), and "*Diseourses on America*" (1885). Arnold first became known as a poet of classical taste by the volume of poems and selections issued under his name in 1854. He died in Liverpool, April 15, 1888.

**Arnold of Brescia**, one of the reformers prior to the Reformation, a disciple of Abelard of Paris, and of Berengarius. As early as the middle of the 12th century, his bold spirit, his scriptural knowledge, and his eloquence, had succeeded in arousing France and Italy against the abuses of the Roman Church. Driven by the clergy from Italy, he sought refuge in Zurich, where he made many converts. At length, through the instigation of St. Bernard of Clairvaux, he was charged with heresy, and excommunicated by Pope Innocent II. At this juncture, serious popular tumults occurred at Rome, and Arnold, hastening thither, was received with great cordiality, and soon vested with supreme power. In 1155, however, Adrian IV. interdicted and expelled him from the city. For a time he lived in Campagna, but was seized, and taken back to Rome, where he was executed, and his ashes were thrown into the Tiber. Arnold was a man of great eloquence and sanctity. He taught that Christ's kingdom was not of this world; that temporal dignities and large independent revenues ought not to be held by the clergy; and that nothing should be left to them but spiritual authority and a moderate subsistence. He is also reckoned by Dr. Wall among those who denied the scriptural authority of infant baptism. His followers were called Arnoldists, and held the same opinions as the Waldenses.

**Arnold of Winkelried**, a Swiss hero, who, at the battle of Sempach, in 1386, sacrificed himself to insure victory to his countrymen. The Austrian knights, dismounted, had formed themselves into a phalanx, which the Swiss vainly strove to pierce; when Arnold, rushing on the spear points of the enemy, and burying several in his breast, thus opened a gap in the fence of steel. The Swiss rushed in through the opening, and routed the Austrians with great slaughter.



**Arnold, Samuel**, an English composer, born in 1740; became composer to the Covent Garden Theater about 1763, and organist to the King in 1783; and is best known for his four volumes of "Cathedral Music." He died in 1802.

**Arnold, Thomas**, an English clergyman and historian, born in Cowes, Isle of Wight, June 13, 1795. He entered Oxford University in 1811, and was elected a fellow of Oriel College in 1815. While in this place he was the friend and contemporary of the poet Keble, of Copleston, and of Archbishop Whately. In 1828, Arnold was elected to



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the head-mastership of Rugby School, which office he held until his death, and raised it, by the enlightened system of education he inaugurated, to the highest rank among the great public schools of England. Under his auspices, the antiquated scholastic system became

revolutionized. In politics he was an advanced Liberal, so much so, indeed, that he was at one time denounced by some of the clergy for what they termed the Jacobinism of his views. In 1841 he was appointed Regius Professor of Modern History at Oxford, and died June 12, 1842. As a writer, Arnold's works consisted mainly of a "History of Rome," completed to the end of the Punic War; a "Commentary on the New Testament," and a "Treatise on Church and State." Fearless, disinterested, transparently truthful, religious without cant, and zealous without rancor, Arnold produced through life the impression on his warmest opponents of a man whom it was impossible not to respect. Few men in modern times have so well realized and represented the ideal of the old knightly character as the Rugby schoolmaster. In domestic life he was most happy; here he was distinguished by unfailing cheerfulness and spirit. In 1832 he purchased Fox How, a small estate; and in this charming retreat he enjoyed in the vacations, among the family circle, his own studies. His life has been written by Dean Stanley, one of his old pupils.

**Arnold, Thomas**, an English writer on literature, and editor of old texts, son of Dr. Arnold, of Rugby, and brother of Matthew Arnold, born at Laleham, Nov. 30,

1823. He became a Roman Catholic, and spent a number of years in New Zealand and Tasmania. Among his works are "A Manual of English Literature," "Select English Works of Wyclif" (3 vols., 1869); "Selections from the Spectator;" "Beowulf" (text, translation, and notes); "Henry of Huntingdon;" "Symeon of Durham," and "Chronicles of the Abbey of Bury St. Edmunds." He died Nov. 12, 1900.

**Arnold, Thomas Kerchever**, an English educator, born in 1800; educated at Cambridge University; became an Anglican clergyman; and published a large number of text-books for schools, including manuals for the Greek, Latin, French, and German languages. He died in 1853.

**Arnolfo di Cambio** (ar-nōlfō), or **di Lapo**, an Italian architect and sculptor, born in Tuseany, in 1232. The most celebrated of his architectural works are, the churches of Santa Croce, the Cathedral, and Or San Michele, at Florence, in which the gradual transition from the Gothic severity to the Italian elegance is markedly represented. This structure was completed, after the death of Arnolfini, by Brunelleschi, between 1420 and 1444. He died in 1300.

**Arnon**, a river in Palestine, the boundary between the country of the Moabites and that of the Amorites, latterly of the Israelites, a tributary of the Dead Sea.

**Arnott, Neil**, a Scottish physicist, born in Aberdeen, in 1788. In 1811, he settled in medical practice in London, and in 1827 published his great work, "Elements of Physics." He is also known as the inventor of the Arnott stove, the Arnott ventilator, and the water-bed. He died in 1874.

**Arnotto.** (1) The waxy-looking pulp which envelops the seeds in the arnotto-tree. This is detached by throwing the seed into water, after which it is dried partially, and made up first into soft pellets, rolled in leaves, in which state it is called flag, or roll arnotto. Afterward, becoming quite dry, it is formed into cakes, and becomes cake arnotto. The South American Indians color their bodies red with it; farmers here and elsewhere use it to stain cheese; in Holland, the Dutch employ it to color butter; the Spaniards put it in their chocolate and soups; dyers use it to produce a reddish color, and varnish makers, to impart an orange tint to some varnishes. As a medicine, it is slightly purgative and stomachic. This substance is very frequently adulterated. Previous to the passing of the Adulteration Act, it was found almost impossible to obtain a pure sample, the adulterants being flour, rye meal, turmeric, chalk, gypsum, Venetian red, and, in some cases, red lead; this last substance being a poison. At the present time the only adulterants used are flour, turmeric, and



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small quantities of either chalk or gypsum. Pure arnotto should not contain more than 6 per cent. of ash. Adulterated samples contain as much as 20, or even 30 per cent. The organic adulterants are easily detected by the microscope.

(2) In botany, the arnotto tree, the *bixa orellana* of Linnæus, has a five-dentate calyx, 10 petals, many hypogynous stamina, and a two-valved hispid capsule. It is from 20 to 30 feet in height, and grows in tropical America. It is the type of the old order *bixaceæ*, now more generally called *flacourtiaceæ*.

**Arnould, Arthur**, a French novelist, dramatist, and journalist, born in Paris in 1833. At an early age he devoted himself to journalism, and soon attracted attention by his hostility to the empire. In 1870 he founded "La Marseillaise" and the famous "Journal de Peuple." After the fall of the empire, he became a member of the Commune, and with its downfall barely escaped with his life. Besides essays and dramas, he is the author of a history of the Commune and over 30 novels, the best known being "Zoé" and "Princess Belladonna." He died in Paris, Nov. 25, 1895.

**Arnulf**, great-grandson of Charlemagne, elected King of Germany in A. D. 887; invaded Italy, captured Rome, and was crowned Emperor by the Pope (896); died A. D. 889.

**Aromatic**. (1) In chemistry, acids whose radical has the form  $C_nH_{2n}-8O_2$ , as the benzoic, the toluic, and the cummic, or cumic. There are also aromatic alcohols, aldehydes, hydrocarbons, and ketones. (2) A plant or a substance which exhales a fragrant odor, conjoined in general with a warm, pungent taste.

**Aromatic Vinegar**, a very volatile and powerful perfume, made by adding the essential oils of lavender, cloves, etc., and often camphor, to crystallizable acetic acid. It is a powerful excitant in fainting, languor, and headache.

**Aroostook**, an American river; rises in Piscataquis county, Me.; flows more than 120 miles in a circuitous course, receiving many important tributaries; and enters the St. John River in New Brunswick. It was an important factor in the settlement of the long-pending dispute concerning the boundary between the United States and British America.

**Arouet**. See VOLTAIRE.

**Arpad**, the conqueror of Hungary, and founder of the Arpad dynasty, which reigned till 1301, was born in the second half of the 9th century. He was the son of Almus, whom the seven Magyar clans dwelling in the steppes N. E. of the Caspian Sea had elected their hereditary chief about 889.

## Arraignment

Thus united into one nation, the Magyars, mustering about 25,000 warriors, crossed the Carpathians and conquered Hungary, when Arpad was elected their prince. Arpad was unable completely to transform their nomadic hordes into an agricultural nation. He died in 907.

**Arpeggio** (är-pej'ō), the distinct sound of the notes of an instrumental chord; the striking the notes of a chord in rapid succession, as in the manner of touching the harp instead of playing them simultaneously.

**Arpent** (ar-pan), formerly a French measure for land, equal to five-sixths of an English acre; but it varied in different parts of France.

**Arpino** (ar-pē'no), a town of South Italy, province of Caserta, 6 miles S. S. E. of Sora. It is the ancient Arpinum, birthplace of Caius Marius, Agrippa, and Cicero.

**Arqua** (ar'kwa), a town of North Italy, 12 miles S. W. of Padua, in which province it is situated. It is famous for having been the residence of Petrarch during the greater part of his life, and the place where he died in 1374. His sarcophagus is still to be seen.

**Arquebus**, a hand-gun; a species of firearm resembling a musket, anciently used. It was fired from a forked rest, and sometimes cocked by a wheel, and carried a ball that weighed nearly two ounces. A larger kind used in fortresses carried a heavier shot.

**Arracacha**, a genus of plants belonging to the order *apiaceæ*, or umbellifers. *A. esculenta* is cultivated for the sake of its root in the elevated portions of equinoctial America.

**Arrack**, a term used, in the countries to which the Arabs have penetrated, for distilled spirits. See ARACK.

**Arrah**, a town of British India, in Shaha-bad district, Bengal, rendered famous during the mutiny of 1857 by the heroic resistance of a body of 20 civilians and 50 Sikhs, cooped up within a detached house, to a force of 3,000 Sepoys, who were ultimately routed and overthrown by the arrival of a small European reinforcement.

**Arraignment**, in the practice of criminal law the calling of a prisoner by his name to the bar of the court to answer the matter charged upon him in the indictment. His innocence being presumed, it is the law, and is so laid down in the most ancient books, that, though charged upon an indictment of the gravest nature, he is entitled to stand at the bar in the character of a free man, without irons or any manner of shackles or bonds, unless there be evident danger of his escape, or of violence at his hands.



## Arran

**Arran**, an island of Scotland, in the firth of Clyde, between the coast of Ayr on the E. and the peninsula of Cantyre on the W.; length, N. to S., 20 miles; breadth, about 10 miles; area, 165 square miles. It is of a wild and romantic appearance, particularly the N. half, which is covered by lofty granitic mountains, connected by serrated ridges, intersected by deep ravines, and separated by gloomy dells or glens. The island attains its loftiest summit in Goatfell (a corruption of the Gaelic Goadh-Bhein, Wind mountain), which is 2,900 feet high. The S. portion is rather hilly than mountainous, and contains several arable tracts of considerable extent and tolerable fertility. The coast is generally belted with a level tract of more or less width, and presents several indentations. The geology of Arran has attracted much attention, as furnishing within a comparatively narrow space distinct sections of the great geological formations. The botany possesses almost equal interest, both in the variety and the rarity of many of its plants. Among objects of historical interest are the cave of Drumidoon, which Fingal is fabled to have occupied, and in which Robert Bruce is alleged, on better grounds, to have found shelter; relics of Danish forts, Druidical stones, etc. Pop. (1901) 5,343.

**Arran Islands, or South Arran Islands**, three islands near the W. coast of Ireland, in the Atlantic, at the mouth of Galway bay. The largest, Arranmore or Inishmore, comprises 7,635 acres, and has a pop. of 2,592; the next, Inishmaan, 2,252 acres, has a pop. of 473; and the least, Inishere, 1,400 acres, has a pop. of 456. The three islands continue in a more primitive state than any part of Great Britain. In Inishmore are so-called Druidical remains, open temples, altars, stone pillars, sacred mounts and raths, miraculous fountains, and sacred groves. The surface of Inishmore rises to the height of 360 feet above the sea, and is undulating and fertile. Agriculture and fishing are the chief employments. Good oats are raised, sheep fed, and the most esteemed calves are reared here. The varieties of fish are very great; and the board for the fisheries has erected a pier 245 feet in length at Killeany, on Inishmore, where 100 vessels of 40 tons burden may ride safely.

**Arras** (ar-ä'), a city of France, capital of the Department of Pas-de-Calais, 60 miles S. E. of Calais, and 100 miles N. N. E. of Paris. This is a very ancient city, replete with fine old architectural remains, and also possessing a large commerce in cotton and stuffs, hosiery, lace, pottery, etc. Arras has been the theater of many memorable historical events, and was fortified by Vauban, in the reign of Louis XIV. Robes-

## Arrest

pierre was born here, as was also Damiens, the assassin of Louis XV. During the Middle Ages, Arras was famed for its tapestry, richly figured hangings that adorned the halls of the kings and the nobles. They were known under the name of arras; but have been for a long time superseded by the tapestry of the Gobelins. Arras was the capital of the Celtic Atrebates (whence the name), and subsequently of the Province of Artois. As such it was long a part of Burgundy. It was ceded to France in 1482; attached to Austria in 1493; and finally became French in 1640, when Louis XIII. took it after a long siege. Pop. (1901) 25,813.

**Arrebo, Anders Christensen** (är-e-bō), a Danish poet (1587-1637). Bishop of Drontheim, Norway, when only 31, but deposed in 1622, owing to his objectionable life; he was afterward rehabilitated as preacher in Vordingborg. As the pioneer of the Renaissance movement, he is considered the father of modern poetry in Denmark. His rhymed translation of the "Psalms of David" (1623), but especially his "Hexameron" (1641), an imitation of a once famous poem of the French poet Du Bartas on the "Creation," are highly esteemed.

**Arrest**, the seizure of a suspected criminal or delinquent that security may be taken for his appearance at the proper time before a court to answer to a charge. Ordinarily, a person can be arrested only by a warrant from a justice of the peace; but there are exceptional cases in which he can be apprehended by an officer without a warrant, by a private person also without a warrant, or by what is technically called a "hue and cry." An arrest is made by touching the body of the person accused, and after this is done a bailiff may break open the house in which he is to take him; but without so touching him first it is illegal to do so. The object of arrest being to make sure that he answers to a charge about to be brought against him, it does not follow that after being seized he is incarcerated; if bail for his appearance at the proper time be given, and the case be not too aggravated a one for such security to be accepted, he will be released till the day of trial.

In law, an arrest of judgment is the act or process of preventing a judgment or verdict from being carried out till it shall be ascertained whether it is faulty or legally correct. Judgment may be arrested (1) when the declaration made varies from the original writ; (2) where the verdict materially differs from the pleadings and issue thereon; and (3) where the case laid in the declaration is not sufficient in law to admit of an action being founded upon it.



## Arrhenatherum

**Arrhenatherum**, a genus of plants belonging to the order *graminaceæ*, or grasses. A species grows wild in England, *A. avenaccum*, or tall, oat-like grass. It is also cultivated occasionally in England, and much more frequently in France, but is not very nutritious.

**Arria** (ar'ē-a), a celebrated Roman matron, wife of Cæcinnæ Pætus, consul during the reign of Claudius, about A. D. 41. Pætus having raised an unsuccessful revolt against Claudius, in Illyria, was condemned to die. He was, however, allowed the option of ending his life by suicide, which the Romans did not deem a crime. Pætus hesitated; Arria seized the dagger, plunged it into her bosom, and then presenting it to her husband, said, "It is not painful, Pætus." This, with other instances of her conjugal devotion, has immortalized her.

**Arrianus, Flavius** (ar-i-ā'nus), a Greek philosopher and historian (95-180), born at Nicomedia. He aimed to imitate Xenophon in the direction of his studies; and as Xenophon recorded the sayings of Socrates, so Arrianus became the reporter of the "Discoveries of Epictetus." These were comprised in eight books, but only the first four remain. He next wrote "Epictetus' Handbook," a compendium of that teacher's moral doctrine. He wrote also an "Anabasis," a history of Alexander's conquests in Asia; this is still extant complete.

**Arrow**, a missile weapon, designed to be propelled by the impulse communicated by the snapping of the string of a bow, temporarily bent into an angular form, back to its normal state of rest in a straight line. To make the wound it inflicts more deadly, and prevent its being easily pulled out, it is barbed at the tip, and often poisoned, while at the other extremity it is feathered, to make it move more directly forward. In Scripture, arrows signify or symbolize (1) bitter words (Ps. lxxiv: 3); (2) false words (Jer. ix: 8); (3) a false witness; (4) affliction divinely sent (Lam. iii: 12, 13; Job vi: 4; Ps. xxxviii: 2); (5) the judgments of God on sinful nations or individuals (Num. xxiv: 8; Deut. xxxii: 23), or more specifically (a) famine (Ezek. v: 16, etc.), (b) lightning (II Sam. xxii: 14, 15; Ps. xviii: 14; Zech. ix: 14); (6) children, especially stalwart sons (Ps. cxxvii: 4). Arrows are often represented on coats of arms, either singly or in sheaves, *i. e.*, in bundles. A broad arrow is one with a head resembling a pheon, except in wanting the engraving or jagg on the inner edge.

**Arrowhead**, a genus of aquatic plants found in all parts of the world within the torrid and temperate zones, natural order *alismaceæ*, distinguished by possessing barren and fertile flowers, with a three-leaved calyx and three colored petals. The com-

## Arrowroot

mon arrowhead (*S. sagittifolia*) has a tuberous root, nearly globular, and is known by its arrow-shaped leaves with lanceolate straight lobes.



ARROWHEAD.

**Arrow Lake**, an expansion of the Columbia river, in British Columbia, Canada; about 95 miles long from N. to S.; often regarded as forming two lakes — Upper and Lower Arrow Lake.

**Arrow Poison**, a poisonous substance into which Indians at war dipped their arrowheads. The substance differs with different tribes. By some the poison capsicum and infusions of a strong kind of tobacco and of *euphorbiaceæ* are mixed together, with the poisonous emmet, and the teeth of the formidable serpent called by the Peruvian Indians *miuamaru*, the *jergon-lachesis picta* of Tschudi. The arrow-poison of Borneo is called there *dajasksch*; that obtained by Dr. Kirk, of the Zambesi expedition, *manganja*.

**Arrowroot.** (1) In botany, the English name of the botanical genus *maranta*, the type of the endogenous order *Marantaceæ*, called by Lindley, in his "Natural System of Botany," the arrowroot tribe; but altered in his "Vegetable Kingdom" to marants. The flowers of *maranta* are in long, close, spike-like panicles, with irregular corollas, each having a single perfect stamen, with half an anther. The veins of the leaves run out obliquely from the midrib to the margin. The root is a fleshy corm, which, when washed, grated, strained through a sieve, and again repeatedly washed, furnishes the substance so much prized as food for invalids, which is described under 2.

(2) In commerce, the starch extracted from the rhizomes of a *maranta*, and exported to England in large quantities from the East and West Indies, and from Africa, each importation taking the name of the place from which it comes. Thus they have East Indian arrowroot, Bermuda arrowroot, St. Vincent arrowroot, Natal arrowroot, etc. Attempts have been made to call every



starch "arrowroot," which bore the slightest resemblance to the true maranta; for example, potato, or British arrowroot, from the *solanum tuberosum*; tous-les-mois, or French arrowroot, from the *Canna edulis*; tapioca, or Brazilian arrowroot, from the *Manihot utilissima*, etc. This has failed since the passing of the adulteration act, and it is now understood by public analysts, magistrates, etc., that arrowroot must consist entirely of the starch which is extracted from the rhizomes of a maranta, and that any admixture of potato or other starch is regarded as an adulteration.

Arrowroot is adulterated either by the mixing together of various qualities of arrowroot, or by the admixture of other starches, such as potato or tapioca. Neither of these methods renders the arrowroot deleterious; but when we consider that the price of the different qualities of genuine arrow-



ARROWROOT.

A, flowering branch; B, base of flower stem; C, rhizome. (From Bentley and Trimen's "Medicine.")

root varies from 12 cents to 60 cents per pound, and that the price of potato or tapioca flour seldom exceeds 12 cents per pound, we then see how the public may be cheated in pocket. The adulteration by potato or tapioca flour is readily detected by the microscope.

**Arrowsmith, Aaron**, an English cartographer, born in 1750, died in 1823. He raised the execution of maps to a perfection it had never before attained. His nephew, JOHN, born in 1790, died in 1873, was no less distinguished in the same field; his "London Atlas of Universal Geography" may be especially mentioned.

**Arroyo Molinos** (ar-oi'o-mō-lē'nōs), a town of Spain, in Estremadura, 27 miles S. S. E. of Caceres. Here, on Oct. 28, 1811, a body of the French sent out by Soult on

a foraging expedition was surprised by a much larger English force under Lord Hill. An engagement took place, the result of which is differently appreciated by the historians of the two nations. The English took 1,300 prisoners, but the French retreated in good order.

**Arru Islands** -(ar'ö), a group of over 80 islands in the Dutch East Indies, lying W. of New Guinea, with a united area of about 2,650 square miles and a population of some 15,000. The largest island is Tanna-Besar (77 miles long by 50 broad). The surface is low, and the coasts are steep and inaccessible, on the E. side fringed with coral reefs. The soil is covered with the most luxuriant vegetation. The islands are remarkably rich in animal life, especially birds, mostly related to those of New Guinea. The inhabitants resemble the Melanesians of New Guinea more than the natives of the Moluccas. On the ground of this inclination to the Papuan type, in connection with the peculiar formation of the Archipelago, Wallace has advanced the supposition that the Arru Islands formed originally a part of New Guinea. There is an active trade, but not in native hands. Cotton and woolen goods, iron and copper wares, Chinese pottery, knives, rum, rice, opium and arrack are imported, and bartered for mother-of-pearl, trepang, edible nests, pearls, tortoise-shell, and the skins of birds of paradise.

**Arsaces**, founder of the Parthian monarchy. He induced his countrymen to rise against the Macedonian yoke, 250 B. C., on which they raised him to the throne. Arsaces was slain in battle, after a reign of 38 years. He was the first of a long line of monarchs of the same name, the last of whom was put to death about 226 A. D.

**Arsaces Tiranus**, King of Armenia, who, being taken prisoner by Sapor, King of Persia, was cast into prison at Ecbatana, where he died 362 B. C. His country then became a Persian province. There were many other Armenian kings of his name, but they are not easily distinguishable from each other, and are generally of small historical importance.

**Arsenal**, a place appointed for the making, repairing, keeping and issuing of military stores. An arsenal of the first class should include factories for guns and gun-carriages, small-arms, small-arms ammunition, harness, saddlery, tents and powder; a laboratory and large store-houses. In arsenals of the second class workshops take the place of the factories. The Royal Arsenal at Woolwich, England, which manufactures warlike implements and stores for the English army and navy, was formed about 1720, and comprises factories, laboratories, etc., for the manufacture and final fitting up of almost



## Arsenic

every kind of arms and ammunition. Great quantities of military and naval stores are kept at the dockyards of Chatham, Portsmouth, Plymouth and Pembroke. In France there are various arsenals or dépôts of war material, which latter is manufactured at Mézières, Toulouse, Besançon, etc.; the great naval arsenals are Brest and Toulon. The chief German arsenals are at Spandau, Strasburg, and Dantzig, that at the first-mentioned place being the great center of the military manufactories. The chief Austrian arsenal is the immense establishment at Vienna, which includes gun factory, laboratory, small arms and carriage factories, etc. Russia has her principal arsenal at St. Petersburg, with supplementary factories of arms and ammunition at Briansk, Kiev, and elsewhere. In Italy Turin is the center of the military factories.

The principal arsenals of the United States in 1904 were the Allegheny (Pa.); Augusta (Ga.); Benecia (Cal.); Columbia (Tenn.); Fort Monroe (Va.); Frankford (Pa.); Indianapolis (Ind.); Kenebec (Me.); New York (N. Y.); Rock Island (Ill.); San Antonio (Tex.); Watertown (Mass.); and Watervliet (N. Y.). There were also powder dépôts at St. Louis (Mo.), and Dover (N. J.); a noted armory at Springfield (Mass.), and an ordnance proving ground at Sandy Hook (N. J.).

**Arsenic**, (symbol As, at. wt. 75, sp. gr. 5.76), a metallic element of very common occurrence, being found in combination with many of the metals in a variety of minerals. It is of a dark grey color, and readily tarnishes on exposure to the air, first changing to yellow, and finally to black. In hardness it equals copper; it is extremely brittle, and very volatile, beginning to sublime before it melts. It burns with a blue flame, and emits a smell of garlic. It forms alloys with most of the metals. Combined with sulphur it forms orpiment and realgar, which are the yellow and red sulphides of arsenic. Orpiment is the true arsenicum of the ancients. With oxygen arsenic forms two compounds, the more important of which is arsenious oxide or arsenic trioxide ( $\text{As}_2\text{O}_3$ ) which is the white arsenic or simply arsenic of the stores. It is usually seen in white, glassy, translucent masses, and is obtained by sublimation from several ores containing arsenic in combination with metals, particularly from arsenical pyrites. It is used as a flux for glass, and also for forming pigments. The arsenite of copper (Scheele's green) and a double arsenite and acetate of copper (emerald green) are largely used by painters; they are also used to color paper hangings for rooms, a practice not unaccompanied with considerable danger, especially if flock papers are used or if the room is a confined one. Arsenic has been too frequently used to give that

## Arsenical Poisoning

bright green often seen in colored confectionery, and to produce a green dye for articles of dress and artificial flowers.

**Arsenical Poisoning**, a noxious consequence of the absorption by the human system of the drug. Although arsenic is classed as a metallic irritant poison, its action is by no means limited to that of an irritant. It acts specifically on the gastrointestinal mucous membrane whatever be the channel of entrance to the system. The most usual source of acute arsenical poisoning is the administration of white arsenic, or arsenious acid; but the sulphides, various arsenites, and impure dyes, wall-papers, and pigments, Paris green, rat and roach poisons, may be sources of arsenical poisoning.

*Acute Arsenical Poisoning.*—This is the usual form of poisoning ensuing on the nefarious administration of any preparation of arsenic, but usually arsenious acid is employed. A half-hour or an hour after poison has been introduced the symptoms come on. The quantity and its state, as regards solubility, also have an obvious relation to the appearance of the symptoms. Most commonly, after a sense of faintness and depression, intense burning pain is felt in the epigastric region, accompanied by tenderness on pressure; nausea and vomiting quickly supervene, increased by every act of swallowing. Unlike an ordinary bilious attack, the nausea and pains are not relieved by vomiting. Ordinarily the vomiting is followed by violent purging, the motions being often streaked with blood. Purging may, however, be entirely absent. Other prominent symptoms are great thirst, a feeble, irregular pulse, and cold, clammy skin. The patient dies usually within 18 to 12 hours in a state of collapse; but tetanic convulsions are not uncommon, and even coma and paralysis may close the scene.

*Treatment.*—Emetics, diluents and demulcents are the appropriate remedies. The stomach-pump may be usefully employed. In administering emetics tartar emetics should be avoided, as it increases the depression, and its presence complicates a chemical analysis. Moreover, tartar emetic frequently contains traces of arsenic, and in the event of an analysis being made an unfounded suspicion may be raised. Hydrated oxide of iron (freshly made) or dialized iron may be given ad libitum. Rest should be secured later on, and stimulants given if necessary.

*Chronic Arsenical Poisoning.*—This is generally accidental. The inhalation of arsenical vapors in factories, or of arsenic dust, as from green and other wall-papers, and in the process of artificial flower making, is a common source of chronic arsenical poisoning. The symptoms of chronic



arsenical poisoning are, first, loss of appetite, pains about the heart, looseness of bowels, and occasional headache. Suffusion of the eyes and intolerance of light are early present. The muscular powers of the limbs become impaired, sometimes progressing to paralysis; a characteristic vesiculous, eczematous eruption appears on the skin. Green arsenical pigments sometimes cause bleeding from the nose.

*Treatment.*—Remove the patient from the source of infection. Quinine, or other tonics, iron, and attention to the digestive system will be needed. Removal to fresh country air is of marked benefit. Soothing lotions to the skin and careful attention to eroding ulcers, especially of the cheek, may be necessary. Shampooing and warm baths form the best treatment for the paralytic conditions.

**Arsenious Acid**, the arsenical compound most familiarly known and popularly called arsenic. It is obtained principally during the roasting of the arsenican nickel ores in Germany in furnaces communicating with flues. Ordinary arsenious of the stores (which is what is popularly known as arsenic) is a white crystalline powder, which feels decidedly gritty, like fine sand, when placed between the teeth, and has no well-marked taste. It is very heavy, so much so as at once to be noticeable when a paper or bottle containing it is lifted by the hand. It is soluble in water, to the extent of 1 part of acid in about 100 parts of cold water, and 1 part of acid in about 10 parts of boiling water. When placed in a spoon or other vessel, and heated, it volatilizes and condenses in crystals on any cool vessel held above. By this means it can be distinguished from ordinary flour, which, when heated, chars and leaves a coal behind; and from chalk, stucco, baking-soda, tooth-powder, and other white substances, which, when heated, remain in the vessel as a non-volatile white residue. In medicine it is tonic and escharotic, and is the most virulent of mineral poisons. It is used in intermittents, periodical headaches, neuroses, etc. Dose, one-tenth to one-eighth grain in pill. In some countries, as in the mountainous regions of Austria, Styria and the Tyrol, arsenic is eaten habitually, beginning with small doses and gradually increasing them. It is said to favor nutrition, and to improve the respiration in ascending heights. Some of the "arsenicophages" can take great quantities with impunity.

**Arsinoë** (ar-sin'ō-ē), a city of ancient Egypt, on Lake Mæris, said to have been founded about B. C. 2,300, but renamed after Arsinoë, wife and sister of Ptolemy II, of Egypt, and called also Crocodilopolis, from the sacred crocodiles kept at it.

**Arsinoë**, daughter of Ptolemy I., King of Egypt, born 316 B. C., married at 16 the

aged Lysimachus, King of Thrace, whose eldest son, Agathocles, had already wedded Lysandra, her half-sister. Desirous of securing the throne for her own children, Arsinoë prevailed on her husband to put Agathocles to death; whereupon Lysandra fled with her children to Seleucus in Asia, and induced him to declare war against her unnatural father-in-law. Lysimachus was slain, and Seleucus seized the kingdom. Arsinoë now sought refuge in Macedonia, which, however, was also ARSINOË AND PTOLEMY II. taken possession



of by Seleucus; but on his assassination, a few months later, by Ptolemy Ceraunus, her half-brother, she received a hypocritical offer of marriage from the usurper, who wanted to destroy her two sons lest they should prove formidable rivals to his ambition. She consented to the union, and opened the gates of the town in which she had taken refuge, but her children were butchered before her eyes. She then fled to Egypt, where, in 279, she married her own brother, Ptolemy II. Philadelphus.

**Arson**, the malicious and willful burning of a dwelling-house or out-house belonging to another person by directly setting fire to it, or even by igniting some edifice of one's own in its immediate vicinity. If a person, by maliciously setting fire to an inhabited house, cause the death of one or more of the inmates, the deed is murder, and capital punishment may be inflicted. When no one is fatally injured the crime is not capital, but is still heavily punishable; it is a penal offense also to attempt to set a house on fire, even if the endeavor do not succeed.

**Art**, the power of doing something not taught by nature or instinct; as, to walk is natural, to dance is an art; — power or skill in the use of knowledge; the practical application of the rules, or principles of science. A system of rules to facilitate the performance of certain actions; contrivance; dexterity; address; adroitness.

In esthetics, art as distinguished from science, consists of the truths disclosed by that species of knowledge disposed in the most convenient order for practice, instead of the best order for thought. Art proposes to itself a given end, and, after defining it, hands it over to science. Science, after investigating the causes and conditions of this end, returns it to art, with a theorem of the combination of circumstances under which the desired end may be effected. After receiving them, art inquires whether any



or all of those scientific combinations are within the compass of human power and human means, and pronounces the end inquired after attainable or not. It will be observed here, that all that art supplies is the major premise, or the assertion that the given aim is the one to be desired. The grounds of every rule of art are to be found in the theorems of science. An art can then only consist of rules, together with as much of the speculative propositions (which lose all their speculative look as soon as they come into the artist's hands) as comprises the justification of those rules. Though art must assume the same general laws as science does, yet it follows them only into such of their detailed consequences as have led to certain practical rules, and pries into every secret corner, as well as into the open stores of the household of science, bent on finding out the necessities of which she is in search, and which the exigencies of human life demand. Hence, as Edmund Burke remarks, in his "Treatise on the Sublime and Beautiful," "Art can never give the rules that make an art." It must always owe them to science. Whatever speaks in precepts or rules, as contrasted with assertions regarding facts, is art; and hence it always adopts the imperative mood, whereas, science almost invariably adopts the indicative. Science is wholly occupied with declarations, while art is wholly engaged with injunctions that something should be done. Thus, the builder's art desires to have houses, the architect's art desires to have them beautiful; and the medical art desires to cure diseases of the human body.

In a special sense the principles of science practically carried out; a series of rules designed to aid one in acquiring practical skill or dexterity in performing some specified kind of work, manual or mental. The several arts may be arranged in two groups — (a) the mechanical, and, (b) the liberal or fine arts. The mechanical arts are those which may be successfully followed by one who does not possess genius, but has acquired the facility of working with his hands which long practice imparts. Such are the arts of the carpenter, the blacksmith, the watchmaker, etc. They are often called trades. The liberal or fine arts are such as give scope not merely to manual dexterity, but to genius; as music, painting, sculpture, architecture, etc.

In medieval education, the arts signified the whole circle of subjects studied by those who sought a liberal education. This included science as well as art. The seven liberal arts, which, in the palmy days of Rome, plebeians were not allowed to study, were thus divided: (1) The *Trivium* — viz., grammar, rhetoric, and logic. (2) The *Quadrivium* — viz., arithmetic, music,

geometry and astronomy. It is a remnant of this classification, which was in vogue as early as the 5th century, that we still speak of as the curriculum of arts at a university, and that graduates become bachelors or masters of arts.

**Art, Metropolitan Museum of**, a spacious edifice in Central Park, New York, erected by the city for the purpose to which it is devoted. It was incorporated in 1870, and possesses an art collection amounting in value to over \$2,000,000, including the Cesnola collections. The treasures to be found here are various in character and of most profound interest, especially the ancient sculptures and relics from the island of Cyprus. These, in the study of antiquities, are of much value, and many of the other departments possess rare attractions.

**Artabanus** (-bā'nus) IV., the last of the Parthian monarchs, who A. D. 217, escaping with great difficulty from a perfidious massacre begun by the Romans under Caracalla, mustered an army, and engaged his foes in a battle which lasted for two days; but, as the armies were preparing to renew the combat, Artabanus was informed of Caracalla's death. Peace was then made on honorable terms. Artabanus afterward incited his subjects to revolt, and in a battle, in 226, was taken and put to death. Thus ended, in the 3d century, the Parthian empire.

**Artabazus** (-bā'zus), the name of several distinguished Persians under the dynasty of the Achæmenidæ. When Xerxes advanced against Greece, an Artabazus led the Parthians and Chorasmians. At a later period he warned Mardonius, but in vain, against engaging in battle at Plataea; and on his defeat fled with 40,000 men, and reached Asia in safety. Another Artabazus was general under the Persian king, Artaxerxes II., and afterward revolted against Artaxerxes III. For this offense he was forgiven, through the exertions of his brother-in-law, Mentor, a favorite and staunch supporter of the next king, Darius, whom we subsequently find Artabazus faithfully attending after the battle of Arbela. Alexander rewarded his fidelity by appointing him satrap of Bactria.

**Artasires** (-sī'rēs), the last Arsacid King of Armenia. He was placed on the throne by Bahram V. of Persia, who afterward deposed him and annexed his dominions to Persia, under the name of Persarmenia, 248 B. C.

**Artavasdes** (-vas'dēs) I., a King of Armenia, who succeeded his father Tigranes. He joined the Roman forces commanded by Crassus, but deserted to the enemy, causing the defeat of the Romans, and the death of Crassus. He similarly betrayed Mark Antony when engaged against the Medes; but afterward falling into Antony's power, Arta-



## Artaxerxes

**vasdes** was taken with his wife and children to Alexandria, where they were dragged at the victor's chariot-wheels in golden chains. After the battle of Actium, Cleopatra caused his head to be struck off and sent to the King of Media. Reigned in the 1st century B. C.

**Artaxerxes** (-zerks'ēz) **I.**, surnamed Longimanus, was the third son of Xerxes, King of Persia, and, having murdered his brother Darius, ascended the throne 465 B. C. He died in 424 B. C., and was succeeded by his only son, Xerxes. This prince is generally supposed to have been the Ahasuerus of Scripture, who married Esther, and by whose permission Ezra restored the Jewish religion at Jerusalem. Some modern authors, nevertheless, identify Ahasuerus with Xerxes.

**Artaxerxes II.**, surnamed Mnemon, was the eldest son of Darius Nothus, and began his reign 405 B. C. His brother Cyrus formed a conspiracy against him, for which he was sentenced to death; but at the intercession of his mother, Parysatis, the sentence was commuted to banishment to Asia Minor. Cyrus repaid this act of clemency by mustering a large army of Asiatics, and some Greek troops under Clearchus, with whom he marched to Babylon; but, being encountered by Artaxerxes, he was defeated and slain. The Greeks, however, escaped and reached their own country, under Xenophon. Artaxerxes died at the age of 94, after reigning 62 years.

**Artaxerxes III.**, succeeded Artaxerxes II., his father, 359 B. C. To pave his way to the succession, he murdered two of his brothers, and afterward put to death all the remaining branches of the family. He suppressed several insurrections which were raised against him, and in Egypt slew the sacred bull Apis, and gave the flesh to his soldiers. For this, his eunuch, Bagoas, an Egyptian, caused him to be poisoned, and, after giving his carcass to cats, made knife-handles of his bones, 339 B. C.

**Artaxerxes Bebegan**, or **Ardshir**, the first King of Persia of the race of Sassanides, was a shepherd's son; but his grandfather, by the mother's side, being governor of a province, he was sent to the court of King Ardavan. On his grandfather's death, Artaxerxes, being refused an appointment, retired to Persia proper, where, exciting the people to revolt, he defeated and slew Ardavan and his son, on which he assumed the title of King of Kings. He made vast conquests, and wisely administered the affairs of his kingdom. He died B. C. 240.

**Artedi, Peter** (ar'te-dē), a Swedish naturalist, born in 1705. He studied for the church at Upsala, but soon betook himself to the natural sciences, having Linnæus for fellow-student and friend. He became espe-

## Artemisia

cially distinguished in ichthyology; and, having gone to England in 1734, he there completed his great work, the "Ichthyologia," the first which gave a truly scientific character to the study of fishes. He was also a distinguished botanist. He went to Leyden in 1735, and in the same year was drowned in a canal near Amsterdam.

**Artemis** (ar'tē-mis), an ancient Greek divinity, identified with the Roman Diana. She was the daughter of Zeus (Jupiter) and Leto or Latona, and was the twin sister of Apollo, born in the island of Delos. She is variously represented as a huntress, with bow and arrows; as a goddess



ARTEMIS.

of the nymphs, in a chariot drawn by four stags; and as the moon goddess, with the crescent of the moon above her forehead. She was a maiden divinity, never conquered by love, except when Endymion made her feel its power. She demanded the strictest chastity from her worshippers, and she is represented as having changed Actæon into a stag, and caused him to be torn in pieces by his own dogs, because he had secretly watched her as she was bathing. The Artemisia was a festival celebrated in her honor at Delphi. The famous temple of Artemis at Ephesus was considered one of the wonders of the world, but the goddess worshipped there was very different from the huntress goddess of Greece, being of Eastern origin, and regarded as the symbol of fruitful nature.

**Artemisia** (ar-tē-mē'zē-a), wormwood; named after Artemis, the Greek goddess, corresponding to the Roman Diana. (Worm-



## Artemisia

wood, southernwood, or mugwort.) A genus of plants belonging to the order *asteraceæ*, or composites. It contains four British species, the *A. campestris*, or field southernwood; the *A. vulgaris*, or common mugwort; the *A. absinthium*, or common wormwood; and the *A. maritima*, or sea-wormwood. Numerous species are natives of the temperate regions of Europe and Asia; the *A. absinthium* grows wild in Great Britain and the United States; the *A. santonica* is a native of Tartary; the *A. indica* grows on the Himalaya mountains; the *A. vulgaris* is a native of Great Britain; and several species, locally known as sage brush, the largest of which is the *A. tridentata*, are found on the table-lands of the Rocky mountains and on the Western plains of the United States.

**Artemisia I.**, daughter of Lygdamis, and Queen of Caria, who assisted Xerxes in person against the Greeks, and behaved with such valor that the Athenians offered a reward for her capture, and the Spartans erected a statue to her. Lived in the 5th century B. C.

**Artemisia II.**, Queen of Caria; sister and wife of Mausolus, whose death she lamented in the most tender manner, and to whom she erected, in her capital, Halicarnassus, a monument, which was reckoned among the seven wonders of the world. The principal architects of Greece labored on it. Bryaxis, Scopas, Leochares, and Timotheus made the decorations on the four sides of the edifice; Pythes, the chariot drawn by four horses, which adorned the conical top. Vitruvius thought that Praxiteles was also employed on it. After the death of Artemisia the artists finished it without any compensation, that they might not be deprived of the honor of their labor. It was an oblong square, 411 feet in compass, and 130 feet high. The principal side was adorned with 36 columns, and 24 steps led to the entrance. Artemisia died soon after her husband, in the monument which she had erected to him, 351 B. C.

**Artemisium**, a promontory in Eubœa, an island of the Ægean, near which several naval battles between the Greeks and Persians were fought, B. C. 480.

**Artemus Ward.** See BROWNE, CHARLES FARRAR.

**Arteritis**, an inflammation occurring in the arteries. It may be acute or chronic. Its anatomical characters are redness of the internal membrane of the heart and arteries, an effusion of plastic, pseudo-membranous lymph on its surface, and thickening and ulceration of its substance. In chronic, which is much more common than acute inflammation, the internal membrane of the artery is thickened, softened and colored

## Artesian Wells

a deep, dirty red, especially in the vicinity of calcareous and other degenerations.

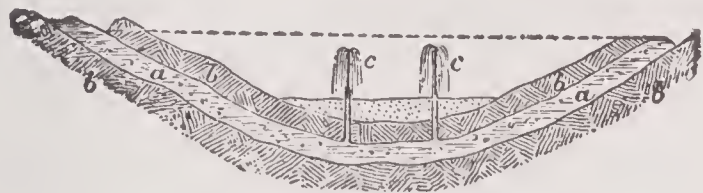
**Artery** (from *aer* = air, and *terco* = to watch over; *teros* = a watch, a guard. So called because the ancients, finding that, in the dead bodies which they examined, the arteries were empty of blood, took up the very erroneous notion that they were designed for the circulation of air through the system. Thus Cicero says, "Spiritus ex pulmone in cor recipitur et per arterias distribuitur, sanguis per venas." This error was not shaken by Herophilus), one of the vessels designed to convey the blood from the heart. The arteries are long, cylindrical tubes, with three coats, an external tunic commonly called the cellular coat, a middle or fibrous tunic or coat, and an epithelial tunic. The coating of the arteries is very elastic. The largest arteries which leave the heart are the aorta and the pulmonary artery; both spring from the base of the heart in front. They branch and anastomose to a large extent. The contractility of the arteries forces the blood to the extremities from the heart, the valves of which prevent its return. The prominent difference between blood drawn from the arteries and that from the veins is to be found in the bright scarlet color of the former and the dark red, almost black, of the latter.

**Artesian Wells**, deep wells bored through impervious rock strata to a porous water bearing rock stratum whence the water flows to the surface and is discharged from the bore. It is also applied, though less correctly, to deep wells where the waters rise to within a short distance of the surface even if no real flow is established. The principal condition of an artesian well is a pervious stratum protected above and below by a water-tight bed. These layers come to the surface in some elevated region where they get their rain flow, then pitch downward to a considerable depth and then rise again, thus forming a great basin which retains the water. Rain water and surface water fill the porous stratum to the brim. If it be tapped any, the water will rise in the bore and be discharged as long as the supply equals the demand. The whole Mississippi valley is ideally adapted for wells of this kind. Artesian wells are probably of considerable antiquity, as it has been asserted that in the Desert of Sahara there are remains of borings which were originally flowing wells. The Chinese and Egyptians were early acquainted with artesian wells. The oldest known in Europe is at Lillers, in Artois (hence the name artesian), and was sunk in 1126. They have been in use for centuries in Austria, especially in the neighborhood of Vienna, where formerly the boring for them was conducted in a rude and empirical manner.



## Artesian Wells

As soon as geology took the position of a science, and the theory of artesian wells was propounded, the engineer was able, after the geological survey of a district, to discover whether a supply of water could there be obtained in this way. Already, districts formerly dry and arid have received a plentiful supply of water by means of such wells and many more applications have yet to be made. In 1836, the first artesian well was dug in the Eastern Sahara and at a depth



ARTESIAN WELLS.

(a) water; (b) strata; (c) flow.

of nearly 200 feet struck water which poured forth 4,500 liters a minute. In 1860 there were 50 wells, averaging 735 liters a minute. In the province of Constantine alone there are more than 150. The result is proving beneficial not only to the country materially, but also to the character and habits of its nomadic Arab inhabitants. Several tribes have already settled down around these wells, and, forming thus the centers of settlements, have constructed villages, planted date palms, and entirely renounced their previous wandering existence. The earliest exploration for artesian water in Colorado was at Kit Carson Station on the Kansas Pacific railroad. It was sunk to a depth of 1,300 feet without obtaining water. The next attempt was near Denver in 1870, and was drilled to a depth of 755 feet. In 1879, a well was drilled for petroleum at South Pueblo, in the Arkansas valley. At a depth of 1,180 feet a flow of mineral water (82°) was struck yielding 160,000 gallons per 24 hours. In 1880, a well was bored for water at Coal Creek, Fremont county, to a depth of 1,278 feet, but without surface flow. At 350 feet the water rose to within 15 feet of the surface. In 1881, a second well at Pueblo on a mesa 120 feet above Arkansas river obtained water at a depth of 1,200 feet. In March, 1883, a well bored for coal in North Denver was abandoned on account of the large flow of water. Others were sunk, and it was shown that Denver was underlaid by a body of artesian water. Since then 400 wells have been bored 40 miles along the Platte river. Most were strong at first, but now only a few yield a surface flow. In the San Luis valley, Col., boring began in 1886 to 1887. In December, 1888, there were 12 wells flowing at the rate of from 1 to 40 gallons per minute; one, 400 gallons. In December, 1890, there were 394 of these wells; and now there are several thousand of them. The

## Artesian Wells

thickness of formation under Denver is about 1,500 feet, so that it is estimated that the average amount of water permanently available from artesian wells in and around the city is 180,000 cubic feet daily. The American Desert, also, which includes one-fifth of the total area of the United States, has deep artesian wells, which were bored for the purpose of irrigation, and it is making a great change in the whole region.

Many such wells exist in London and its vicinity; those which, since 1844, have supplied the ornamental fountains in Trafalgar Square descend into the upper chalk to a depth of 393 feet. The most famous artesian well, perhaps, is that of Grenelle, near Paris, which was bored in 1833-1841, and whose water is brought from the Gault at a depth of 1,798 feet. It yields 516½ gallons of water per minute, projected 32 feet above the surface; temperature, 81° 7' F. An artesian well bored at Pest in 1868-1879 yields, at a depth of 3,182 feet, water of a temperature of 165° F. In the United States, numerous artesian wells have been sunk, some of great depth, among which are two in St. Louis, Mo., 2,197 and 3,843½ feet deep, respectively; several in Chicago of from 700 to 1,200 feet in depth; one in Louisville, Ky., 2,086 feet deep; one in Columbus, Ohio, 2,775½ feet in depth, with many others from 500 to 2,000 feet deep.

The life of artesian wells has been known to vary, ranging from two months to six years. In December, 1890, out of 209 in the vicinity of Denver, only six were flowing, 119 had to be pumped, and the rest were plugged. The Windsor Hotel well, which was dug Aug. 30, 1883, was originally 530 feet. It struck a flow at 342 feet with a head of 25 feet. In February, 1886, it discharged 17,581 gallons; in December, 1890, it was pumped and the water-take was 92 feet below the surface. In Ohio, the best fields of flowing water are found in the N. W. corner. At Bryan, the water is reached at 43 feet. In Mereer County, hundreds of wells have been bored 100 to 400 feet in depth and tapping a great reservoir. At the Barrington well, when the drill reached the old channel of the subterranean river at a depth of 350 feet, a flood of water rushed into the casing and spouted up 20 feet, carrying with it great loads of gravel and stone, some of which weighed 6½ pounds. At 360 feet, a large log was found. The Carpenter well in Brule County, S. D., was sunk in 1896 and reached a depth of 907 feet. It was 10 inches in diameter and the flow was 1,386¼ gallons a minute. At present it is much less. It is saline, but adapted to irrigation, and cost \$5,200. At Newark, S. D., is a lake supplied by an artesian well. Many of the wells in the South Dakota basin have a pressure of 150



pounds to the square inch, which equals a head of 350 to 400 feet. At Chamberlain, the head of water was 1,900 feet above the sea. In Brule county 25 wells produced 26,000,000 gallons per diem, sufficient to flood 80 acres one foot deep every day.

Artesian wells have supplied a portion of the data upon which the internal temperature of the earth has been calculated. Thus the Grenelle well has a temperature of 81° F., while the mean temperature of the air in the cellar of the Paris observatory is only 53°. MM. Arago and Walferdin observed the temperature as the work proceeded, and found that there was a gradual and regular increase downward. Walferdin also made a series of very accurate and careful observations on the temperature of two borings at Creuzot, within a mile of each other, commencing at a height of 1,030 feet above the sea, and going down to a depth, the one of 2,678 feet, the other about 1,900 feet. The results, after every possible precaution had been taken to insure correctness, gave a rise of 1° F. for every 55 feet down to a depth of 1,800 feet, beyond which the rise was more rapid, being 1° for every 44 feet of descent; but at Fort Randall the temperature at 80° increased at the rate of 1° every 17½ feet. In Chester, S. C., a well was sunk during six months 500 feet, and a supply of 30,000 gallons a day was obtained. It was abandoned and a well a mile away was sunk 400 feet and obtained a supply of 250,000 gallons. It has often been found that where wells are sunk to the same depth in the same vicinity one diminishes the flow of the other and their productiveness is diminished. It was once supposed that water from artesian wells was much purer than from ordinary wells; but it is found to be a mistake. The lower the water goes, the more impregnated it is with saline and other matter.

**Arteveld, or Artevelde** (ar'te-velt, ar'te-vel-de), the name of two men distinguished in the history of the Low Countries. (1) JACOB VAN, a brewer of Ghent, born about 1300; was selected by his fellow-townsmen to lead them in their struggles against Count Louis of Flanders. In 1338 he was appointed captain of the forces of Ghent, and for several years exercised a sort of sovereign power. A proposal to make the Black Prince, son of Edward III. of England, governor of Flanders led to an insurrection, in which Arteveld lost his life (1345). (2) PHILIP, son of the former, at the head of the forces of Ghent, gained a great victory over the Count of Flanders, Louis II., and for a time assumed the state of a sovereign prince. His reign proved short-lived. The Count of Flanders returned with a large French force, fully disciplined and skillfully commanded. Arte-

veld was rash enough to meet them in the open field at Roosebeke, between Courtrai and Ghent, in 1382, and fell with 25,000 Flemings.

**Arthralgia**, pain in a joint. The term is more particularly applied to articular pain in the absence of objective disease.

**Arthritis**, any inflammatory distemper that affects the joints, particularly chronic rheumatism or gout.

**Arthrodia**, a species of articulation, in which the head of one bone is received into a shallow socket in another; a ball-and-socket joint.

**Arthrogastra**, in Prof. Huxley's classification, an order of *arachnida* (spiders), in which the abdomen is distinctly divided into somites—i. e., into segments—each with an upper and lower pair of appendages. The leading genera are *scorpio*, *chelifer*, *phrynus*, *phalangium*, and *galeodes*.

**Arthropoda**, a subdivision of the *annulosa*, or *articulata*, containing the classes belonging to that sub-kingdom which are of the highest organization. The body is very distinctly divided into rings or segments, sometimes, as in the *myriapoda* (centipedes and millepedes), mere repetitions of each other, but more frequently with some of them differentiated for special ends. In general, the head, thorax, and abdomen are distinct. Under the subdivision arthropoda are ranked in an ascending series the classes *myriapoda*, *crustacea*, *arachnida*, and *insecta*.

**Arthur**, a prince of the Silures, and King of Britain in the time of the Saxon invasions in the 5th and 6th centuries. He was the son of Uther Pendragon, by Ignera, wife of Gorlois, Duke of Cornwall, and was elected King of Britain at the age of 15. He immediately declared war against the Saxons in the North of England, and defeated them so completely, that in one battle alone, it is said, he slew 500 Saxons with his own sword, the famous Calibur. He subdued the Picts and the Scots, and also Ireland and Iceland. After a long peace, during which he married the fair Guinevere, Arthur conquered Gaul and Norway, and even fought against the Muscovite hordes. On the Romans demanding tribute, he crossed into Gaul, and defeated them in a mighty battle. Recalled to England by the revolt of his nephew, Modred, allied to the Scots and Picts, Arthur fought against him in Cornwall, his last battle, in which Modred was slain, and Arthur himself mortally wounded. He was buried at Glastonbury. It was long believed by his countrymen that he was not dead, but carried to fairyland, there to repose on flowers until his deep wounds were healed, and that he would yet reappear, and, with his mighty sword, again lead them to victory over their enemies.



The existence and exploits of Arthur and of his paladins, the Knights of the Round Table, whether they have any real foundation or are but a mere historical fable, have been for ages the theme of minstrels and poets, even down to the present day; examples of which are the famous romaunt of the "Mort d'Arthur" and the "Idylls of the King."

**Arthur, Chester Alan**, 21st President of the United States, born in Fairfield, Vt., Oct. 15, 1830; was the son of Scottish parents, his father being pastor of Baptist churches in Vermont and New York. He chose law as a profession, and practiced in New York. As a politician, he became a leader in the Republican party. During the Civil War he was energetic as quarter-



CHESTER A. ARTHUR.

master-general of New York in getting troops raised and equipped. He was afterward collector of customs for the port of New York. In 1880 he was elected Vice-President, succeeding as President on the death of James A. Garfield, in 1881, and in this office he gave general satisfaction. He died in New York city, Nov. 18, 1886.

**Arthur, Joseph Charles**, an American botanist, born in 1850; was graduated at the Iowa Agricultural College in 1872; took advance courses at Johns Hopkins, Harvard, and Bonn Universities; was instructor in botany at the Universities of Minnesota and Wisconsin, and for several years botanist to the Agricultural Experiment Station, Geneva, N. Y., subsequently becoming Professor of Vegetable Physiology and Pathology at Purdue University, and botanist to the Indiana Experiment Station.

**Arthur, Timothy Shay**, an American author, born in Newburg, N. Y., in 1809. In 1852 he founded "Arthur's Home Magazine." He was a voluminous writer of tales of domestic life. His works are over 100 in number, and have had a large sale in

England as well as in the United States. His most popular work was the famous "Ten Nights in a Bar-Room." Among his other publications were "Tales for Rich and Poor," "Tales of Married Life," and "Lights and Shadows." He died in Philadelphia, Pa., March 6, 1885.

**Artichoke**, a well-known plant, of the order *Compositæ*, cultivated in Europe chiefly for culinary purposes. The parts that are eaten are the receptacle of the flower, called the bottom, and a fleshy substance on the scales of the calyx. The choke consists of the unopened florets and the bristles that separate them from each other. These stand upon the receptacle, and must be cleared away before the bottom can be eaten. For winter use they may be slowly dried in an oven, and kept in paper bags in a dry place. On the continent of Europe artichokes are frequently eaten raw with salt and pepper. By the country people of France the flowers of the artichoke are sometimes used to coagulate milk for the purpose of making cheese. The leaves and stalks contain a bitter juice, which, prepared with bismuth, imparts a permanent gold color to wool. Artichokes were introduced into England early in the 16th century.

The so-called Jerusalem artichoke is a species of sunflower (*Helianthus tuberosus*), which grows wild in parts of South America and yields roots or tubers resembling those of the potato and used as food. This plant bears single stalks, which are frequently eight or nine feet high, and yellow flowers, much smaller than those of the common sunflower.

**Article**, in grammar, a part of speech used before nouns to limit or define their application. In English *a*, or *an*, is usually called the indefinite article (the latter form being used before a vowel sound), and *the*, the definite article, but they are also described as adjectives. *An* was originally the same as *one*, and *the* as *that*. In Latin there were no articles, and Greek has only the definite article.

**Articles of Confederation**, the title of the compact which was made by the 13 original States of the United States of America. It was adopted and carried into force on March 1, 1781, and remained as the supreme law until the first Wednesday of March, 1789.

**Articles of War**, a code of laws for the regulation of the military forces of a country. Those of Great Britain and Ireland were issued prior to 1879, in pursuance of the annually renewed mutiny act. In 1879 the army discipline act consolidated the provisions of the mutiny act with the articles of war. This act was amended in 1881, and now the complete military code is contained



## Articles

in the army act of 1881. In the United States, the articles of war form an elaborate code, thoroughly revised in 1880, but subject at all times to the legislation of Congress.

**Articles, The Six**, in English ecclesiastical history, articles imposed by a statute (often called the Bloody Statute) passed in the year 1539, under the reign of Henry VIII. They decreed the acknowledgment of transubstantiation, the sufficiency of communion in one kind, the obligation of vows of chastity, the propriety of private masses, celibacy of the clergy, and auricular confession. Acceptance of these doctrines was made obligatory on all persons under the severest penalties; the act, however, was relaxed in 1544, and repealed in 1547.

**Articles, The Thirty-nine**, of the Church of England, a statement of the particular points of doctrine, 39 in number, maintained by the English Church; first promulgated by a convocation held in London in 1562-1563, and confirmed by royal authority; founded on and superseding an older code issued in the reign of Edward VI. The first five articles contain a profession of faith in the Trinity; the incarnation of Jesus Christ, His descent to Hell, and His resurrection; the divinity of the Holy Ghost. The three following relate to the canon of the Scripture. The eighth article declares a belief in the Apostles', Nicene, and Athanasian creeds. The ninth and following articles contain the doctrine of original sin, of justification by faith alone, of predestination, etc. The 19th, 20th, and 21st declare the Church to be the assembly of the faithful; that it can decide nothing except by the Scriptures. The 22d rejects the doctrine of purgatory, indulgences, the adoration of images, and the invocation of saints. The 23d decides that only those lawfully called shall preach or administer the sacraments. The 24th requires the liturgy to be in English. The 25th and 26th declare the sacraments effectual signs of grace (though administered by evil men), by which God excites and confirms our faith. They are two: baptism and the Lord's Supper. Baptism, according to the 27th article, is a sign of regeneration, the seal of our adoption, by which faith is confirmed and grace increased. In the Lord's Supper, according to article 28th, the bread is the communion of the Body of Christ, the wine the communion of His Blood, but only through faith (article 29); and the communion must be administered in both kinds (article 30). The 28th article condemns the doctrine of transubstantiation, and the elevation and adoration of the Host; the 31st rejects the sacrifice of the mass as blasphemous; the 32d permits the marriage of the clergy; the 33d maintains the efficacy of excommunication. The remaining ar-

## Artificial Flowers

ticles relate to the supremacy of the king, the condemnation of Anabaptists, etc. They were ratified anew in 1604 and 1628. All candidates for ordination must subscribe these articles.

**Articulata**, Cuvier's name for the third great division or sub-kingdom of animals. The species so designated have their body divided into rings, with the muscles attached to their interior. Their nervous system consists of two cords extending along the under part of their body, and swelled out at regular intervals into knots or ganglia. One of these is the brain, which is not much larger than the other ganglia. Cuvier divided the articulata into four classes, arranged in an ascending order—the annelida, the crustacea, the arachnida, and the insecta. Prof. Owen includes under the province articulata four classes: (1) *annulata*, (2) *cirripedia*, (3) *crustacea*, and (4) *insecta*. With the insects proper, he combines also the *myriapoda*, or centipedes, and the *arachnida*, or spiders. The name *articulata* (jointed animals) being somewhat indefinite, *annulosa* (ringed animals) has been substituted for it by Macleay and other naturalists. Prof. Huxley divides Cuvier's articulata into *annuloida* and *annulosa*.

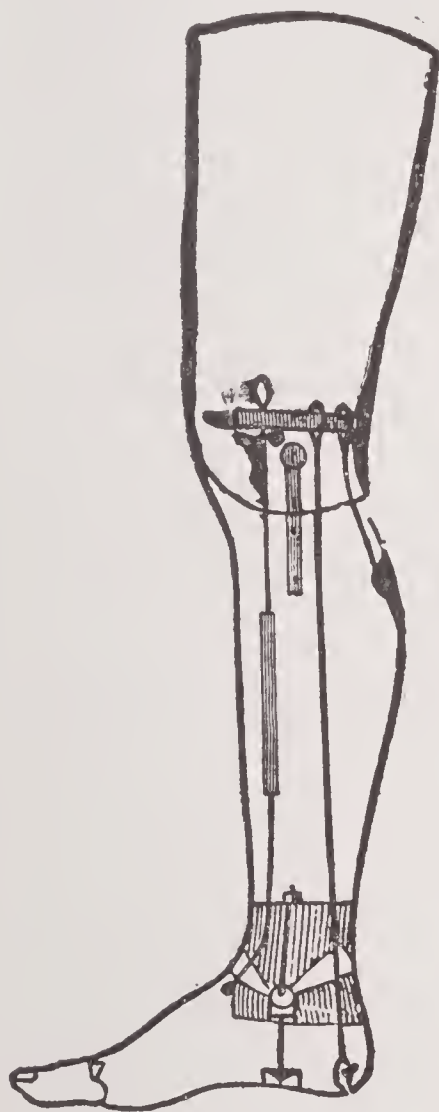
**Articulation**, in anatomy, a joint; the joining or junction of the bones. This is of three kinds: (1) Diarthrosis, or a movable connection, such as the ball-and-socket joint; (2) Synarthrosis, immovable connection, as by suture, or junction by serrated margins; (3) Symphysis, or union by means of another substance, by a cartilage, tendon, or ligament.

**Artificial Flowers**, products of an industry which has been carried to a wonderful degree of perfection, the imitation of natural flowers being so exact as to mislead even artists. The greatest ingenuity is displayed in the imitation of certain flowers; even in a common cheap sprig, consisting of several materials well put together and arranged. The leaves and petals are generally made of silk, or cambric, punched out to proper shapes and sizes. These are tinted with a brush and color, and, if necessary, glazed with gum, or sprinkled with fine flock, to imitate the glossy or velvety surface of natural flowers. The ribs, where present, are indented with a warm iron. The stamens and pistils are formed of wire covered with silk, and dipped in gum-water to form the anthers. The stalk is then made of wire, coated with green paper, and fixed to the stamens and pistil, around which are attached the petals, and, lastly, the calyx. Buds are made of cotton or glass balls, covered with cambric of a proper color. The French excel in the manufacture of these pretty frivolities. This industry has been



successfully carried on in the United States, where a large number of girls are constantly employed in making flowers. The coloring matter, however, used for these articles is often nothing less than the deadly poison arsenic. Hoffman and other chemists have shown that the most terrible effects may spring from the use of these arsenical compounds, and it is to be hoped that their use will be speedily discontinued.

**Artificial Limbs**, substitutes for human arms and legs, and parts thereof, the manufacture of which has received the attention of surgeons and mechanics from a very early date. In the great work on surgery, by Ambrose Paré, in 1579, he refers to, and gives detailed illustrations of, an artificial arm and leg, and although the construction was of a rude character, they showed a very good attempt to conceal the mutilation. In 1696 an artificial leg was invented by Verduin,



ARTIFICIAL LEG.

a Dutch surgeon. It was composed of a wooden foot, to which was fastened two strips of steel extending up to the knee. To these strips was riveted a copper socket to receive the stump; a leather for lacing around the thigh was connected to the socket by two steel side-joints, thus dividing the points of support between the thigh and stump. The construction of this leg was improved later by Prof. Serre, of Montpellier. Improvements and new limbs were more recently introduced into England and

France by Fred. Martin, M. Charrière, MM. Mathieu and Bechard. These were mostly unprotected by patents. We next notice Thomas Mann, whose patents were issued Jan. 20, 1790, and later in 1810. James Potts, of England, patented a new leg Nov. 15, 1800. This soon became celebrated as the "Anglesea leg," because it was so long worn by the Marquis of Anglesea. An improvement on this leg was patented by William Selpho, who was the first

manufacturer of note in New York, where he established himself in 1839. Other inventors and manufacturers soon took a great interest in the business — so many, in fact, that the American patent office shows a record of about 150 patents on artificial legs, or more than double that of all European patents on limbs. The Civil War, which caused the mutilation of so many soldiers and sailors, and the liberality of the government in supplying their losses with artificial limbs, naturally stimulated the efforts of inventors in producing such substitutes as would be accepted. These soldiers and sailors are supplied once in every five years, and to this demand is added that of those who have lost limbs from disease or accident, making in all about 100,000 in the United States who have to be supplied with new limbs on an average of about once in every five to eight years. The perfection to which limbs have been brought is wonderful and very interesting. A person with two artificial legs can walk so perfectly as to avoid detection, and a person with a single amputation can almost defy detection. Notable improvements in artificial limbs, and more particularly in legs, were made by C. A. Frees, of New York. One of these improvements, and one of the most important, consists in the movements of the knee and ankle joints, by which the whole limb is strengthened and made more durable. An important feature of this piece of mechanism consists in the introduction of a universal motion at the ankle-joint, imitating the astragalus movement with an additional joint, and thus producing a most perfect artificial substitute. Another of his improvements, which is of equal importance, is in the knee-joint of the leg for thigh amputation, which is so arranged that when in a sitting position, the cord and spring are entirely relaxed, relieving all strain and pressure; and, when rising to an upright position the cord and spring are again brought into proper position without strain or unnatural movement, no extra attachments being required. Artificial arms and extension apparatus for short legs are also wonderful examples of American ingenuity.

**Artigas** (-tē'-), **Fernando José** (hō-sā'), dictator of Uruguay, born 1755 at Montevideo, of a rich family; became a wild herdsman, then captain of provincial cavalry, and in 1811 joined the revolt of Buenos Ayres against Spain, whose troops he repeatedly defeated; but acting for himself was outlawed by the insurrectionary junta, whose troops in turn he routed, compelled it to cede Uruguay to him (1814), and assumed the dictatorship. In 1820 he was crushed and fled to Paraguay, where the dictator Francia banished him to Candelaria. He devoted himself to agriculture and philanthropy, and died in 1851.



## Artillery

**Artillery**, all sorts of great guns, cannon, or ordnance, mortars, howitzers, machine-guns, etc., together with all the apparatus and stores thereto belonging, which are taken into the field, or used for besieging and defending fortified places. It is often divided into (1) horse artillery; (2) field artillery; and (3) garrison artillery.

Field artillery is artillery designed to be taken with an army to the field of battle; a park of artillery is artillery with the carriages, horses, and stores of all kinds necessary for its effective use; siege artillery is artillery of heavy metal designed to be employed in breaching fortifications; a train of artillery is a certain number of pieces of cannon mounted on carriages, with all their furniture fit for marching.

**Artillery Company, The Honorable**, the oldest existing body of volunteers in Great Britain, instituted in 1585; revived in 1610. It comprises six companies of infantry, besides artillery, grenadiers, light infantry, and yagers, and furnishes a guard of honor to the sovereign when in London.

The ANCIENT AND HONORABLE, of Boston, Mass., copied from that of London, was formed in 1637, and was the first regularly organized military company in America.

**Artillery Schools**, institutions established for the purpose of giving a special training to the officers, and, in some cases, the men, belonging to the artillery service. In Great Britain the artillery schools are at Woolwich and Shoeburyness. The Department of Artillery studies at Woolwich give artillery officers the means of continuing their studies after they have completed the usual course at the Royal Military College, and of qualifying for appointments requiring exceptional scientific attainments. The school of gunnery at Shoeburyness gives instruction in gunnery to officers and men, and conducts all experiments connected with artillery and stores. An artillery school at Fort Monroe, Va., first established in 1823, discontinued, and re-established in 1867, gives instruction, both theoretical and practical. The artillery regiments of the regular army have each one foot-battery at the school; term of instruction, one year.

**Artiodactyla**, a section of the *ungulata* or hoofed mammals, comprising all those in which the number of the toes is even (two or four), including the ruminants, such as the ox, sheep, deer, etc., and also a number of non-ruminating animals.

**Artocarpaceæ**, a natural order of plants, the bread-fruit order, by some botanists ranked as a sub-order of the *urticaceæ*, or nettles. They are trees or shrubs, with a milky juice, which in some species hardens into caoutchouc, and in the cow-tree (*brosimum galactodendron*) is a milk as good as that obtained from the cow. Many of the

## Arundo

plants produce an edible fruit, of which the best known is the bread-fruit (*artocarpus*).

**Artois**, a former province of France, anciently one of the 17 provinces of the Netherlands, now almost completely included in the Department of Pas de Calais.

**Arts**, the name given to certain branches of study in the Middle Ages, originally called the liberal arts to distinguish them from the servile arts or mechanical occupations. These arts were usually given as grammar, dialectics, rhetoric, music, arithmetic, geometry, and astronomy. Hence originated the terms "art classes," "degrees in arts," "master of arts," still in common use in universities, the faculty of arts being distinguished from those of divinity, law, medicine, or science.

**Arum**, a genus of plants belonging to the order *araceæ*, or arads. It contains the well known *A. maculatum*, the cuckoo-print (meaning point), lords and ladies, or wake robin. The solitary spikes of bright scarlet berries may often be seen under hedges in winter, after the leaves and spadix have disappeared. They are poisonous. The rhizomes are used in Switzerland for soap. There is in them an amylaceous substance, which, after the acrid matter has been pressed out, may be employed in lieu of bread flour.

**Arundel, Thomas**, third son of Richard Fitz-Alan, Earl of Arundel, born in 1352, died in 1413. He was Chancellor of England and Archbishop of Canterbury. He concerted with Bolingbroke to deliver the nation from the oppression of Richard II., and was a bitter persecutor of the Lollards and followers of Wyclif.

**Arundelian Marbles**, a series of ancient sculptured marbles discovered by William Petty, who explored the ruins of Greece at the expense of and for Thomas Howard, Earl of Arundel, who lived in the time of James I. and Charles I., and was a liberal patron of scholarship and art. After the Restoration they were presented by the grandson of the collector to the University of Oxford. Among them is the "Parian Chronicle," a chronological account of the principal events in Grecian, and particularly in Athenian, history, during a period of 1318 years, from the reign of Cecrops (B. C. 1450) to the archonship of Diognetus (B. C. 264).

**Arundel Society**, a society instituted in London in 1848 for promoting the knowledge of art by the publication of fac-similes and photographs.

**Arundo**, a Linnæan genus of grasses. One species (*A. donax*) supplies material for fishing-rods, and is imported for the purpose from the S. of Europe, where it is indigenous. The striped-leaved variety, for-



## Aruspices

merly more common than it now is in gardens, is called gardener's garters.

**Aruspices** (a-rus'pe-sez), or **Haruspices**, a class of priests in ancient Rome, of Etrurian origin, whose business was to inspect the entrails of victims killed in sacrifice, and by them to foretell future events.

**Aruwimi** (ar-ö'ē-mē), a large river of Equatorial Africa, a tributary of the Kongo, which it enters from the N.

**Arval Brothers** (*fratres arvales*), a college or company of 12 members elected for life from the highest ranks in ancient Rome, so called from offering annually public sacrifices for the fertility of the fields.

**Arvicola**, a genus of rodent mammalia belonging to the family *castoridæ*, though they have also close affinities with the *muridæ*, or mice.

**Aryan**, in general language, pertaining to the old race speaking the primeval Aryan tongue, or any of the numerous forms of speech which have sprung from it. The ancestors of most modern Europeans lived together as one people, speaking the primeval Aryan tongue, in Central Asia, and apparently near the Pamir steppe. Their separation took place at so remote a period that, while they seem to have known gold, silver, and copper, they were unacquainted with iron, the name of which is different in all the leading Aryan tongues.

In a special sense, the Aryan race which invaded India at a period of remote antiquity, possibly 1700 B. C., and still remains the dominant Hindu race there.

**Aryan Languages**, a great family of languages, sometimes, though rarely, and not quite accurately, called Japhetic; more frequently designated as the Indo-European or Indo-Germanic family of tongues. They have reached a higher development than those of the second great family, the Semitic, better described as the Syro-Arabian family, and are far in advance of the next one—that comprising the Turanian tongues. Like the Syro-Arabian forms of speech, they are inflectional; while those of Turanian origin are only agglutinate. Max Müller separates the Aryan family of languages primarily into a southern and a northern division. The former is subdivided into two classes: (1) The Indic, and (2) the Iranic; and the latter into six: (1) the Celtic; (2) the Italic; (3) the Illyric; (4) the Hellenic; (5) the Windic; and (6) the Teutonic. It is often said that Sanskrit, spoken by the old Brahmins, is the root of all these classes of tongues. It is more correct to consider it as the first branch, and assume the existence of a root not now accessible to direct investigation. As an illustration of the affinity among the Aryan tongues, take the common word **daughter**. It is in Swedish, *dotter*; Danish,

## Arzachel

*datter*; Dutch, *dochter*; German, *tochter*; Old Hebrew German, *tohtar*; Gothic, *dauhtar*; Lithuanian, *duktere*; Greek, *thygater*; Armenian, *dustr*; Sanskrit, *duhitri*; the last-named word signifying, primarily, "milkmaid," that being the function, in the early Brahman or Aryan household, which the daughter discharged. Not only are the roots of very many words akin throughout the several Aryan tongues, but (a more important fact) so also are the inflections. Thus the first person singular of a well-known verb is in Latin, *do*; Greek, *didomi*; Lithuanian, *dumi*; Old Slavonic, *damy*; Zend, *dadhami*; Sanskrit, *dadami*; and the third person singular, present indication of the substantive verb is in English, *is*; Gothic, *ist*; Latin, *est*; Greek, *esti*; Sanskrit, *asti*.

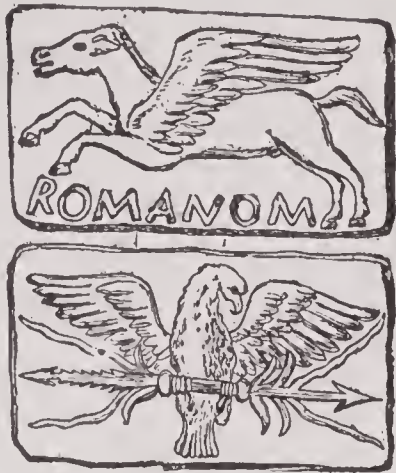
**Aryan Race**, a designation, since about 1845, of the ethnological division of mankind otherwise called Indo-European or Indo-Germanic. That division consists of two branches geographically separated, an eastern and western. The western branch comprehends the inhabitants of Europe, with the exception of the Turks, the Magyars of Hungary, the Basques of the Pyrenees, and the Finns of Lapland; the eastern comprehends the inhabitants of Armenia, of Persia, of Afghanistan, and of Northern Hindustan. The evidence on which a family relation has been established among these nations is that of language, and from a multitude of details it has been proven that the original mother tongue of all these peoples was the same. It is supposed that the Aryan nations were at first located somewhere in Central Asia, probably E. of the Caspian, and N. of the Hindu Kush and Paropamisian Mountains. From this center successive migrations took place toward the N. W. The first swarm formed the Celts, who at one time occupied a great part of Europe; at a considerably later epoch came the ancestors of the Italians, the Greeks and the Teutonic people. The stream that formed the Slavonic nations is thought to have taken the route by the N. of the Caspian. At a later period the remnant of the primitive stock would seem to have broken up. Part passed southward and became the dominant race in the valley of the Ganges, while the rest settled in Persia and became the Medes and Persians of history. It is from these eastern members that the whole family takes its name. In the most ancient Sanskrit writings (the Veda), the Hindus style themselves Aryas, the word signifying "excellent," "honorable," originally "lord of the soil."

**Arzachel** (ar-thäch-el'), a Jewish astronomer, born in Spain, about 1050. He discovered the obliquity of the ecliptic, and compiled certain astronomical tables, called the "Toledo Tables."



## As

**As**, among the Romans, a weight, coin, or measure. (1) As a weight of 12 ounces, the same as a *libra* or pound, and divided into 12 parts called *uncia* or ounces. These



AS COINS.

were: *Uncia* = 1 oz.; *sextans* (1-6th) = 2 oz.; *quadrans* ( $\frac{1}{4}$ ) = 3 oz.; *quincunx* = 5 oz.; *semis* ( $\frac{1}{2}$ ) = 6 oz.; *septunx* = 7 oz.; *bes* = 8 oz.; *dodrans* = 9 oz.; *dextans*, or *decunx* = 10 oz.; *deunx* = 11 oz. (2) As a coin, which, in the time of Tullus Hostilius, is said to have weighed 12 ounces. After the first Punie War had exhausted the treasury, it was reduced to two ounces. The second Punie War brought it to one ounce; and, finally, the Papirian law fixed it at half an ounce only. At first it was stamped with a sheep, an ox, a ram, or a sow, but under the empire it had on one side a two-faced Janus, and on the other the rostrum or prow of a ship.

**Asa**, son of Abijah, and third King of Judah, conspicuous for his earnestness in supporting the worship of God and rooting out idolatry, and for the vigor and wisdom of his government. He reigned from 955 to 914 B. C.

**Asaba** (as-a-bä'), a town and capital of the Niger Territories, in West Africa, on the Niger river, 150 miles from the coast and 75 miles above the delta. It is the seat of the Supreme Court, and contains the central prison, civil and military hospitals, and other public buildings. It is a place of large present importance, and, in the evolution of new British interests in Africa, seems destined to become still more conspicuous.

**Asafetida**, **Asafœtida**, or **Assafœtida**, the English name of two, if not more, plants

## Asbestos

growing in Persia and the East Indies, the *ferula asafœtida* and the *F. persica*. They belong to the order *apiaceæ*, or umbellifers. The word is also applied to the drug made from them. Old plants being cut across, juice exudes from the wound. This being scraped off, is exposed to the sun to harden it, and is sent in large irregular masses to this country for sale. It is a useful medicine in hysteria, asthma, tympanites, etc.

**Asama-Yama**, an active volcano of Japan, about 50 miles N. W. of Tokyo; height 8,260 feet.

**Asaph**, a Levite and psalmist appointed by David as leading chorister in the temple. His office became hereditary in his family, or he founded a school of poets and musicians called "the sons of Asaph."

**Asarabacca**, a small, hardy European plant, natural order *Aristolochiaceæ* (*Asarum europæum*). Its leaves and root are acrid. Both leaves and root were formerly used as an emetic. *A. canadense*, the Canada snakeroot, is found in the Western States.

**Asben**, or **Air**, a hilly oasis in the Sahara; lat. about 20° N.; long., 7° E. The region has a native Sultan, and the inhabitants, chiefly Tuaregs, number about 100,000.

**Asbestos**, a fibrous mineral belonging to the hornblende family, and including several species of amphibole, notably tremolite and actinolite, when the alumina in their composition tends to give them a fibrous character. The chemical composition of asbestos is chiefly silica, magnesia, alumina, and ferrous oxide, this combination rendering it infusible and incombustible. It presents great diversity in structure and color, occurring in long, parallel, extremely slender and flexible fibers, in interwoven and closely matted filaments, in fibers so interlaced that it resembles cork, in a hard, brittle, slightly curved form, or in compact masses, usually harder and heavier when so found than in other varieties. Commonly its colors are gray, yellow, greenish or blue, intermingled with white. It exists, vein-like, in serpentine, mica-slate, and primitive limestone rocks. Asbestos is widely distributed throughout the world, the most delicate, silky variety, called amiantus, coming from Savoy and Corsica, while the stronger and more useful kind employed in the manufacture of fireproof cloths and curtains is principally supplied by Canada. Asbestos is also found in Alpine countries, Russia, New South Wales, and in many parts of the United States, particularly in the Carolinas, Georgia, California, Vermont, and Wyoming. Fireproof paints, papers, putty, cloths, gloves, ropes, plaster, and many other materials are partly or entirely made of asbestos. It is employed for fireproof roofing and flooring, for non-con-



ducting envelopes of steam-pipes, and for the packing in fireproof safes. Consult Jones, "Asbestos and Asbestic" (1890).

**Asbjörnsen, Peter Kristen.** (äs-byern'-sen), a Norwegian folklorist, born in Christiania, Jan. 15, 1812. While pursuing botanical and zoological studies, and subsequently during various travels at government expense, he eagerly collected folk tales and legends, aided by his lifelong friend Jörgen Moe, with whom he published "Norwegian Folk Tales" (1842-1844; 5th ed., 1874), and "Norwegian Gnome Stories and Folk Legends" (1845-1848; 3rd ed., 1870), pronounced by Jacob Grimm the best fairy tales in existence. He died in Christiania, Jan. 6, 1885.

**Asbury, Francis,** the first Methodist bishop consecrated in America, born at Handsworth, Staffordshire, Aug. 20, 1745. When 16 years old he became an itinerant Wesleyan preacher, and in 1771 he was sent as a missionary to America, where he was consecrated in 1784. During a long life of almost incessant labor it is estimated by his biographer that he traveled about 270,000 miles (mostly on horseback), preached about 16,500 sermons, and ordained more than 4,000 preachers. Of great natural ability and indomitable energy, he ranks with Wesley, Whitefield, and Coke in the Methodist movement of his time. He died in Richmond, Va., March 31, 1816.

**Asbury Park,** a city and popular summer resort in Monmouth county, N. J.; on the Atlantic Ocean, 6 miles S. of Long Branch, and on several railroads. It adjoins Ocean Grove on the N., being separated from it by Wesley Lake. It was founded in 1869, and given a city charter in 1897. The city contains a large number of hotels and boarding-houses, many attractive summer dwellings, electric lights and street railways, a National bank, and several periodicals. It has trolley connections with a cluster of summer resorts extending down to Atlantic Highlands, and property valuation of more than \$3,000,000; and is rapidly becoming nearly as popular a winter as a summer resort. Asbury Park and Ocean Grove were originally laid out by members of the Methodist Episcopal Church for camp meetings and other purposes. Pop. (1910) 10,150; in summer, 25,000 and upward.

**Ascalaphus** (as-kal'a-fus), son of Acheron and Nox, turned into an owl by Ceres, because, according to the legend, he disclosed the fact that Proserpine had eaten some pomegranate seeds, when Pluto had carried her off into the lower world.

**Ascalon** (as'kal-on), **Ashkelon**, or **Askelon**, one of the five cities of the Philistines, on the Mediterranean, W. S. W. of Jerusalem, on the main road from Egypt through Gaza to Central Palestine. Very

often mentioned in Scripture, it rose to considerable importance in past Biblical times. Near the town were the temple and sacred lake of Derceto, the Syrian Venus. A great victory was won here by the crusaders in 1099. The position of Ascalon is naturally very strong. Near the ruins of the city stand now a village of the same name. The eschalot or shallot, a kind of onion (*allium escalonicum*), was first grown there.

**Ascanius** (as-kā'nē-us), a son of Æneas and Creusa, who accompanied his father in his flight from the burning of Troy, and landed in Italy. He ably supported Æneas in his war with the Latins, and succeeded him in the government of Latium. He afterward build Alba Longa, to which he transferred his seat of government from Lavinium, and reigned there 38 years. His descendants ruled over Alba for 420 years.

**Ascaris**, a genus of intestinal worms, the typical one of the family *ascaridæ*. *A. lumbricoides*, or round worm, is the commonest intestinal parasite of the human species, generally occupying the small intestines; it is found also in the hog and ox. In the human species it is much more common in children than in adults, and is extremely rare in aged persons. It reaches seven inches in length. A second species, the *ascaris* or *oxyurus vermicularis*, is one of the most troublesome parasites of children, and occasionally of adults. It infests the larger intestines, especially the rectum. The male is two or three lines long, and the female five.

**Ascension** (discovered on Ascension Day), an island of volcanic origin belonging to Great Britain, near the middle of the South Atlantic Ocean, lying about lat. 7° 55' S.; long. 15° 25' W.; 800 miles N. W. of St. Helena; area, about 36 square miles; pop. 165. It is retained by Great Britain mainly as a station at which ships may touch for stores. It has a steam factory, naval and victualling yards, hospitals, and a coal depôt. It is celebrated for its turtles, which are the finest in the world. Wild goats are plentiful, and oxen, sheep, pheasants, guinea-fowl, and rabbits have been introduced, and thrive well. Georgetown, the seat of government, stands on the W. side of the island, which is governed under the admiralty by a naval officer.

**Ascension**, in astronomy, right ascension is the distance of a heavenly body from the first point of Aries (the ram), measured upon the equator. The arc of the equinoctial included between a certain point in that circle, called the vernal equinox, and the point in the same circle to which it is referred by the circle of declination passing through it. Or the angle included between two hour-circles, one of which, called the



equinoctial colure, passes through the vernal equinox, and the other through the body. It is opposed to oblique ascension. The terms, right ascension and declination, are now generally used to point out the position in the heavens of any celestial object, in preference to the old method of indicating certain prominent stars by proper names or by Greek letters. By means of the transit instrument, or by an equatorially-mounted telescope, a star or planet may be readily found, when once its right ascension and declination are known. Oblique ascension is the arc of the equator intercepted between the first point of Aries and the point of the equator which rises with a star or other heavenly body, reckoned according to the order of the signs.

**Ascension Day**, the day on which our Saviour's ascension is commemorated — the Thursday but one before Whitsuntide, sometimes called Holy Thursday. It is one of the six leading festivals for which services are assigned in the Liturgy of the Episcopal Church.

**Ascetics**, a name given in ancient times to those Christians who devoted themselves to severe exercises of piety and strove to distinguish themselves from the world by abstinence from sensual enjoyments and by voluntary penances. They, therefore, abstained from wine, flesh, matrimony, and worldly business; and, moreover, emaciated their bodies by long vigils, fasting, toil, and hunger. Both men and women embraced this austere mode of life. During the 2d century of the Christian Era, when they first attracted notice, they lived by themselves and dressed differently from others, but did not altogether withdraw from the society and converse of ordinary men. During the course of the 3d century they gradually withdrew to the Egyptian desert, and early in the 4th (about A. D. 305), were associated by Anthony into monastic communities.

**Asceticism**, the condition or practice of ascetics. Among the Greeks, the word asceticism was at first applied to those athletes and wrestlers who were accustomed, by rigid abstinence from all sensual and enervating indulgences, to harden their bodies for the personal competition in the public games; but it soon came to bear a deflected, or secondary, meaning. Among the Stoics and Cynics it became applied to that severe discipline to which those persons subjected themselves, by mastering their passions and appetites for the sake of that ideal virtue sought for them all. It was afterward applied by the Christians to all who wrestled with Satan, with the world, and with the flesh, and thus endeavored to exalt themselves by a severe course of personal renunciation above this world, where they were strangers

and sojourners. But the earliest ascetics we read of had an Eastern origin. The Brahmins, and other sects in Asia, carried this practice to a monstrous extent, even long before authentic history begins. The vogis and fakirs of the present time, the suicides in the sacred Ganges and under the wheels of the car of Juggernaut, are only a repetition, in a civilized age, of what was done by their remote ancestors long anterior to any authentic record we have of the country. The Buddhists, who for the most part dwell considerably to the E. of India, carried the principle of asceticism to an extreme height. They despised the world; lived a life of solitude and beggary; mortified the flesh, and abstained from all uncleanness. And so they do at the present day. In the early centuries of Christianity, the adherents of the comparatively new religion were more exemplary for purity of morals than for the practice of ascetic severities. But, before long, in Egypt and elsewhere, they endeavored to escape from the sinful world in which they lived, and by fasting and prayer sought for divine aid, around the shores of Lake Marætis, and in other parts of the Christian world. Asceticism assumed a more intellectual shape among the Neo-Platonists of Egypt than it has ever done in any other part of the world. Its greatest names are Philo the Jew, the father of the system, Plotinus, Porphyry, Iamblichus, and Proclus. Philo has left us a history of it in his "*De Vitâ Contemplativâ*." Even in the 2d century of the Christian Era we find societies of men and women living together under vows of continence. The tendency to outward manifestation and to inward and spiritual life, began to decline in Christian communities. This gave rise to the chief manifestations of asceticism, namely, monasticism. The essence of asceticism is to hold self-denial and suffering to be meritorious in the sight of God, in and for itself, without regarding whether it promotes in any way the good of others, or the improvement of the individual's own character. Ascetic practices have been modified in recent times; nevertheless, its spirit often shows itself as still alive, even in Protestantism. In some religious orders of the Roman Catholic Church, as the Carmelites, asceticism is actually practiced in its greatest severity.

**Ascham, Roger**, an English scholar and author, born at Kirby Wiske, near Northalerton, in 1515; graduated at Cambridge, and struggled with poverty until patrons came to his relief. He was famous for his general knowledge and acquirements in Greek and Latin, and is classed with Spenser, Sir Thomas More, and Sir Philip Sidney. Though he wrote Latin with ease and elegance at a time when custom favored the



use of that language for important works, he urged and practiced the writing of English, and his beautiful style in his own language has given him the name of the "Father of English Prose." In 1548-1550 he was tutor of the Princess (afterward Queen) Elizabeth, by whom he was much beloved. His most noted works are: "Toxophilus," a treatise on archery (his favorite exercise), in the form of a dialogue (1545), and "The Scholemaster," a treatise on education, which, though completed, he did not publish. To this work, conceived with vigor and executed with accuracy, he principally owes his modern reputation. His death, in London, Dec. 30, 1568, was occasioned by his too close application to the composition of a poem, which he intended to present to the queen on the anniversary of her accession. His works are valuable not only on account of the style in which they are written, but also for the amount of historical information which they contain.

**Ascher, Isidore G.**, author, born in Glasgow, Scotland, in 1835; removed to Montreal, Canada, in childhood; was graduated at McGill University; and was called to the bar in 1862. He began publishing his literary works in the daily press and magazines at Montreal, and removed to England in 1864. His publications include "Voices from the Hearth, and Other Poems," "A Cure for a Title," "An Emigrant's Story," and other works in fiction; and, in 1888, a comedietta, "Circumstances Alter Cases," which was produced at the Crystal Palace, London.

**Ascian**, plural **Ascians**, in the plural, those who at midday of one or two days of the year are destitute of a shadow. Those living in the Tropics of Cancer and Capricorn are so at midday once a year, and those living between those circles are so twice a year.

**Ascidia**, or **Ascidia**, the first order of the tunicated class of mollusca. It contains four families, the *ascidiadæ*, or simple ascidians; the *clavellinidæ*, or social ascidians; the *botryllidæ*, or compound ascidians; and the *pyrosomatidæ*, an aberrant family tending to the order biphora.

**Ascidia**, simple ascidians; the typical family of the ascidian order of tunicated mollusca. Prof. Garrod considers them to be degenerate vertebrata, which should be placed quite at the end of that sub-kingdom, after amphioxus. The animals are simple and fixed; they are solitary or gregarious, with their branchial sac simple or disposed in 8—18 deep and regular folds. Their external integument is provided with two apertures, making them look like double-necked jars. When touched they squirt a stream of water to some dis-

tance. They look like shapeless cartilaginous masses. Some are highly colored. In Brazil, China, and the Mediterranean they are eaten as food.

**Ascitæ** (Latin, *Ascitans*), a sect of Montanists who arose in the 2d century. Their name was designed to express the fact that some bacchanals of their party believed the passage in Matt. lx: 17, which speaks of pouring new wine into new bottles, required them to blow up a skin or bag, and dance around it when inflated, which accordingly they did with suitable vigor, as an act of solemn worship.

**Ascites**, an effusion of fluid of any kind into the abdomen; especially effusion of fluid within the cavity of the peritoneum, as distinguished from ovarian dropsy and dropsy of the uterus. There is an idiopathic ascites, which may be of a chronic or acute form, or of an asthenic type; and a sympathetic or consequential ascites. Another division is into active ascites, that in which there is a large effusion of serum into the cavity of the peritoneum, after undue exposure to cold and wet; and passive ascites, that produced by disease of the heart or liver.

**Asclepiad**, a kind of verse used by Horace and other writers, and divided into two primary types: (1) *Asclepiadeus minor*, consisting of a spondee, a choriambus, a dactyl, a trochee, and a cæsure, as *Măēcē | nās ātāvīs || ēdītē | rēgī | būs*, and (2) the *asclepiadeus major*, consisting of a spondee, two choriambuses, a trochee, and a cæsure, as *quīs pōst | vīnā grāvēm | mīlītām āūt | pāūpērēm | crēpāt?*

**Asclepiadaceæ** (as-klep-ē-a-das'ē-i), an order of plants closely allied to the *apocynaceæ*, or dogbanes. Lindley places them under his alliance solanales. They have a five-divided persistent calyx; a monopetalous five-lobed regular corolla; five stamina, with the filaments usually connate; anthers two—sometimes almost four—celled; the pollen at length cohering in masses, or sticking to five processes of the stigma; styles, two; stigma, one, tipping both styles, dilated, five-cornered; ovaries, two; fruit, two follicles, of which one is sometimes abortive; seeds numerous. Shrubs, or more rarely herbs, almost always milky, and frequently twining. Leaves entire, opposite; flowers umbellate, fascicled, or racemose. Their favorite habitat is Africa. They occur also in India, and the tropics generally. In 1846 Lindley estimated the known species at 910; now fully 1,000 or known. The milk, which in some species furnishes caoutchouc, is usually acrid and bitter, though apparently not so deleterious as that of *apocynaceæ*. That of *calotropis gigantea*, the akund, yercum, or mudar plant of India, has been used with effect in leprosy, elephantiasis, and some



## Asclepiades

other diseases. The roots of *cynanchum tomentosum*, and *periploca emetica* are emetic. *Gymnema lactiferum* is the cow-plant of Ceylon. *Pergularia edulis* and *periploca esculenta* are eatable. *Diplopepis vomitoria* is expectorant and diaphoretic, and is used like ipecacuanha in dysentery. *Hemidesmus indica* is the Indian sarsaparilla. The leaves of *cynanchum argel* are used in Egypt for adulterating senna. *Mardenia tenacissima* is employed for bow-strings by the mountaineers of Rajmahal, while *M. tinetoria* and *gymnema tingens* yield an indigo of excellent quality.

**Asclepiades** (as-klep-ē'a-dēz), the descendants of the god of medicine, Æsculapius, by his sons Podalirius and Machaon, spread, together with the worship of the god, through Greece and Asia Minor. They formed an order of priests, which preserved the results of the medical experience acquired in the temples as an hereditary secret, and were thus, at the same time, physicians, prophets, and priests. They lived in the temple of the god, and by exciting the imaginations of the sick, prepared them to receive healing dreams and divine apparitions; observed carefully the course of the disease; applied, as it is believed, besides the conjurations and charms usual in antiquity, real magnetic remedies, and noted down the results of their practice. They were, accordingly, not only the first physicians known to us, but, in fact, the founders of scientific medicine, which proceeded from their society. At first, this order of priests was confined to the family of the Asclepiades, who kept their family register with great care. Aristides celebrated them by his eulogiums at Smyrna. Hippocrates of Cos, the founder of scientific physic, derived his origin from it, and the oath administered to the disciples of the order (*jusjurandum Hippocratis*) is preserved in his writings.

**Asclepiades**, a Greek physician, born at Prusa, Bithynia, who flourished during the early part of the 1st century B. C. He seems to have wandered about as a not very successful teacher of rhetoric, before he finally settled at Rome, where, by the practice of medicine, he had risen in Cicero's time to considerable fame and wealth. He was opposed to the principles of Hippocrates. Pliny, who professes very little respect for him, reduces his medicinal remedies to five, abstinence from flesh, abstinence from wine under certain circumstances, friction, walking, and gestation, or carriage exercise, by which he proposed to open the pores, and let the corpuscles which caused disease escape in perspiration; for his leading doctrine was, that all disease rose from an inharmonious distribution of the small, formless corpuscles of which the body was composed. He also employed

## Asdood

emetics and bleeding, but in general consulted the tastes and whims of his patients; his maxim being, that a physician ought to cure surely, swiftly, and agreeably. He is said to have been the first who distinguished between acute and chronic diseases, and the invention of laryngotomy is also ascribed to him; but his knowledge of anatomy was apparently very slight.

**Asclepias**, a genus of plants, the typical one of the order *asclepiadaceæ*. The species are found chiefly along the eastern portion of North America, in Bermuda, etc. Though all more or less poisonous, they are used medicinally. *A. decumbens* excites general perspiration without in any perceptible degree increasing the heat of the body. It is used in Virginia as a remedy against pleurisy. Another variety, *A. tuberosa*, is a mild cathartic and diaphoretic. The root and tender stalks of *A. volubilis* create sickness and expectoration. *A. tuberosa* (butterfly weed) and *A. curasavica*, sometimes but incorrectly called ipecacuanha, are also medicinal plants, while *A. lactifera* yields a sweet, copious milk used by the Indians, etc.; hence the ordinary name milkweed. *A. aphylla* and *stipitata* are eatable.

**Ascoli** (as'kō-lē), a frontier town of Central Italy, in the Marches, 53 miles S. of Ancona. It is a handsome place, well built and strongly fortified. Ascoli is the ancient Asculum Picenum, described by Strabo as a place of almost inaccessible strength. It sustained a memorable siege against the Romans under Pompey.

**Ascolidi Satriano** (sat-rē-ä'nō) a very ancient town of South Italy, in the Province of Capitanata, 13 miles S. E. of Rovino. It was here that Pyrrhus encountered for a second time the Roman legion, but with no decisive result to either side. It was destroyed by an earthquake in 1400.

**Ascot Heath**, a race-course in Berkshire, England, 29 miles W. S. W. of London, and 6 miles S. W. of Windsor. It is circular, only 66 yards short of 2 miles in length; the races, which take place early in June, are generally attended by the royal family in semi-state. From the accounts of the Master of Horse for the year 1712, it would appear that they were instituted, not in 1727 as is commonly supposed, but by Queen Anne on Aug. 6, 1711.

**Asdood**, or **Asdoud**, a small seaport of Palestine, on the Mediterranean, 35 miles W. of Jerusalem. It was the Ashdod of Scripture, one of the five confederate cities of the Philistines, and one of the seats of the worship of Dagon (1 Sam. v: 5). It occupied a commanding position on the high road from Palestine to Egypt, and was never subdued by the Israelites. It sustained against Psammetichus a siege of 29 years,



B. C. 630; was destroyed by the Maecabees (1 Mac. v: 68, x: 84), and restored by the Romans, B. C. 55. It is now an insignificant village, from which the sea is constantly receding.

**Asellio, Gasparo** (a-sel'yō), an Italian physician, born at Cremona about 1581; became Professor of Anatomy and Surgery at Padua. In 1622, while at Milan, he discovered the lacteal vessels, which he seems, however, never to have understood or described with complete accuracy. He left a treatise, "De Lactibus" (1627). He died in 1626.

**Asellus**, a generic name now disused, formerly applied to the cod and other gadidæ. It is retained in the pharmacopœias, in the name of cod-liver oil, oleum jecoris aselli. The same generic name is also employed to denote a genus of small isopod crustaceans, one of which, *A. aquaticus*, is common in stagnant ponds in Great Britain, and is sometimes called the water hog-louse. This genus is the type of a family, *asellidæ*.

**Asgard**, the Heaven of Scandinavian mythology.

**Ash**, a genus of deciduous trees (*Fraxinus*) of the natural order *Oleaceæ*, having imperfect flowers and a seed vessel prolonged into a thin wing at the apex (called a samara). There are a good many species, chiefly indigenous to Europe and North America. The common ash (*F. excelsior*), indigenous to Great Britain, has a smooth



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bark, and grows tall and rather slender. The branches are flattened; the leaves have five pairs of pinnae, terminated by an odd one, dark green in color; lanceolate, with serrated edges. The flowers are produced in loose spikes from the sides of the branches, and are succeeded by flat seeds which ripen in autumn. It is one of the most useful of British trees on account of the excellence of its hard, tough wood and the rapidity of its growth. There are many varieties of it, as the weeping ash, the curled-leaved ash, the entire-leaved ash, etc. The flowering or manna ash (*F. ornus*), by some placed in a distinct genus (*ornus*), is a native of the S. of Europe and

Palestine. It yields the substance called manna, which is obtained by making incisions in the bark, when the juice exudes and hardens. Among American species are the white ash (*F. americana*), with lighter bark and leaves; the red or black ash (*F. pubescens*), with a brown bark; the black ash (*F. sambucifolia*), the blue ash, the green ash, etc. They are all valuable trees. The mountain ash, or rowan, belongs to a different order.

**Ash**, or **Ashes**, the incombustible residue of organic bodies (animal or vegetable) remaining after combustion; in common usage, any incombustible residue of bodies used as fuel; as a commercial term, the word generally means the ashes of vegetable substances, from which are extracted the alkaline matters called potash, pearl-ash, kelp, barilla, etc.

**Ashango**, a region in the interior of Southern Africa, lying between lat. 1° and 2° S., and between the Ogowe and the Lower Kongo. The inhabitants belong to the Bantu stock, and among them are a dwarfish people, the Obongo, said to be about 4½ feet high at most.

**Ashanti**, or **Ashantee**, formerly a kingdom, now a British protectorate, in West Africa, on the Gold Coast, and to the N. of the river Prah; area about 70,000 square miles. It is in great part hilly, well watered, and covered with dense tropical vegetation. The country round the towns, however, is carefully cultivated. The crops are chiefly rice, maize, millet, sugar-cane, and yams, the last forming the staple vegetable food of the natives. The domestic animals are cows, horses of small size, goats, and a species of hairy sheep. The larger wild animals are the elephant, rhinoceros, giraffe, buffalo, lion, hippopotamus, etc. Birds of all kinds are numerous, and crocodiles and other reptiles abound. Gold is abundant, being found either in the form of dust or in nuggets. The Ashantis are warlike and ferocious, with a love of shedding human blood amounting to a passion, human sacrifices being common. Polygamy is practiced by them to an enormous extent. They make excellent cotton cloths, articles in gold, and good earthenware, tan leather, and make sword blades of superior workmanship. The government is a despotic monarchy. The chief town is Kumasi or Coomassie, which, before being burned down in 1874, was well and regularly built with wide streets, and had from 70,000 to 100,000 inhabitants. The British first came in contact with the Ashantis in 1807, and hostilities continued off and on till 1826, when they were driven from the seacoast. Immediately after the transfer of the Dutch settlements on the Gold Coast to Great Britain in 1872 — when the entire coast remained in British hands — the



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Ashantis reclaimed the sovereignty of the tribes round the settlement of Elmina. This brought on a sanguinary war, leading to a British expedition in 1874, in which Kumasi was captured, and British supremacy established along the Gold Coast. In 1895-1896 another British expedition, from the Gold Coast, took possession of Kumasi, forced the submission of the King, who, with his principal chiefs, was sent to Sierra Leone, and established a protectorate over the country. In 1900 an uprising of native tribes was precipitated as a result of the British Governor's efforts to gain possession of the golden stool upon which the exiled King and his predecessors had been crowned. The Governor, Sir Frederick M. Hodgson, found himself practically besieged in Kumasi, a British force subsequently relieving him. The pacification of the country must be a matter of considerable time. Pop. est. at between 1,000,000 and 2,000,000.

**Ashburnham, Sir Cromer**, a British military officer; born in 1831; served with distinction in the Indian Mutiny campaign, Afghanistan campaign, Boer War (1881), and Egyptian and Eastern Sudan campaigns, and later was governor of Suakim.

**Ashburton, Alexander Baring, Lord**, a British statesman and financier; born in London, Oct. 27, 1774; second son of Sir Francis Baring. He was bred to commercial pursuits, which for some years kept him in the United States, and in 1810 he became head of the firm of Baring Brothers & Co. He served for many years in Parliament, was president of the Board of Trade in 1834-35, and in 1835 was raised to the peerage. With Daniel Webster he negotiated the Ashburton Treaty. He died May 13, 1848.

**Ashburton Treaty**, a treaty concluded at Washington in 1842 between the United States and Great Britain. It defined the boundaries between the United States and Canada. See NORTHEAST BOUNDARY DISPUTE.

**Ashby-de-la-Zouch** (-zōsh), a town of Leicestershire, England, near the source of the Mease, a tributary of the Trent, 18 miles N.W. of Leicester. It owes its suffix to the Norman family of La Zouch. Their ruined castle, celebrated in Scott's "Ivanhoe," and rebuilt in 1480 by Sir William Hastings, crowns a height to the S. of the town. Mary, Queen of Scots, was imprisoned here. In the church are the tombs of the Hastings or Huntingdon family. Leather is the staple industry. Pop. (1891), 4,535.

**Ashdod**, the New Testament Azotus, now Esdud, or Asdood.

**Ashera** (ash-ē'ra), an ancient Semitic goddess, whose symbol was the phallus. In the Revised Version of the Old Testament this word is used to translate what in the

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ordinary version is translated "grove," as connected with the idolatrous practices into which the Jews were prone to fall.

**Asheville**, city and county-seat of Buncombe Co., N. C.; on the Southern railroad, near the French Broad river; 275 miles W. of Raleigh. It is in a tobacco-growing region; has manufactories of cotton goods, shoes, ice, tobacco, and flour; and is widely noted as a winter and summer resort, especially for invalids from the Northern States. The city is more than 2,000 feet above the level of the sea, is surrounded by impressive mountain scenery, and has the Asheville College for Young Women, Bingham Military Academy, Normal College and Collegiate Institute for Young Women, Home Industrial School for Girls, Asheville Farm School for Boys, Industrial School for Colored Youth, a National bank, electric lights, and nearly 50 hotels and boarding-houses. In the suburbs are the grand estate of Biltmore, established by George Vanderbilt of New York City; one of the finest botanical gardens in the world; Pisgah forest, a hunting preserve of 84,000 acres; Battery and Riverside parks; and Mount Beaumont, 2,800 feet high. Pop. (1890), 10,235; (1900) 14,694; (1910) 18,762.

**Ashford, Cyril Ernest**, an English educator, born in Birmingham, June 17, 1867; was graduated at Trinity College, Cambridge; senior science master at Harrow in 1894-1903; head master, Royal Naval College, Osborne, till 1905; then the same, Royal Naval College, Dartmouth.

**Ashhurst, John, Jr.**, an American surgeon, born in 1839; was graduated at the University of Pennsylvania in 1857; served as an army surgeon in the Civil War; became surgeon of several Philadelphia hospitals after his return; and was made President of the College of Physicians in Philadelphia in 1898. Dr. Ashhurst had held surgical chairs in the University of Pennsylvania; was a member of the principal medical and surgical associations of the country; and, besides many individual publications, edited the "International Encyclopædia of Surgery" (6 vols., 1881-1886; rev. ed., 1888) and "Lippincott's New Medical Dictionary." He died July 8, 1900.

**Ashira** (ash-ē'ra), a region in the W. part of Equatorial Africa, S. of the Ogowe river. Its inhabitants are said to be industrious, peaceable and intelligent. The country is now within the French sphere of influence.

**Ashland**, town and county-seat of Ashland Co., O.; on the Erie railroad; 6 miles S. W. of Cleveland. It has important manufactures, large trade, a National bank, and several newspapers, and is the seat of



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**Ashland University** (non-sectarian), founded in 1878. Pop. (1910) 6,795.

**Ashland**, a borough in Schuylkill co., Pa.; in the valley of the Mahanoy, and on several railroads; 12 miles N. W. of Pottsville, the county-seat. It is in the center of the great anthracite coal field; has extensive mining industries, large machine shops, foundries, and factories; and contains the State Miners' Hospital, a National bank, public hall, and several churches. Pop. (1900) 6,438; (1910) 6,855.

**Ashland**, city and county-seat of Ashland co., Wis.; on Chequamegon Bay, Lake Superior and several railroads; 80 miles E. of Duluth, Minn. It has one of the finest harbors on the lake, and, besides its general lake traffic, it is a shipping port for the hematite ore of the great Gogebic Iron Range. To accommodate its iron interests, it has a number of enormous ore docks. Other special interests are lumber and brown stone. It has very large charcoal blast furnaces, used for the manufacture of pig iron, and, since 1885, when the real development of the Gogebic iron mines began, the city has had a rapid growth. Near by is the group of Apostles' Islands. The institutions include the North Wisconsin Academy, Sisters' Hospital (Roman Catholic), and Rhinehart Hospital. Pop. (1890) 9,956; (1900) 13,074; (1910) 11,594.

**Ashley, Lord.** See SHAFTESBURY.

**Ashley, William James**, an American educator, born in London, England, in 1860; was educated at Oxford; became a private tutor in history and afterward lecturer in history in Corpus Christi College. In 1888 he became Professor of Political Economy and Constitutional History in the University of Toronto; in 1892, was called to the new chair of Economic History in Harvard University; and in 1901 became head of the new faculty of Commerce in the University of Birmingham, England.

**Ashmole, Elias**, an English antiquary, born in 1617; became a chancery solicitor in London, but afterward studied at Oxford, taking up mathematics, physics, chemistry, and particularly astrology. He published "Theatrum Chymicum" in 1652. On the Restoration he received the post of Windsor herald, and other appointments, both honorable and lucrative. In 1672 appeared his "History of the Order of the Garter." He presented to the University of Oxford his collection of rarities, to which he afterward added his books and MSS., thereby commencing the Ashmolean Museum. He died in 1692.

**Ashmun, Jehudi**, an American missionary, born at Champlain, N. Y., in April, 1794; graduated at the University of Vermont, in 1816, and later became a professor in the Bangor Theological Seminary. He

## Ashtaroth

resigned this chair to unite with the Protestant Episcopal Church. On June 19, 1822, he sailed for Liberia, and there founded a colony, which, when he left, six years later, had increased to 1,200 inhabitants. He was the author of "Memoirs of Samuel Bacon" (1822). He died in New Haven, Conn. Aug. 25, 1828.

**Ashraf**, a town in the Persian province of Mazanderan, near the S. coast of the Caspian Sea, 56 miles W. of Astrabad. It was a favorite residence of Shah Abbas the Great, and was adorned by him with splendid buildings, of which only a few miserable ruins now remain. It still contains over 800 houses, and has some trade in the cotton and silk produced in its vicinity.

**Ashtabula**, a city in Ashtabula co., O., on Lake Erie, and several important railroads; 55 miles N. E. of Cleveland. It is in an agricultural and dairy region, and has an excellent harbor where the river of the same name enters the lake. The city is noteworthy for the facts that it receives the largest amount of iron ore of any port in the United States, and the amount of its shipment of the same is surpassed by few on the Great Lakes. Its extensive railroad and lake communications give it a special importance in the industrial world, as it stands between the great coal and iron-mining regions and the extensive manufacturing districts of Pennsylvania. On Dec. 29, 1876, there was a terrible railroad accident here, which resulted in the loss of over 100 lives. Pop. (1900) 12,949; (1910) 18,266.

**Ashtaroth** (ash'ta-rôt), or **Astaroth**, plurals of **Ashtoreth** and **Astarté**, a goddess worshipped by the Jews in times when idolatry prevailed; the principal female divinity of the Phœnicians, as Baal was the principal male divinity; and the plural Ashtaroth indicate probably different modifications of the divinity herself. Ashtoreth is the Astarté of the Greeks and Romans, and is identified by ancient writers with the goddess Venus (Aphrodite). She is probably the same as the Isis of the Egyptians, and closely connected with the Asherah of Scripture; Ashtoreth being, according to Berthau, the name of the goddess, and Asherah, the name of her image or symbol. In Scripture, she is almost always joined with Baal, and is called god, Scripture having no particular word for expressing goddess. She was the goddess of the moon; her temples generally accompanied those of the sun, and while bloody sacrifices or human victims were offered to Baal, bread, liquors, and perfumes were presented to Astarté. She was also goddess of woods, and in groves consecrated to her, such lasciviousness was committed as rendered her worship infamous. Cicero says (lib. iii, *de Nat. Deorum*), that their Astarté was the Syrian Venus,



born at Tyre, and wife of Adonis; very different from the Venus of Cyprus. On medals she is represented in a long habit; at other times with a short one; sometimes holding a large stick; sometimes she has a crown of rays; sometimes she is crowned with battlements, as the Venus of Ascalon. In a medal of Cæsarea she is in a short dress, with a man's head in her right hand, and Sanchoniathon says that she was represented with a cow's head, or only with horns, intended to represent the lunar rays.

**Ashton, John**, an English antiquarian, born in London, Sept. 22, 1834; has published a long list of works on history, chap-books, legends, ballads, manners and customs, caricature and satire, etc.

**Ashwanipi**, or **Hamilton**, the great river of Labrador, has its source near the head waters of the E. branch of the Moisie, and after a course of 600 miles, enters the Atlantic through Esquimaux Bay, or Hamilton Inlet. At its mouth it is nearly  $1\frac{1}{2}$  miles wide, and 25 miles up its breadth varies from  $\frac{1}{4}$  to  $\frac{1}{2}$  mile. About 100 miles up occur the falls, one of the grandest spectacles in the world. Six miles above the falls, the river suddenly contracts to about 100 yards, then, rushing along in a continuous foaming rapid, finally contracts to a breadth of 50 yards ere it precipitates itself over the rock which forms the fall, when, still roaring and foaming, it continues its maddened course for about 30 miles, pent up between walls of rock that rise sometimes to the height of 300 feet on either side. This stupendous fall exceeds in height the Falls of Niagara.

**Ash Wednesday**, the first day of Lent, so called from a custom in the Western Church of sprinkling ashes that day on the heads of penitents, then admitted to penance. The period at which the fast of Ash Wednesday was instituted is uncertain. In the Roman Catholic Church the ashes are now strewn on the heads of all the clergy and people present. In the Anglican Church Ash Wednesday is regarded as an important fast day.

**Asia**, the largest of the land divisions of the world, occupies the northern portion of the Eastern Hemisphere in the form of a massive continent, which extends beyond the Arctic circle, and by its southern peninsulas nearly reaches the equator. The origin of its name remains unknown. Europe and Asia constitute but one continent, extending from W. to E., and having the shape of an immense triangle, the angles of which are Spain in the W., the peninsula of the Tchukthi in the N. E., and that of Malacca in the S. E. The Arctic Ocean in the N., the Pacific in the E., and the Indian Ocean, continued by its narrow gulf, the Red Sea, which nearly reaches the Mediter-

anean, inclose the continent of Asia. The area covered by Asia and its islands is 17,255,890 square miles; that is, almost exactly one-third of the land surface of the globe (32 per cent). It is one-seventh larger than the surface of both Americas together, by one-half larger than that of Africa, and more than four times larger than Europe. Geographically speaking, Europe is a mere appendix to Asia, and no exact geographical delimitation of the two continents is possible. The line of separation from Africa is better defined by the narrow Red Sea; but Arabia participates so largely in the physical features of Africa that it is in a sense intermediate between the two continents.

*Peninsulas*.—Asia has 1 mile of coastline for every 337 square miles of its area; that is, three times less than Europe; besides one-fifth of its shores is washed by the ice-bound Arctic Ocean (9,900 miles out of 51,000), or by the foggy and icy Sea of Okhotsk, where navigation is possible only for a few months, or even weeks, in each year. Its peninsulas comprise nearly one-fifth of its surface (19 per cent., as against 28 in Europe), but they partake of the massive structure of the continent. Three immense offsets continue the continent of Asia into more tropical latitudes, Arabia, India, and the Indo-Chinese peninsula, and some likeness exists between them and the three southern peninsulas of Europe, Spain, Italy, and the Balkan peninsula, surrounded by its archipelago of hundreds of islands. Asia Minor protrudes between the Black Sea and the Mediterranean as a huge mass of tableland, broken by narrow gulfs in its western parts. In the Pacific are three large peninsulas, Korea, Kamchatka, and that of the Tchukthi. The flat, ever frozen, uninhabitable peninsulas of the Arctic Ocean, Taimyr and Yalmal, could play no part in the growth of civilization.

*Seas and Gulfs*.—The early inhabitants of Asia had no Mediterranean Sea to serve as a highway of communication between the southern peninsulas. The gulfs which separate them, the Arabian Sea and the Bay of Bengal, are wide open divisions of the Indian Ocean. The Red Sea penetrates between Africa and Arabia; and only now, since it has been brought into communication with the Mediterranean by the Suez Canal, has it become an important channel of traffic. Asia's true Mediterranean is on the E., where several archipelagoes, like so many chains of islands, mark off from the ocean the Southern and Eastern China Seas, whose Gulfs of Siam and Tonkin, and, especially, the Yellow Sea, with the Gulf of Pechili, penetrate into the continent. Those gulfs, since the dawn of history, have promoted the development of marine traffic in these regions, and would have done so still more



















but for the typhoons, the constant danger of these seas. The Sea of Japan is less favored by climate and currents, and it has on its W. the inhospitable coasts of Northern Manchuria, where Russia is trying to establish a maritime center at Peter the Great Bay. The Sea of Okhotsk and that of Bering, although possessing fine gulfs (Ghizhiga, Anadyr), have no importance for the maritime traffic of nations.

*Islands.*—The islands of Asia cover an aggregate of no less than 1,023,000 square miles (nearly 6 per cent. of Asia's surface). The coasts of Asia Minor are dotted with islands, of which the Sporades connect it with Greece. Cyprus was from remote antiquity a center of civilization; so also Ceylon. The Laccadives and Maldives are mere coral atolls, rising amid the Indian Ocean and sheltering some 200,000 inhabitants. The islands of East Asia are much more important. A narrow strip of islands, some large like Sumatra (177,000 square miles) and Java, others mere reefs, extend in a wide semicircle, under the name of Andaman and Sunda Islands, from Burma to Australia, separating the Indian Ocean from the shallow Java Sea and the Malay Archipelago. This last immense volcanic region, inhabited by the Malay race, comprises the huge Borneo, the ramified Celebes, and the numberless small islands of the Moluccas, the Philippines, etc., connected on the N. W. with the Chinese coast by the Island of Formosa. This latter, as well as Hainan, may be properly considered as part of the Chinese mainland. The Loo-choo (Liu-Kiu) Islands and the Japanese Archipelago, the latter joining Kamchatka by the Kuriles, continue farther N. E. this chain of islands which border the coast of Asia. In the Arctic Ocean, the small Bear Islands, the archipelago of the Liakhof, Anjou, and De Long Islands, as also those of the Kara Sea, are lost amid ice-fields, and are but occasionally visited by whalers. Kellett's, or Wrangel's Land, off the peninsula of the Tehukteh, was thoroughly explored by Lieut. R. M. Berry, United States navy.

*Orography.*—If the whole mass of the mountains and plateaus of Asia were uniformly spread over its surface, the continent would rise no less than 2,885 feet above the sea, while Africa and North America would respectively reach only 2,165 and 1,950 feet. High plateaus occupy nearly two-fifths of its area. One of them, that of Western Asia, including Anatolia, Armenia, and Iran, extends in a southeasterly direction from the Black Sea to the valley of the Indus; while the other, the high plateaus of Eastern Asia, still loftier and much more extensive, stretches N. E. from the Himalayas to the northeastern extremity of Asia, resembling in shape a South America point-

ing N. E., and meeting Bering Strait, the northwestern extremity of the high plateau of North America.

*Rivers.*—Only four rivers, the Mississippi, Amazon, Kongo, and Nile, surpass the largest rivers of Asia, the Yenisei and the Yangtse-kiang, both as to length and drainage areas; but owing to the scarcity of rain over large parts of Asia, the amount of water carried down by the largest rivers is, as a rule, disproportionately small as compared with American or European rivers. The predominant feature of Asia's hydrography is the existence of very wide areas having no outlet to the sea. On the great plateau of Eastern Asia, the region which has no outlet from the plateau, and whose water does not reach even Lake Aral or the Caspian, covers a surface larger than that of Spain, France, and Germany together. It is watered only by the Tarim, which supplies some irrigation works in its upper parts, and enters the rapidly drying marshes of Lob-nor. This area is steadily increasing, and since 1862 we have had to add to it the drainage area (as large as England and Wales) of the Keruleñ, which empties into Dalai-nor, but no longer reaches the Arguñ, a tributary of the Amur. The Ulyasutai River and the Tchagantogoi now no longer reach Lake Balkash; and the Urungu, which obviously joined the Upper Irtysh at no very remote date, empties into a lake separated from the Black Irtysh by a low isthmus not 5 miles wide. If we add to this the drainage basins of Lake Balkash with its tributaries, the Ili and other smaller rivers; the great Lake Aral, with the Syr-daria (Jaxartes) and Amudaria (Oxus), as also the numerous rivers which flow toward it or its tributaries, but are desiccated by evaporation before reaching them, and finally the Caspian with its tributaries, the Volga, Ural, Kura, and Terek, we find an immense surface of more than 4,000,000 square miles; that is, much larger than Europe, which has no outlet to the ocean. The plateaus of Iran and Armenia, two separate areas in Arabia, and one in Asia Minor, represent a surface of 5,567,000 square miles.

The drainage area of the Arctic Ocean includes all the lowlands of Siberia, its plains and large portions of the great plateau. The chief rivers flowing N. to the Arctic Ocean are the Obi, with the Irtysh; the Yenisei, with its great tributary, the Angara, which brings to it the waters of Lake Baikal, itself fed by the Selenga, the Upper Angara, and hundreds of small streams; and finally the Lena, with its great tributaries, the Vitim, Olekma, Vilui, and Aldan. Owing to their great tributaries and to the fact that each of them is formed by two great rivers of nearly equal importance, navigation is carried on over wide distances



in Siberia. Three great navigable rivers enter the Pacific: the Amur, composed of the Arguñ and Shilka, and receiving the Sungari, a great artery of navigation in Manchuria, the Usuri and the Zeya; the Hoang-ho; and the Yang-tse-kiang, the last two rising on the plateau of Tibet. Freightened boats penetrate from the sea-coast to the very heart of China. The Cambodia, or Me-kong, the Salwen, and the Irawadi, rising in the eastern parts of the high plateau, water the Indo-Chinese peninsula. Rising on the same height, the Indus and the Brahmaputra flow through a high valley in opposite directions along the northern base of the Himalayas, until both pierce the gigantic ridge at its opposite ends, and find their way, the former to the lowlands of the Punjab, where it is joined by the Sutlej, and the latter to Assam and Bengal, where it joins the great river of India, the Ganges, before entering the Gulf of Bengal by a great number of branches forming an immense delta. The plateau of the Deccan is watered by the Godavari and Krishna, flowing E., the Narbada, flowing W., and a great number of smaller streams. The Tigris and Euphrates, both rising in the high plateau of Armenia, flow parallel to each other, bringing life to the valley of Mesopotamia, and join before entering the Persian Gulf. Arabia proper has no rivers worthy of notice; only the *wadys*, or dry channels of former rivers, show that there was a time not far distant when it was well watered. The Irmah, which enters the Black Sea, is the only river worthy of notice in Asia Minor. In Caucasus, the Rion and Kubañ enter the Black Sea, and the Kura and Terek, the Caspian.

*Inland Seas and Lakes.*—A succession of great lakes or inland seas are situated all along the northern slope of the high plateaus of Western and Eastern Asia, their levels becoming higher as we advance farther E. The Caspian, 800 miles long and 270 wide, is an immense sea, even larger than the Black Sea, but its level is now 85 feet below the level of the ocean; Lake Aral, nearly as wide as the Ægean Sea, has its level 157 feet above the ocean; farther E. we have Lake Balkash (780 feet), Zaisan (1,200 feet), and Lake Baikal (1,550 feet). Many large lakes appear on the plateau of Tibet (Tengri-nor, Bakha), and on the high plateau of the Selenga and Vitim (Ubsa-nor, Ikhe-aral, Kosogol, Oron); and smaller lakes and ponds are numerous also in the plateau of the Deccan, Armenia, and Asia Minor. Three large lakes, Urmia, Van, and Goktcha, and many smaller ones, lie on the highest part of the Armenian plateau. On the Pacific slope of the great plateau, the great rivers of China and the Amur, with its tributaries, have along their lower

courses some large and very many small lakes.

*Geology.*—The great plateaus, built up of crystalline unstratified rocks, granites, granitites, syenites, and dionites, as well as of gneisses, talc, and mica-schists, clapslates and limestones, all belong to the Archæan formation (Huronian, Laurentian, Silurian, and partly Devonian), and have been submerged by the sea since the Devonian epoch. The higher terrace of the plateau of Pamir and the plateaus of the Selenga and Vitim are built up only of Huronian and Laurentian azoic schists; and even Silurian deposits, widely spread on the plains, are doubtful on the plateaus. Their upheaval dates from an earlier age, and they arose above the sea during the Devonian epoch, while parts at least of the lower terrace were under the sea at that period. During the Jurassic period, immense fresh water basins covered the surface of those plateaus, and have left their traces in Jurassic coal beds, which are found in the depressions of the plateaus and lowlands. Carboniferous deposits are met with in Turkestan, India, and Western Asia; while in Eastern Asia the numerous coalbeds of Manchuria, China, and the archipelagoes are all Jurassic. During the Cretaceous and Tertiary period an immense mediterranean sea spread over the surface of the plateau, and penetrating through the Zungarrian trench, it covered the Han-hai. This interior sea persisted until earlier parts of the Tertiary epoch, when new upheavals broke its connection with the Tertiary seas which covered what are now plains and lowlands. Thick layers of Tertiary deposits are found at great heights in the alpine tracts which fringe the plateau. These chains of mountains are of the same geological origin. They arose above the carboniferous Triassic chalk and Jurassic seas which covered what are now the lowlands and lower terraces of Asia; but their upheaval has continued throughout these epochs, so that in the outer chains of Asia we see carboniferous and younger deposits, up to Tertiary, lifted to great heights.

More than 120 active volcanoes are known in Asia, chiefly in the islands of the S. E., the Philippines, Japan, the Kurile, and Kamchatka, and also in a few islands of the Seas of Bengal and Arabia, and in Western Asia. Numerous traces of volcanic eruptions are found in Eastern Tian-shan in the northwestern border ridges of the high Siberian plateau, and in the S. W. of Aigun, in Manchuria. Earthquakes are frequent, especially in Armenia, Turkestan, and around Lake Baikal.

*Minerals.*—There are gold mines of great wealth in the Urals, the Altai, and Eastern Siberia; and auriferous sands are found in Korea, Sumatra, Japan, and in the Cau-



casus Mountains. Silver is extracted in Siberia; platina, in the Urals; copper, in Japan, India, and Siberia; tin, in Banca; mercury, in Japan. Iron ore is found in nearly all the mountainous regions, especially in Asia Minor, Persia, Turkestan, India, China, Japan, and Siberia; but iron mining is still at a rudimentary stage. Immense coal-beds are spread over China and the islands of the Pacific (Hainan, Japanese Archipelago, Sakhalin), Eastern Siberia, Turkestan, India, Persia, and Asia Minor. They cover no less than 500,000 square miles in China alone; but the extraction of coal is as yet very limited. Graphite of very high quality is found in the Sayans and Northern Siberia. The diamonds of India, the sapphires of Ceylon, the rubies of Burma and Turkestan, the topazes, beryls, etc., of the Urals and Nertchinsk, have a wide repute. Layers of rock-salt are widely spread, and still more so the salt lakes and springs. The petroleum wells of the Caspian shores already rival those of the United States. A variety of mineral springs, some of them equal to the best waters of Western Europe, are widely spread over Asia.

*Climate.*—On account of the immense area of Asia, great differences of climate are met with, and, therefore, the meteorologists subdivide the continent into several climatic regions.

*Flora.*—There is little difference between the vegetation of the E. of Europe and that of Northwestern Asia. Forests cover extensive tracts, and consist of pine, fir, larch, cedar, silver fir, birch, aspen, and poplars. The red beech does not penetrate into Siberia; and the oak does not cross the Ural. The forests of Siberia differ widely from those of Europe in the predominance of the larch, the rarity of the Scotch fir, which grows only on the drier ground, and the very characters of the trees compelled to accommodate themselves to a harsh climate, and to soil either stony or swampy. The underwood of the Siberian forests also offers a richer variety of species, and many a bush, now a favorite in our gardens for its wealth of blossom, has its home in the alpine tracts which border the great plateau on the N. W.

In the region to the E. of the high plateau, including China, Manchuria, and Japan, oak reappears. So also the walnut, the hazel, the lime-tree, and the maple; while several new species of poplars, willows, acacias, and many others, make their appearance. The forests become really beautiful. In Japan a variety of species of pine, and the reappearance of the beech, add to their beauty. A rich underwood of lianas, ivies, wild vines, roses, and so on, renders the forests quite impassable, especially in the littoral region, submitted to the influ-

ence of the monsoons. In the lower parts, rich prairies cover immense spaces; the grass vegetation becomes luxuriant; and in the virgin prairies of the Amur man and horse are easily concealed by the stems of grasses of gigantic size. Rice and cotton are cultivated in the southern parts of the region. The gradual disappearance of the southern species; and the prevalence of northern ones, permits the division of the region into two parts: the Chinese flora, and that of Manchuria and the Okhotsk littoral.

The beech is characteristic of the forests of Western Asia. Here also are found all the trees of Southern Europe. The vine and several of the European fruit-trees (plum, cherry, apricot, pear) are regarded by botanists as belonging originally to this region. The flora of Asia Minor combines those of Southern Europe and Northern Africa, owing to its evergreen oaks, laurels, olive-trees, myrtles, oleanders, and pistachio-trees, as also to its variety of bulbous plants.

Southern and Southeastern Asia, with their numerous islands, display the richest flora, which seems quite distinct from the above, and extends as a separate domain of vegetation over India, the Indo-Chinese peninsula, and the archipelagoes, and reaches Northwestern Australia. The hot climate and the great amount of the summer rains, with a relatively dry winter, contribute to the development of a rich tropical vegetation. The higher parts of the region, particularly the Himalayas, are clothed on their southern slopes with forests up to the heights of 12,000 and 13,000 feet. In the lower parts of the region, and especially the neighborhood of the seacoasts, the tropical vegetation reaches the variety and size of the American. Here the sugar cane, the cotton shrub, and the indigo had their origin. The cocoanut palm and the banyan-tree are the most striking feature of the coast vegetation. Ferns reach the size of large trees. The gigantic banyan, the screw pine, the India rubber, and the red cotton trees occur in immense forests; and bamboos grow thick and high.

In Borneo, Java, and the islands of the archipelago, the tropical vegetation is like that of India. The mountain flora also resembles that of the Himalayas; rich forests clothe the volcanoes up to their tops. The sago palm, the bread tree, imported from the South Sea Islands, and the tamarind, also imported, are largely cultivated, as also the cocoanut palm and the sugar palm. Orchids appear in their full variety and beauty. The swamps are covered with mangroves or with the nipa or susa palm; and vanilla, pepper, clove, and nearly all the species are native to this region.

Asia has given to Europe a variety of useful plants; among them, wheat, barley, oats,



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and millet, onions, radishes, peas, beans, spinaeh, and other vegetables. Nearly all our fruit trees have the same origin; the apple, pear, plum, cherry, almond, pistachio, and mulberry, the raspberry, and even lucerne, were imported from Asia to Europe.

*Fauna.*—The fauna of nearly the whole of continental Asia belongs to one single domain. Animals could easily spread over the plains of Europe and Siberia on the one side, and on the other along the high plateau which stretches from Tibet to the land of the Tehukteh. This wide region can be easily subdivided into the Arctic region, the Boreal, embracing the lowlands of Western Siberia; the Daurian, in the northern parts of the great plateau; and the Central Asian. The fauna of Siberia is much like that of Eastern Europe, and would be still more like were it not for the disappearance from Europe of several species still existing in Siberia. It is the true habitat of all furbearing animals, as the bear, wolf, fox, sable, ermine, otter, beaver, common weasel and squirrel; also the hare, wild boar, the stag, the reindeer, and the elk, all belonging to the European faunas, with the addition of several species common to the Arctic fauna. In Eastern Siberia, *i. e.*, in the N. parts of the high plateau, are representatives of the fauna of Central Asia, which spread from the S. W. (see SIBERIA). A further addition of Mongolian species is found on the lower plateau in Transbaikalia, where the fauna of the Central Asian depression meets with that of Siberia.

The Central Asian plateau has a fauna of its own. We find there the wild ancestors of several of our domestic animals, *viz.*, the wild horse, discovered by Przewalski (Prejevalsky) in the Ala-shan Mountains, the wild camel and donkey, and the *capra ægar-gus*, from which our common goat is descended. The yak, several species of antelopes, and the roebuck are characteristic of the Central Asian fauna; so also are the huge sheep, now disappearing, which found refuge in the wilder parts of the plateaus. In the Steppe region we find the same fauna as in Siberia, with the addition of the tiger, which occasionally reaches Lake Zaisan, and even Lake Baikal; the leopard and hyena coming from warmer regions; and a variety of endemic birds; while in Arabia there is an admixture of African species. Several Indian species also penetrate within this region. The Caucasus has a fauna belonging to the Circum-Mediterranean region. The bison, which has now completely disappeared from Europe (with the exception of the Byelovyezh forests in Western Russia), is still found in the forests of Caucasus; also the same abundance of pheasants as on the Pacific littoral.

Southern and Southeastern Asia belong to a separate zoological domain. The heights

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of the Himalayas have the fauna of the Tibet portion of the high plateau; but on their S. slopes the fauna is purely Indian and Transgangeitic, while a few African species are found on the plains of India and in the Deccan. As a whole the tropical fauna of Asia is richer than the African, and the American tropical fauna surpasses it only in the number of parrots and the family of *picariæ*. It is characterized by the great number of carnivora, which find refuge in the jungles, and by the elephant, rhinoceros, wild buffalo, red deer, many long-armed apes and half-apes, huge bats, genets, and a variety of serpents and crocodiles; the bird fauna includes vultures, a variety of parrots, pelicans and flamingoes. The fauna is still richer in the Indo-Chinese Peninsula, while in the archipelagos of Southeastern Asia several Australian species add to its extent. Since the glacial period the mammoth and hairy rhinoceros have disappeared, also the cave-bear, tiger, wolf, and hyena. Even within historic times, several species of mammals, like the bison and the aurochs, have all but disappeared, while others are found only in very small numbers in the wildest parts of the high plateau.

*Ethnography.*—The aggregate population of Asia is estimated at 865,000,000, being thus more than one-half of the entire population of the globe. This population however, is small, giving only an average of 49 inhabitants per square mile. It is unequally distributed, and reaches 557 per square mile in some provinces of China, denser than in Belgium (539 per square mile), and 520 in some parts of Northwestern India. It is greatest in those parts of Asia which are most favored by rains, the densest population being met with to the S. and S. E. of the great plateau on an area comprising only one-fifth of Asia's surface. Seventenths have scarcely more than from 3 to 20 inhabitants per square mile; and nearly one-tenth is almost quite uninhabited. The inhabitants of Asia belong to five different groups; the so-called Caucasian (fair type) in Western Asia and India; the Mongolian in Central and Eastern Asia, as also in the Indo-Chinese Peninsula; the Malay in Malacca and the Indian Archipelago; the Dravidas in Southeastern India and Ceylon; and the Negritos and Papuas in the virgin forests of the Philippine Islands and Celebes; also a sixth great division comprising the stems which inhabit Northeastern Asia, the Hyperboreans, whose affinities are not yet well known. The Mongolian race alone embraces nearly seven-tenths of the population of Asia; the Malay, about two-tenths, and the Caucasian about one-tenth. The Europeans reckon about 6,000,000 (Russians) in Caucasus, Turkestan and Siberia; some 150,000 (English) in India; and 45,000 in the Dutch Indies.



*Religions.*—Asia has been the birthplace of religions; the Jewish, Buddhist, Christian and Mohammedan having their origin in Asia, where they grow up under the influence of still older religions, the Babylonian and that of Zoroaster, both also of Asiatic origin. At present the inhabitants of Asia belong chiefly to the Buddhist religion, which has 530,000,000 to 560,000,000 of followers, *i. e.*, nearly one-third of mankind. The old faith of Hinduism has 187,000,000 of followers in India. Most of the inhabitants of Western Asia, as also of part of Central Asia, follow the religion of Islam; they may number about 90,000,000. The Christians number about 20,000,000 in Armenia, Caucasia, Siberia and Turkestan. Jews are scattered mostly in Western and Central Asia. A few fire-worshippers, Guebres or Parsi of India and Persia, are the sole remnant of the religion of Zoroaster; while vestiges of Sabæism are found amidst the Gesides and Sabians on the Tigris.

*Civilization.*—At present one finds in Asia all varieties of civilization, the primitive tribes of Northeastern Siberia, the confederations of nomadic shepherds, and great nations in possession of a common stock of national customs, beliefs and literature, like China; the tribal stage; the compound family, forming the real basis of China's social organization; the rural community, both of the Indian and Mussulman type; the loose aggregations of Tehukteh's, having no rulers and no religion beyond the worship of forces of nature, but professing with regard to one another principles of morality and mutual support often forgotten in higher stages of civilization; and despotic monarchies with a powerful clergy. So also in economic life. While the tribes of the N. E. find their means of subsistence exclusively in fishing and hunting, carried on with the simplest implements, among which stone weapons have not yet quite disappeared, and the tribes of Central Asia carry on primitive cattle breeding and lead a half-nomadic life, others are agriculturists, and have brought irrigation (in Turkestan) to a degree of perfection hardly known in Europe.

*Political Conditions.*—While the countries beyond the great plateau entered but quite recently within the domain of Western history, those on its Mediterranean slope have never ceased to exercise a powerful influence on Europe. At the very dawn of written history, that is, 50 centuries before our era, the great Akkadian Empire already influenced the inhabitants of the coasts of the Mediterranean. Later on the Phœnicians extended their authority over Northern Africa, and the Ægean Sea; the Persians modified the development of Egypt; and at a very remote epoch an oasis of high

civilization, grown up at the base of the Altai Mountains, spread itself to the W. over Northern Europe. Alexander of Macedonia pushed his conquests as far as Turkestan; and, later on, Rome conquered Western Asia. But the Greek and Arabian civilization in Central Asia decayed under the raids of Mongolian tribes; the Roman empire was absorbed by the East, and fell into decay at the very confines of Asia, on the shores of the Bosphorus; the Arsacides and Sassanides of Persia repulsed the Roman aggression and conquered Roman provinces, while the great migrations of the first centuries of our era were due to mass movements from Asia into Europe. Ural-Altaians migrated to the Urals and thence to Hungary. Other Turanians, the Mervs, the Alans, the Avars, penetrated into Europe from the S. E. Mongols abandoned plateaus, and invaded the Russian plains; the Arabs, following the S. coast of the Mediterranean, invaded Spain; and the empire of the Osmanlis arose on the ruins of the Eastern Roman empire. By these invasions, Asia arrested the free development of Europe, and compelled the Germanic, Gallic, and Slavonic federations to gather into powerful States of the Roman monarchical type.

Portuguese ships, rounding the Cape, founded the first European colonies in India. They were soon followed by the Spaniards, the Dutch, the French, the Danes and the British, all endeavoring to seize the richest colonies in Asia, and all involved in interminable struggles for preponderance in her lands and on her seas; while Russia, in the course of a few centuries, conquered and colonized the northwestern slopes of the high plateau and reached the Pacific. Great Britain established herself in India, and took possession of the whole of the peninsula, and extended her power over the western parts of the Indo-Chinese Peninsula. The Portuguese retain in India only Diu, Daman and Goa; and the French keep Chandernagore, Yanaon, Pondicherry, Charical and Mahé. The next colonial power in Asia is the Dutch, who have under their dominion most of Borneo, Sumatra, Java, Celebes, the Moluccas and the small Sunda Islands. British and French interests are rivals in the Indo-Chinese Peninsula, and, while Burma has become English, the annexation by France of Tonkin and of Siamese territory E. of the Mekhong has consolidated French power in Indo-China. The joint intervention by Russia and France in Chinese affairs after the Japanese War of 1894–1895 has further extended both French and Russian influence in Asia. China, till then regarded as forming, with Great Britain and Russia, the third great power in Asia, has assumed, temporarily at least, a quite subordinate place, while Japan has become the foremost native Asiatic power.



*Ways of Communication.*—Caravans of camels are the chief means of transport for goods and travelers in the interior; donkeys, yaks and even goats and sheep are employed in crossing the high passages of the Himalayas, horses are the usual means of transport in most parts of China and Siberia, and in the barren tracts of the N. the reindeer and, still farther N., the dog, are made use of. Fortunately the great rivers of Asia provide water communication over immense distances. The deep and broad streams of China, allowing heavy boats to penetrate far into the interior of the country, connect it with the sea; a brisk traffic is carried on along these arteries. In Siberia, the bifurcated rivers supply a water way, not only N. and S. along the course of the chief rivers running toward the Arctic Ocean, but also W. and E.; thus a great line of water communication crosses Siberia, and is, with but a few interruptions, continued in the E. by the Amur, navigable for more than 2,000 miles. In the winter the rivers and plains of Siberia become excellent roads for sledges, on which goods are still chiefly transported.

*Railways.*—In 1900 the lines in existence had a total length of about 30,000 miles, of which two-thirds belonged to British India. The portions of the Trans-Caspian and Trans-Siberian railways already constructed had a length of 3,200 miles. A number of European syndicates held concessions for 3,600 miles of railroads in China, which will traverse regions rich in minerals and agriculture; many of these lines were then in process of construction. The Chinese Government owned about 300 miles of railway. The lines are very remunerative, especially that from Peking to Tien-Tsin. Japan is well provided with railroads; the length being 3,200 miles. French Indo-China had only 120 miles, but the French possessions in Cochin-China, Anam, and Tonkin were expected soon to have 2,400 miles, which will greatly help to develop their mineral and agricultural resources. The Dutch Indies are well supplied. Java alone has 1,000 miles. There are as yet no railroads in Persia of any consequence; but Turkey operates 1,500 miles in Asia, and 600 miles more were in construction or projected.

Telegraph communications are in a much more advanced state than the roads. St. Petersburg is connected by telegraph with the mouth of the Amur and Vladivostok (on the frontier of Korea); while another branch, crossing Turkestan and Mongolia, runs on to Tashkend, Peking and Shanghai. Constantinople is connected with Bombay, Madras, Singapore, Saigon, Hong-Kong and Nagasaki in Japan; and Singapore stands in telegraphic communication with Java, and Port Darwin in Australia. Finally, Odessa is connected by wire with Tiflis in Caucasus, Teheran, and Bombay.

*Trade.*—Notwithstanding the difficulties of communication a brisk trade is carried on between the different parts of Asia, but there is no possibility of arriving at even an approximate estimate of its aggregate value. The maritime exports to Europe, the United States, and overland to Russia, have an annual value of about \$900,000,000, and the imports of about \$750,000,000. Asia deals chiefly in raw materials, gold, silver, petroleum, teak, and a variety of timber-wood, furs, raw cotton, silk, wool, tallow, and so on: the products of her tea, coffee and spice plantations; and a yearly increasing amount of wheat and other grain. Steam industry is only now making its appearance in Asia, and, although but a very few years old, threatens to become a rival to European manufacture. Indian cottons of European patterns and jute-stuffs already compete with those of Lancashire and Dundee. Several of the petty trades carried on in India, China, Japan, Asia Minor and some parts of Persia, have been brought to so high a perfection that the silks, printed cottons, carpets, jewelry and cutlery of particular districts far surpass in their artistic taste many like productions of Europe. The export of these articles is steadily increasing, and Japan supplies Europe with thousands of small articles—applications of Japanese art and taste to objects of European household furniture.

**Asia Minor** (Asia the Less, as distinguished from Asia in the widest extent), is the name usually given to the western peninsular projection of Asia, forming part of Turkey in Asia. The name is not very ancient; originally the Greeks seem by Asia to have meant only the western part of Asia Minor, but with their geographical knowledge, the scope of the name Asia gradually widened. The late Greek name for Asia Minor is *Anatolia*—*Anatolé*, “the East,” whence is formed the Turkish *Anadöli*. Asia Minor includes the peninsula; the eastern boundary, somewhat artificial, being a line from the Gulf of Skanderoun to the Upper Euphrates, and thence to a point E. of Trebizond. The area of the peninsula exceeds 220,000 square miles. It constitutes the western prolongation of the high tableland of Armenia, with its border mountain-ranges. The interior consists of a great plateau, or rather series of plateaus, rising in graduation from 3,500 to 4,000 feet, with bare steppes, salt plains, marshes and lakes; the structure is volcanic, and there are several conical mountains, one of which, the *Ergish-dagh* (*Argæus*), with two craters, attains a height of 11,830 feet, towering above the plain of *Kaisarieh*, which has itself an elevation of between 2,000 and 3,000 feet. The plateau is bordered on the N. by a long train of parallel mountains, 4,000 to 6,000 feet high, and cut up into groups by cross valleys. These mountains sink



abruptly down on the N. side to a narrow strip of coast; their slopes toward the interior are gentler and bare of wood. Similar is the character of the border ranges on the S., the ancient Taurus, only that they are more continuous and higher, being, to the N. of the Bay of Skanderoon, 10,000 to 12,000 feet, and, farther to the W., 8,000 to 9,000 feet. The W. border is intersected by numerous valleys opening upon the archipelago, to the northern part of which Mounts Ida and Olympus belong. Between the highlands and the sea lie the fertile coast-lands of the Levant. Of the rivers the largest is the Kizil Irmak (Ilalys), which, like the Yeshil Irmak (Iris), and the Sakaria (Sangarius), flows into the Black Sea; the Sarabat (Hermus) and Meinder (Mæander) flow into the Ægean.

The climate has, on the whole, a South European character; but a distinction must be made of four regions. The central plateau, nearly destitute of wood and water, has a hot climate in summer, and a cold in winter; the S. coast has mild winters and scorching summers; while on the coast of the Ægean there is the mildest of climates and a magnificent vegetation. On the N. side the climate is not so mild, but the vegetation is most luxuriant.

In point of natural history, Asia Minor forms the transition from the continental character of the East to the maritime character of the West. The forest-trees and cultivated plants of Europe are seen mingled with the forms characteristic of Persia and Syria. The central plateau, which is barren, has the character of an Asiatic steppe, more adapted for the flocks and herds of nomadic tribes than for agriculture; while the coasts, rich in all European products, fine fruits, olives, wine, and silk, have quite the character of the S. of Europe, which on the warmer and drier S. coast shades into that of Africa.

The inhabitants, some 7,000,000 in number, consist of the most various races. The dominant race are the Osmanli Turks, who number about 1,200,000, and are spread over the whole country; allied to these are the Turkomans and Yuruks, speaking a dialect of the same language. The latter are found chiefly on the tableland, leading a nomadic life; there are also hordes of nomadic Kurds. Among the mountains E. of Trebizond are the robber tribes of the Lazes.

The Greeks and Armenians are the most progressive elements in the population, and have most of the trade. While the Greeks monopolize the professions, the ownership of the land is largely passing into the hands of Greeks, Armenians and Jews. Administratively the country falls into eight *vilayets* or government, with their capitals in Brusa, Smyrna, Konieh (Iconium), Adana, Sivas, Angora, Trebizond and Kastamuni respectively. In ancient times the divisions

were Pontus, Paphlagonia, Bithynia, in the N.; Mysia, Lydia, Caria, in the W.; Pisdia with Pamphylia, and Cappadocia, in the S.; and Galatia with Lycaonia and Phrygia, in the center. The Turkish islands of the archipelago belong, most of them, to Asia Minor.

Here, especially in Ionia, was the early seat of Grecian civilization, and here were the countries of Phrygia, Lycia, Caria, Paphlagonia, Bithynia, Lydia, Pamphylia, Isauria, Cilicia, Galatia, Cappadocia, etc., with Troy, Ephesus, Smyrna, and many other great and famous cities. Here, from the obscure era of Semiramis (about 2,000 years B. C.), to the time of Osman (about 1,300 A. D.), the greatest conquerors of the world contended for supremacy; and here took place the wars of the Medes and Persians with the Scythians; of the Greeks with the Persians; of the Romans with Mithridates and the Parthians; of the Arabs, Seljuks, Mongols and Osmanli Turks with the weak Byzantine Empire. Here Alexander the Great and the Romans successfully contended for the mastery of the civilized world. But, notwithstanding all these wars, the country still continued to enjoy some measure of prosperity till it fell into the hands of the Turks, under whose military despotism its ancient civilization has been sadly brought to ruin. Recently, considerable portions of Armenia have been absorbed by Russia. In 1878 Great Britain made a secret engagement to guarantee against Russian aggression the Asiatic dominions of the Porte.

**Asiarch**, under the Romans, the director-general of religious ceremonies in the province of Asia. The expression occurs in the Greek Testament, *Tines de kai tōn Asiarchōn*, "And certain also of the Asiarchs" (Acts xix: 31). Properly speaking, there was but one Asiarch residing at Ephesus; the others referred to were his subordinates.

**Asiatic Societies**, learned bodies instituted for the purpose of collecting information respecting the different countries of Asia, such as the Asiatic Society of Bengal, founded in 1784 by Sir William Jones; and the Royal Asiatic Society of Great Britain and Ireland, established by Mr. Colebrooke, and opened in 1823. There are similar societies on the European continent and in the United States, such as the Société Asiatique at Paris, founded in 1822; the Oriental Society of Germany (Deutsche Morgenländische Gesellschaft), founded in 1845; and the Oriental Society at Boston, founded in 1842.

**Asinarli** (as-in-ar'ē-ē), a name given in derision to the Jews because they were said to worship an ass; subsequently the same term was applied to Christians, who were also accused of the same thing. Tertullian tells the story, which was illustrated by a draw-



## Asinius

ing, made in the 2d century, in the palace of Cæsar, in Rome. The drawing represented a Christian convert bowing to a man with an ass's head, hanging on a cross. Underneath is the Greek inscription "Alexamenos is worshiping God." This drawing was discovered in 1856, and is now in the library of the Collegio Romano.

**Asinius.** See POLLIO.

**Asiphonata**, or **Asiphonida**, an order of lamellibranchiate, bivalve mollusks, destitute of the siphon or tube through which, in the siphonata, the water that enters the gills is passed outward. It includes the oysters, the scallop shells, the pearl oyster, the mussels, and in general the most useful and valuable mollusks.

**Ask**, in Scandinavian mythology, the name of the first man created. According to the legend, one day three gods, Odin, Hæner and Loder, found two trees by the seaside, an ash and an elm. From these trees they created the first man and first woman, Ask and Embla, and gave them the earth as their dwelling place.

**Askabad**, the administrative center of the Russian province of Transcaspia, situated in the Akhal Tekke oasis, and occupied by Skobeleff in January, 1881, after the sack of Geok Tepé. Its distance from Merv is 232 miles, from Herat 388 miles.

**Askew, Anne**, a victim of religious persecution, born in 1521; was a daughter of Sir William Askew of Lincolnshire, and was married to a wealthy neighbor named Kyme, who, irritated by her Protestantism, drove her from his house. In London, whither she went, probably to procure a divorce, she spoke against the dogmas of the old faith, and, being tried, was condemned to death as a heretic. Being put to the rack to extort a confession concerning those with whom she corresponded, she continued firm, and was then taken to Smithfield, chained to a stake, and burned, in 1546.

**Askja** (ask'ya), a volcano near the center of Iceland, first brought into notice by an eruption in 1875. Its crater is 17 miles in circumference, surrounded by a mountain-ring from 500 to 1,000 feet high, the height of the mountain itself being between 4,000 and 5,000 feet.

**Asmodai** (az-mō'dī), or **Asmodeus**, an evil spirit, who, as related in the book of Tobit, slew seven husbands of Sara, daughter of Raguel, but was driven away into the uttermost parts of Egypt by the young Tobias under the direction of the angel Raphael. Asmodai signifies a desolator, a destroying angel. He is represented in the Talmud as the prince of demons who drove King Solomon from his kingdom.

**Asmonæans** (az-mōn-ē'ans), a family of high priests and princes who ruled over the Jews for about 130 years, from 153 B. C.,

## Asparagus

when Jonathan, son of Mattathias, the great-grandson of Chasmen or Asmonæus, was nominated to the high priesthood. They were also known as the Maccabees.

**Asmus, Georg** (äs'mös), a German poet, born at Giessen, Nov. 27, 1830; was employed as an engineer in 1854-1862; came to the United States to conduct some mining operations in the copper region of Lake Superior; then lived in New York until 1884, when he returned to Europe. Among the German population of the United States he had an enormous success with his "American Sketch-Booklet" (1875), an epistle in verse, written in Upper Hessian dialect and overflowing with delicious humor. It was followed by "New American Sketch-Booklet" (1876). Besides these he wrote "Camp Paradise" (1877), a story, and a collection of miscellaneous poems (1891). He died in Bonn, May 31, 1892.

**Asnyk, Adam** (as-nik), a Polish patriot and poet, born at Kalish, Sept. 11, 1838. He participated in the insurrection of 1863, for which he had to spend some years in exile in Germany. He is the author of "Poezye" (3 vols., 1872-1880), and several historical works. He died in Cracow, Aug. 2, 1897.

**Asoka**, an Indian sovereign, who reigned 255-223 B. C. over the whole of Northern Hindustan, grandson of Chandragupta or Sandracottus. He embraced Buddhism, and forced his subjects also to become converts. Many temples and topes still remaining are attributed to him.

**Asp**, or **Aspic**, the kind of serpent peculiar to Egypt and Libya, which has obtained great celebrity from having been chosen by Cleopatra to give her an easy death. Its poison is so quick and deadly in its operation that it kills without a possibility of applying any remedy. It is believed to have been the *naia haje*. It is the same genus as the cobra capello but differs in having the neck less wide, and having the color greenish, bordered with brown. It is probably the asp (*aspis*) of the New Testament (Rom. iii: 13), and the asp (*pethen*) of the Old (Deut. xxxii: 33; Job xx: 14, 16; Isa. xi: 8). The common asp or chersæa (*vipera aspis*) is olive above, with four rows of black spots. Its poison is severe. It is common in Sweden and some other parts of Europe.

**Asparagus**, a plant of the order *liliaceæ*, the young shoots of which, cut as they are emerging from the ground, are a favorite culinary vegetable. In Greece, and especially in the southern steppes of Russia and Poland, it is found in profusion; and its edible qualities were esteemed by the ancients. It is mostly boiled and served without admixture, and eaten with butter and salt. It is usually raised from seed; and the plants should remain three years in the ground before they are cut; after which, for



## Aspasia

10 or 12 years, they will continue to afford a regular annual supply. The beds are protected by straw or litter in winter. Its diu-



ASPARAGUS.

(a) Upper end of a stem, showing leaves, etc.;  
(b) young shoot.

retic properties are ascribed to the presence of a crystalline substance found also in the potato, lettuce, etc.

**Aspasia** (as-pā'zē-a), a celebrated Grecian, belonging to a family of some note in Miletus, and was early distinguished for her graces of mind and person. She went to Athens after the Persian War, and, by her beauty and accomplishments soon attracted the attention of the leading men of that city. She engaged the affections of Pericles, who is said to have divorced his former wife in order to marry her. Their union was harmonious throughout; he preserved for her to the end of his life the same tenderness;



ASPASIA.

she remained the confidant of the statesman's schemes, and the sharer of his struggles. Their house was the resort of the wisdom and wit of Athens. Orators, poets and philosophers came to listen to the eloquence of Aspasia; and in their conversation, which turned upon the politics, literature, and metaphysics of the age, they deferred to her authority. Plato

says that she formed the best speakers of her time, and, chief among them, Pericles himself. The sage Socrates was a frequent visitor at her salons,

## Aspern

drawn thither, it is insinuated, by the double attraction of eloquence and beauty. Anaxagoras, Phidias and Alcibiades were also numbered among her admirers. The envy which assailed the administration of Pericles was unsparing in its attacks on his mistress. Jealousy of foreigners, and dislike of female influence, combined to offend the prejudices of the masses. Her fearless speculation aroused their superstitious zeal. She shared the impeachment, and narrowly escaped the fate, of her friend Anaxagoras. She was accused by Hermippus of disloyalty to the gods, and of introducing free women into her house to gratify the impure tastes of Pericles. He himself pleaded her cause triumphantly, and Aspasia was acquitted. She survived Pericles some years, and is reported to have married an obscure Athenian, Lysicles, whom she raised by her example and precept to be one of the leaders of the republic.

**Aspen**, a tree, the *populus tremula* or trembling poplar. The leaves are nearly orbicular, and are bluntly sinuate-toothed. They soon become glabrous on both sides. The tremulous movement of the leaves which exists in all the poplars, but culminates in the aspen, mainly arises from the length and slender character of the petiole or leaf-stalk, and from its being much and laterally compressed.

**Aspen**, city and county-seat of Pitkin co., Col., on the Roaring Fork of Grand river, and the Atchison, Topeka and Sante Fé, and the Denver and Rio Grande railroads; 30 miles W. of Leadville. It became a mining camp in 1880; was incorporated in 1883; and has since become the center of one of the richest mining sections in the country. In the city and vicinity are more than 20 mines, for which there are a number of gold, silver, copper and lead ore mills. While the smelting and concentrating of ores is the distinctive industry, the city has several minor factories, and it is also the principal mining trade center of the Roaring Fork Valley. Pop. (1890) 5,108; (1900) 3,303.

**Aspendos**, or **Aspendus**, a city of Pamphylia, Asia Minor, in ancient geography, on the Eurymedon river. It contains one of the best preserved Roman theaters. There is also an ancient aqueduct built in a long range of arches.

**Aspergillus**, the brush used in Roman Catholic churches for sprinkling holy water on the people. It is said to have been originally made of hyssop.

**Aspern**, a small village of Austria, on the Danube, about 2 miles from Vienna. Here, and in the neighboring village of Esslingen, were fought the tremendous battles of the 21st and 22d of May, 1809, between the French grand army, commanded



## Asphalt

by Napoleon, and the Austrians under the Archduke Charles. The French, after this continuous fighting, with vast loss to both sides, were obliged to retreat, and occupy the island of Lobau.

**Asphalt**, or **Asphaltum**, the most common variety of bitumen; also called mineral pitch. Asphalt is a compact, glossy, brittle, black or brown mineral, which breaks with a polished fracture, melts easily with a strong pitchy odor when heated, and when pure burns without leaving any ashes. It is found in the earth in many parts of Asia, Europe and the United States, and in a soft or liquid state on the surface of the Dead Sea, which, from its circumference, was called Asphaltites. It is of organic origin, the asphalt of the great Pitch Lake of Trinidad being derived from bituminous shales, containing vegetable remains in the process of transformation. Asphalt is produced artificially in making coal gas. During the process, much tarry matter is evolved and collected in retorts. If this be distilled, naphtha and other volatile matters escape, and asphalt is left behind.

What is known as asphalt rock is a limestone impregnated with bitumen, found in large quantities in Switzerland, France, Alsace, Hanover, Holstein, Sicily, and other parts of Europe, and in the United States, the purest forms taking the names of elaterite, gilsonite, albertite, maltha, brea, etc. In the trade there is wide distinction between these and the sandstones, and limestones impregnated with bitumen, which are known as bituminous or asphaltic limestone, sandstone, etc. The latter are usually shipped without being previously treated or refined, and are used principally in street paving. This class is known to the trade as bituminous rock, and of its entire product California yields about 90 per cent. In 1908, the production of asphalt in its various forms was 185,382 short tons, valued at \$1,888,881, of which oil asphalt yielded 102,281 short tons, valued at \$1,322,616. The productive States, with values, were: California, \$1,347,257; Texas, \$350,440; Utah, \$100,324; Kentucky, \$67,040; and Oklahoma, \$23,820.

**Asphodel**, the English name of the plants belonging to the genus *asphodelus*. The yellow and white species were introduced into this country during the 16th century — the former about the year 1596, and the latter in 1551. Immense tracts of land in Apulia are covered with white asphodel, which affords good nourishment to sheep. The asphodels, being sacred to Proserpine, were used in classic times in funeral ceremonies, and the souls of the departed were supposed by the poets to wander in meadows adorned with these beautiful flowers.

In botany, a genus of plants belonging to the order *liliaceæ* and the section *anthericeæ*. About eight species are familiar, the

## Aspidium

best known being *A. luteus*, the yellow; *A. albus*, the white; and *A. ramosus*, the branched lily, or asphodel, called also king's



WHITE ASPHODEL.

rod. To this family belong the garlic, the hyacinth, the squill, and the Star of Bethlehem.

**Asphyxia**, suspended animation; an interruption of the arterialization of the blood, causing the suspension of sensation and voluntary motion. It may be produced by breathing some gas incapable of furnishing oxygen, by submersion under water, by suffocation, from an impediment to breathing applied to the mouth and nostrils, by strangulation, or by great pressure, external or internal, upon the lungs. If asphyxia continue unrelieved for a short period, it is necessarily followed by death.

**Aspidium**, a genus of ferns belonging to the order *polypodiaceæ*. The sori are roundish, and the involucre covering them orbicular or kidney-shaped. There are 10 British species. Some have orbicular reniform involucre fixed by their sinuses, while others have orbicular and peltate involucre. To the former, sometimes called *lastrea*, belong the *A. filix mas*, or blunt; the *A. spiculolum*, or prickly toothed; the *A. oreopteris*, or heath; and the *A. thelypteris*, or marsh shield fern, with other species more rare; and to the latter, the *A. lonchitis*, or rough alpine; the *A. lobatum*, or close leaved prickly; the *A. aculeatum*, or soft prickly; and the *A. angulare*, or angular leaved shield fern.



**Aspinwall**, or **Colon**, a town in the Republic of Panama, at the Atlantic end of the Panama railway (1849-1855), and of the American Panama Canal (see article on PANAMA), on the island of Manzanilla, in Limon Bay, 8 miles N.E. of the old Spanish port of Chagres, 47 miles N. W. of Panama by rail, and equidistant from the great trading capitals of Valparaiso and San Francisco. From its commanding position as a place of transit, Aspinwall benefits by the traffic in both directions. The climate, formerly very unhealthy, has been greatly improved by drainage. In 1870 the Empress Eugénie presented the town with a statue of Columbus, after whom it is named officially Colon. The name Aspinwall is derived from a New York merchant, the originator of the Panama railway; the company having founded the town in 1850. It was burned by insurgents in 1885.

**Aspinwall, William**, an American physician, born in Brookline, Mass., May 23, 1743; was graduated at Harvard University in 1764; studied medicine in Philadelphia; was a volunteer in the fight at Lexington; and afterward became surgeon in the Revolutionary army, having partial charge of the military hospital at Jamaica Plains. After the war, he became deeply interested in the subject of vaccination, and, building a smallpox hospital at Brookline, established that remedy in American practice. He died April 16, 1823.

**Aspinwall, William H.**, an American merchant, born in New York city, Dec. 16, 1807; was trained to commercial business by his uncles, and became a member of the firm of Howland & Aspinwall in 1837. He is best remembered as the chief promoter of the Panama railroad, and of the Pacific Mail Steamship Company. The eastern terminus of the railroad was named in his honor, but has since officially been given the name of Colon. He died in New York city, Jan. 18, 1875.

**Aspirator**, an instrument invented by Dieulafoy, of France, in 1869, and used in chemistry to draw gases through bottles or other receptacles. It is a tight vessel containing water; a tube with a stop cock extends from the upper end and another tube also with a stop cock from the lower end. The first tube is fastened to the receptacle from which gas is to be drawn; both stop cocks are opened, and the water flowing from the lower tube acts as a suction and draws the gas. It is also the name of a modern appliance which firemen attach to their faces to prevent suffocation from smoke while working at large fires.

**Aspis**, or **Clupea**, an ancient city of the Carthaginians, on the Mediterranean Sea, about 50 miles E. of the city of Carthage. It was founded about 310 B. C., and was a place of much importance, because of its

large and accessible harbor, which was strongly fortified. Here Manlius and Regulus landed in the first Punic War, and in the third one it sustained a determined siege. The place is mentioned in the records of the Julian Civil War. From 411 to 646 A. D., it was an Episcopal see, and it was the last place where the Christians resisted the Moslems.

**Asplenium**, a genus of ferns, of the natural order *polypodiaceæ*. Several are natives of the United States.

**Aspromonte**, a mountain of Italy, in the S. W. of Calabria, where Garibaldi was taken prisoner in August, 1862.

**Asquith, Herbert Henry**, an English statesman, born in Morley, Sept. 12, 1852; was educated at Oxford University, became a barrister at Lincoln's Inn in 1876, and a queen's counsel in 1890; was secretary of state for the Home Department, 1892-95; ecclesiastical commissioner in 1892-95. Entering Parliament in 1886, he became a conspicuous figure in the Home Rule debates, and his subsequent activities kept him prominently before the British public. In 1908 he succeeded Sir H. Campbell-Bannerman as Liberal prime minister.

**Ass** (*asinus*), a genus of *perissodactyla* closely related to the horse. It differs from the latter in having short hair at the root of the tail and a long tuft at the end, in the absence of warts on the hind legs, and in the persistence of stripes, except in albinos. The upright mane, the long ears, the cross stripe on the shoulders, and the dark bands on the back, are also characteristic. The domestication took place at an early date, probably before that of the horse, from a type like the present Abyssinian ass (*A. taniopus*), and apparently in Asia; but the donkey has been common in England only since Queen Elizabeth's time. The dwarfing and degeneration so generally exhibited are the results rather of ill-treatment and careless breeding than of congenial climate, as the condition of the domesticated forms in some favorable parts of the East plainly indicates. In Arabia, Syria, Egypt, Spain, Kentucky, and elsewhere, the asses are well cared for, and the breed has been considerably varied and improved; a Spanish he-ass of a good breed may be worth \$1,000. In Great Britain not a little improvement has been due to the kindly interest of the late Lord Shaftesbury. The stupidity for which the animal has for long been proverbially reproached seems largely the result of human influence. The male ass is capable of procreation at two years old; the female carries her foal 11 months. The mule is a hybrid bred between mare and male ass; while the hinny is the rarer result of hybridism between horse and female ass. The mule is much nearer in temper and appearance to the ass



than to the horse; the hinny in some points resembles the horse more, as it neighs, while the mule brays like the ass. The ass is admirably adapted for a beast of burden, being remarkable for endurance, hardiness, and docility under kind treatment. The peculiar pace, the quaint intelligence, often superior in spite of ill-usage to that of the horse, curious traits of character, such as the aversion to cross water, which is probably an unconscious recollection of ancestral nomadic life, the longevity and general hardiness, are facts as familiar as the names donkey, dicky, neddy, cuddy, etc., of these useful animals.

The various species of wild asses are handsomer in form than the familiar degenerate donkey. They have shorter ears, and longer, finer limbs. The shy, swift *A. onager* occurs in herds in the Asiatic deserts, migrating southward in winter. The large, handsome *A. hemionus*, with dark stripes on its back, inhabits high plateaus from Tibet to Mongolia. The Abyssinian form has been already noted as the probable ancestor of the donkey. The even wilder zebras and quaggas will be discussed separately. The wild ass is hunted in the East — *e. g.*, in Persia; and the flesh of the hardly-won booty is much esteemed. The milk of the ass is more sugary and less cheesy than that of the cow, and is on that account recommended to some invalids — *e. g.*, consumptives. The leather called shagreen is made by a peculiar process from the skin, which is also utilized for shoes and drums. The ancients are said to have used the bones for making flutes. From early times, white (albino) asses were reserved for the use of the honored.

**Assab Bay**, an Italian trading station on the W. coast of the Red Sea, 40 miles N. W. of the Strait of Bab-el-Mandeb. The district around it, with an area of 243 square miles, and 1,300 inhabitants, was sold in 1870 by some Danakil chieftains to an Italian steamship company for a coaling station on the road to India. In 1880 it was taken over by the Italian Government, who, since 1884, have improved the harbor and erected a lighthouse.

**Assal**, a large salt lake in the district of Adal, in Eastern Africa, nearly 9 miles from the coast of the Bay of Tadjurrah. It is nearly 600 feet below the level of the sea. Abyssinian caravans resort to Assal for the purpose of carrying off the salt, which is thickly incrusting on its shores.

**Assam**, a province at the N. E. extremity of British India, stretching in N. lat. between 23° and 28°, and in E. long. between 89° and 97°, with an area of 46,341 square miles. In 1874 it was formed into a separate administration (including Cachar) under a chief commissioner. It consists of a fertile series of valleys, watered by the Brahmaputra and more than 60 les-

ser rivers. It is thus very fertile, and abounds in wood. The tea-plant is indigenous, and some believe that the *thea assamiensis* is the original of the Chinese plant. Since 1840, when its commercial cultivation was begun, 600,000 acres have been taken up for tea; in 1882 there were over 1,000 gardens. Some three-fourths of the tea grown in India is the produce of Assam: and, between 1875 and 1895, the total exports of Indian tea increased from 25,000,000 pounds to near 120,000,000 pounds. Coolies are imported from Western Bengal for the work in the tea gardens. The other products are rice, mustard, gold, ivory, amber, musk, iron, lead, petroleum, and coal. From Bengal, the principal imports are woollens, India fabrics, salt, opium, glass, earthenware, tobacco, betel, etc. For want of population, scarcely a fourth of the fertile area is cultivated. There is railway and steamboat communication with Calcutta. The development of the rich coal-fields is of increasing importance; the annual output is now over 170,000 tons.

In 1826, at the close of the first Burmese war, Assam was ceded to the British. The upper portion of the province, however, was conferred, as a separate principality, on the native Rajah, whom the Burmese had expelled; and it was only in 1838, that, in consequence of his misgovernment, the entire country was placed under British administration. Since then, the province has exhibited a noticeable improvement. The population being rural and agricultural, the only towns of any size are Gauhati (12,000) and Sebsagar (6,000). The peasantry are indolent, good-natured, and fairly prosperous, short and robust in person, with a flat face and high cheek-bones, and coarse, black hair. A majority of the people are Hindus. In 1883 there were 1,500 educational institutions, with an attendance of 50,000 pupils. One of the most striking features of Assam is the abundance of wild animals, such as tigers, rhinoceroses, leopards, bears, buffaloes, and elephants. The snakes are the most destructive to human life. Some 400 people are killed every year by wild animals, for whose destruction about \$5,000 is yearly paid as a reward. The forests teem with game, and the rivers with fish. Pop. (1891) 5,476,833; (1901) 6,122,201.

**Assas, Nicolas, Chevalier d'** (äs-ä'), a French officer, celebrated for an act of patriotism which cost him his life, was captain in the regiment of Auvergne when the French army was stationed near Gueldres, in 1760. On Oct. 15, while engaged in reconnoitering, he was taken prisoner by a division of the enemy advancing to surprise the French camp, and was threatened with death if a word escaped him. He shouted, "*A moi, Auvergne, voila les ennemis!*" and was instantly struck down. An annual pension was allowed to his descendants.



# Assassination

**Assassination**, the act of taking the life of anyone by surprise or treacherous violence, either by a hired emissary, by one devoted to the deed, or by one who has taken the task upon himself. Generally, the term is applied to the murder of a public personage by one who aims solely at the death of his victim. In ancient times, assassination was not unknown, and was often even applauded, as in the Scriptural instances of Ehud and Jael, and in the murder of Hipparchus by Harmodius and Aristogeiton; but assassination by enthusiasts and men devoted to an idea first became really prominent in the religious struggles of the 16th and 17th centuries. To this class belong the plots against the life of Queen Elizabeth; while the horrible succession of assassinations of Roman emperors is simply a series of murders prompted by self-interest or revenge. Omitting these last, which are noted elsewhere, the following list includes the most important assassinations.

|  |                        |      |
|--|------------------------|------|
| Julius Cæsar .....   | Mar. 15, B. C.         | 44   |
| Thomas Becket....  | Dec. 29, A. D.         | 1170 |
| Albert I., Emperor of Germany.....                                     | May 1,                 | 1308 |
| James I., of Scotland .....  | Feb. 21,               | 1437 |
| Alessandro de Medici.....  | Jan. 5,                | 1537 |
| Cardinal Beaton.....   | May 29,                | 1546 |
| David Riccio.....  | Mar. 9,                | 1565 |
| Lord Darnley.....  | Feb. 10,               | 1567 |
| James, Earl of Murray, Regent.....                                     | Jan. 23,               | 1570 |
| William of Orange .....  | July 10,               | 1584 |
| Henry III., of France.....   | Aug 1-2,               | 1589 |
| Henry IV., of France .....   | May 14,                | 1610 |
| Villiers, Duke of Buckingham.....                                      | Aug 23,                | 1628 |
| Wallenstein .....  | Feb. 25,               | 1634 |
| Archbishop Sharp.....  | May 3,                 | 1679 |
| Gustavus III., of Sweden. Mar. 16; died                                | Mar. 20,               | 1792 |
| Marat, by Charlotte Corday.....  | July 13,               | 1793 |
| General Kleber, at Cairo.....  | June 14,               | 1800 |
| Paul, Czar of Russia .....   | Mar. 24,               | 1801 |
| Spencer Perceval, premier.....   | May 11,                | 1812 |
| Kotzebue, the dramatist.....   | Mar. 23,               | 1819 |
| Duc de Berri.....  | Feb. 13,               | 1820 |
| Charles III., Duke of Parma, Mar. 26; died.....                        | Mar. 27,               | 1854 |
| President Abraham Lincoln, April 14; died .....                        | April 15,              | 1865 |
| Michael, Prince of Servia.....   | June 10,               | 1868 |
| Marshal Prim .....   | Dec. 28; died Dec. 30, | 1870 |
| Georges Darboy, Archbishop of Paris.                                   | May 24,                | 1871 |
| Earl of Mayo, governor-general of India.....                           | Feb. 8,                | 1872 |
| Sultan Abdul-Aziz.....   | June 4,                | 1876 |
| Alexander II., Czar of Russia.....                                     | Mar. 13,               | 1881 |
| President James Abraham Garfield, July 2; died. ....                   | Sept. 19,              | 1881 |
| Lord Frederick Cavendish and T. H. Burke, in Phoenix Park, Dublin .... | May 6,                 | 1882 |
| President Sadi Carnot, France.   | June 24,               | 1894 |
| Ex-Premier Stefan Stambuloff, Bulgaria, July 15; died ..               | July 18,               | 1895 |
| Premier Canovas del Castillo, Spain.                                   | April 22,              | 1897 |
| President Juan Idiarte. Uruguay....                                    | Aug. 25,               | 1897 |
| Empress Elizabeth of Austria, in Geneva.....                           | Sept. 10,              | 1898 |
| President Ulysses Heureaux, Santo Domingo..                            | July 26,               | 1899 |
| King Humbert, of Italy .....   | July 29,               | 1900 |
| President McKinley, shot Sept. 6; died .....                           | Sept 14,               | 1901 |
| King and Queen of Servia.....  | June 10,               | 1903 |
| King and Crown Prince, Portugal ...                                    | Feb. 1,                | 1908 |

# Assassins

In the foregoing list, no mention is made of plots or attacks ending in failure. Several of those who fell had previously escaped more than once. The "Assassination Plot," in English history, was a conspiracy by some Jacobites to murder William III. in 1696. It is doubtful whether Louis XIV. and James II. were privy to the scheme; the chief conspirator was Sir George Barclay. The King was to have been assassinated at Turnham Green, on his return from a hunting-party; but one of the 40 conspirators sent word to the King, the hunting was postponed, a number of the conspirators were arrested, and nine of them executed. A catalogue of unsuccessful attempts at assassination would be too long for insertion here; but the most important within the last hundred years have been directed as follows: Against Alexander III., of Russia, repeatedly; Alfonso XII., of Spain, 1878 and 1879; Amadeus of Spain, 1872; Duc d'Aumale, 1841; Prince Bismarck, 1866 and 1874; Francis Joseph, of Austria, 1853; George III., of England, 1786 and 1800; George IV. (when Regent), 1817; Humbert I., of Italy, 1878 and 1897; Isabella II., of Spain, 1847, 1852, and 1856; Louis Philippe, six attempts, from 1835 to 1846; Lord Lytton, Viceroy of India, 1878; Napoleon I., by infernal machine, 1800; Napoleon III., twice in 1855, and Orsini's attempt in 1858; Queen Victoria, June 10, 1840, May 30, 1842, July 3, 1842, May 19, 1849, and March 2, 1882; William I., of Germany, 1861, 1875, and twice in 1878; Presidents Diaz, of Mexico, and Morales, of Brazil, both in 1897; the Prince of Wales, in 1900; King Alphonso, of Spain, and his bride, in 1906; and William J. Gaynor, Mayor of New York City, in 1910.

**Assassins**, or **Ismaili**, a sect of religious fanatics who existed in the 11th and 12th centuries. They derived their name of assassins originally from their immoderate use of *hasheesh*, which produces an intense cerebral excitement, often amounting to fury. Their founder and law giver was Hassan-ben-Sabah, to whom the Orientals gave the name of Sheikh-el-Jobelz, but who was better known in Europe as the "Old Man of the Mountain;" he was a wily impostor, who made fanatical and implicit slaves of his devotees, by imbuing them with a religion compounded of that of the Christians, the Jews, the Magi, and the Mohammedans, The principal article of their belief was that the Holy Ghost was embodied in their chief, and that his orders proceeded from the Deity, and were declarations of the divine will. They believed assassination to be meritorious when sanctioned by his command, and courted danger and death in the execution of his orders. In the time of the crusades, they mustered to the number of



## Assault

50,000. So great was the power of the Sheikh, that the sovereigns of every quarter of the globe secretly pensioned him; and Philip Augustus, King of France, hearing that the Sheikh had ordered his assassination, instituted a new bodyguard, distinguished for their courage and activity, called *sergens d'armes*, who were armed with bows and arrows and brass clubs; and he himself never ventured in public without a club loaded with gold or iron. The Knights Templars alone dared bid defiance to this terrible and subtle foe. Among their victims was Conrad, Marquis of Montferrat, who was murdered in the market-place at Tyre, in 1192, although some historians have attributed the crime to Richard Cœur de Lion. For a long time this fearful sect reigned in Persia, and on Mt. Lebanon. Holagoo, or Hulaka, a Mogul Tartar, in 1254, dispossessed them of several of their strongholds; but it was not till some years after that they were extirpated partially by the Egyptian forces sent against them by the great Sultan Bibars. A feeble residue of the Ismaili, from whom proceeded the Druses, about A. D. 1020, has survived in Persia and Syria. The Syrian Ismaili dwell around Mesiodé, W. of Hamah, and on Lebanon; they are under Turkish dominion, with a sheik of their own, and formerly enjoyed a productive and flourishing agriculture and commerce. Since the war with the Nassarians, 1809–1810, they have dragged out a miserable existence, but are commended by modern travelers for their hospitality, frugality, gentleness, and piety.

**Assault**, in military language, a furious effort to carry a fortified post, camp, or fortress, where the assailants do not screen themselves by any works. It is the appropriate termination of a siege which has not led to the capitulation of the garrison. To give an assault: To attack any post. To repulse an assault: To cause the assailants to retreat; to beat them back. To carry by assault: To gain a post by storm.

In fencing, an assault of arms, is an attack on each other (not in earnest), made by two fencers to exhibit or increase their skill. (Sometimes it is used in a wider sense for other military exercises.)

In law, an assault is a movement which virtually implies a threat to strike one, as when a person raises his hand or his cane in a menacing manner, or strikes at another but misses him. It is not needful to touch one to constitute an assault. When a blow actually takes effect, the crime is not simple assault, but assault and battery. A person assaulting another may be prosecuted by him for the civil injury, and may also be punished by the criminal law for the injury done to the public.

**Assaying**, the estimation of the amount of pure metal, and especially of the precious

## Assay Offices

metals in an ore or alloy. In the case of silver, the assay is either by the dry or by the wet process. The dry process is called cupellation, from the use of a small and very porous cup, called a cupel, formed of well burned and finely ground bone ash made into a paste with water. The cupel, being thoroughly dried, is placed in a fire clay oven about the size of a drain tile, with a flat sole and arched roof, and with slits at the sides to admit air. This oven, called a muffle, is set in a furnace, and when it is at a red heat the assay, consisting of a small weighted portion of the alloy wrapped in sheet lead, is laid upon the cupel. The heat causes the lead to volatilize or combine with the other metals, and to sink with them into the cupel, leaving a bright globule of pure metallic silver, which gives the amount of silver in the alloy operated upon. In the wet process, the alloy is dissolved in nitric acid, and to the solution are added measured quantities of a solution of common salt of known strength, which precipitates chloride of silver. The operation is concluded when no further precipitate is obtained on the addition of the salt solution, and the quantity of silver is calculated from the amount of salt solution used. An alloy of gold is first cupelled with lead as above, with the addition of three parts of silver for every one of gold. After the cupellation is finished, the alloy of gold and silver is beaten and rolled out into a thin plate, which is curled up by the fingers into a little spiral, or cornet. This is put into a flask with nitric acid, which dissolves away the silver and leaves the cornet dark and brittle. After washing with water, the cornet is boiled with stronger nitric acid to remove the last traces of silver, well washed, and then allowed to drop into a small crucible, in which it is heated, and then it is weighed. The assay of gold, therefore, consists of two parts: cupellation, by which inferior metals (except silver) are removed; and quartation, by which the added silver and any silver originally present are got rid of. The quantity of silver added has to be regulated to about three times that of the gold. If it be more, the cornet breaks up; if it be less, the gold protects small quantities of the silver from the action of the acid. Where, as in some gold manufactured articles, these methods of assay cannot be applied, a streak is drawn with the article upon a touchstone, consisting of coarse-grained Lydian quartz, saturated with bituminous matter, or of black basalt. The practiced assayer will detect approximately the richness of the gold from the color of the streak, which may be further subjected to an acid test. The Goldsmith's Company, of London, is the statutory assay master of England.

**Assay Offices**, in the United States, government establishments in which citizens



## Assay Offices

may deposit gold and silver bullion, receiving in return its value, less charges. The offices are in New York city; Boise City, Ida; Helena, Mont.; Denver, Col.; Seattle, Wash.; San Francisco, Cal.; Charlotte, N. C.; and St. Louis, Mo.

The Assay Office in New York was established by law in 1853, and was opened in the autumn of 1854. The first assayer of the New York Assay Office was Dr. John Torrey, of Columbia College, who was appointed in 1854 and held his position till 1873. On his death he was succeeded by his son, Herbert Gray Torrey, who has been in the office for 40 years. The superintendent of the Assay Office is Andrew Mason, who was appointed to his present position in 1883, having previously been assistant-assayer and melter and refiner. While holding the latter office he substituted the use of sulphuric for nitric acid in the refining process, thus saving this one Assay Office \$100,000 per annum.

The United States Assay Office is in a low modest-looking marble building located beside the more imposing Sub-Treasury building at the intersection of Wall and Broad streets, which marks one of the most historic spots in the country, namely, the site of the old Federal Hall where Washington took the oath as first President of the United States. Although the building is small, yet it only masks a really large, inner building surrounded on all sides by office buildings and the Sub-Treasury. The Assay Offices, and particularly this one, have an important position in the world of finance, for here the precious metals—gold and silver—in all forms and conditions of fineness are assayed and refined. In brief, the work of this office consists in assaying or determining the value of gold and silver, in whatever form presented, as coin, jewelry, or in any other shape. Any one wishing to have gold or silver assayed in quantity or wishing to sell to the government, may present his property at the Assay Office, where he may have the metal reduced and made into bars, or if he prefers, he may sell his bullion to the government. The charge for doing the work is merely nominal, and is based on the actual cost. Millions of dollars are stored at all times in the vaults. When the metal is received, the first step consists in weighing the coin, bars, jewelry, or tableware. This is done with great exactness and a receipt is given. Each person's holdings are placed in a box and are taken to the melting room, where they are placed in crucibles with a flux and smelted and cast in ingot molds, the pouring being a highly picturesque operation. A small chip is taken from the bar for assay.

The chip is taken to the assay room, where a hydraulic press reduces the sample to a size which permits of it being run through drawing rollers, so that the sam-

## Assay Offices

ple may be cut from the ribbon with the weight of one gram. This is placed in a small unglazed earthen cup termed a cupel, and a known quantity of silver, copper, and lead is added before firing, for the following reasons: The function of the lead, which is in the form of a thin sheet, is twofold; first, it serves as an envelope to hold the particles of bullion, silver, and copper together, while melting, and the lead also oxidizes freely, dissolving the copper oxide and making it possible for both oxides to be absorbed by the porous body of the cupel. Silver is added so that the proportion of silver in the sample of bullion shall be approximately two of silver to one of gold, and that in the subsequent acid bath the gold shall not surround or mask the silver so as to prevent it from dissolving. In cooling, the button which remains in the cupel after firing is apt to spurt up, thus wasting a portion of its weight and destroying the value of the assay. The lead oxide assists the copper oxide to be absorbed by the cupel. The cupel and its contents are now placed in a muffle furnace, and heated for a period sufficient to insure complete melting. If there be any copper or lead present in the sample, they will become alloyed with the copper and lead added by the assayer, and will become oxidized and absorbed. The gold and silver, together with the known quantity of silver which has been added by the Assay Office, remain in the cupel in the form of a button. Each button is placed in a special tray which keeps each sample by itself and is then flattened and rolled, boiled in nitric acid, 32° Baume, for 10 minutes, and then in fresh acid for 10 minutes more. The silver is dissolved by the acid, forming silver nitrate, while the gold remains intact because only nitro-hydrochloric acid, so-called "aqua regia," dissolves it. Gold is left in the flask and is washed and weighed. The loss of weight in the furnace is base metal—lead and copper. The loss of weight in the nitric acid is silver, and the remainder is gold. In the case of silver bullion it is subjected to the humid test as well.

So far the government has been acting as an assayer, but if the depositor wishes to part with his bullion, which is now of known value, the government pays for it at the prevailing price and proceeds to separate or part the gold from the silver. The price of gold never varies, costing \$20.67 a fine ounce. Silver fluctuates with the market.

The importance of the Assay Office in its relation to the financial world, the Treasury and the Mint cannot be overestimated. During the fiscal year ending June 30, 1900, the fineness of 11,802 melts of gold and silver deposits, 993 melts of fine gold



and silver, also 1,050 melts of mixed metal, about 500 special deposits, 350 barrels of sweeps, 83,178 gold and silver bars were estimated, and about 60,000 cupels and the necessary "proof" gold and silver were made.

**Assegai**, a spear used as a weapon among the Kaffirs of South Africa, made of hard wood tipped with iron, and used for throwing or thrusting.

**Assemani**. (1) JOSEPH SIMON, a famous Orientalist, born of a Maronite family at Tripoli, in Syria, in 1687. After completing his studies at Rome, he traveled on the Pope's commission through Egypt and Syria, collecting many oriental manuscripts and coins for the Vatican library, of which he was appointed keeper. He died at Rome, Jan. 14, 1768. Of his numerous learned works, the most important is his "*Bibliotheca Orientalis Clementino-Vaticana*" (4 vols., Rome, 1719-1728), containing the Syrian manuscripts of the Vatican. He was succeeded as keeper of the Vatican library by his nephew. (2) STEPHEN EPHODIUS (1707-1782), also a learned author of books on Oriental learning. Yet another nephew and Orientalist was (3) JOSEPH ALOYSIUS (1710-1782), professor at Rome. (4) SIMON, a relative of the preceding, was born at Tripoli in 1752, filled the chair of Oriental Languages at Padua, and died there, April 8, 1821. One of the greatest Orientalists of his time, he wrote an important work on ancient coins, "*Museo Cufico Naniano Illustrato*" (2 vols., Padua, 1787-1788).

**Assembly, Constituent**. See ASSEMBLY, NATIONAL.

**Assembly, General**, official name of the supreme ecclesiastical court of the Established Church of Scotland, of the Free Church of Scotland, of the Presbyterian Church in Ireland, and of the two Presbyterian Churches in the United States. The term is also used in the United States to designate the dual legislative body of the several States, the branches being commonly spoken of as the Senate and the House (of Representatives).

**Assembly, National**, a body set up in France on the eve of the Revolution. Upon the convocation of the States-General by Louis XVI., the privileged nobles and clergy refused to deliberate in the same chamber with the commons, or *tiers-état* (third estate). The latter, therefore, on the proposition of the Abbé Siéyès, constituted themselves an *Assemblée Nationale*, with legislative powers (June 17, 1789). They bound themselves by oath not to separate until they had furnished France with a constitution, and the court was compelled to give its assent. In the 3,250 decrees passed by the Assembly were laid the foundations of

a new epoch, and having accomplished this task, it dissolved itself, Sept. 30, 1791. The term is also applied to a joint meeting of the Senate and Corps Legislatif, for the purpose of electing a chief magistrate or the transaction of other extraordinary business.

**Assent, The Royal**, is the approbation given by the sovereign in Parliament to a bill which has passed both Houses, after which it becomes a law. It may either be done in person, when the sovereign goes to the House of Peers and the assent (in Norman French) is declared by the clerk of Parliament; or it may be done by letters-patent under the Great Seal, signed by the sovereign. In the United States, executive assent is given when the President approves an act of Congress by signing an especially prepared copy of it, or a Governor does the same with an act of a State Legislature. In all cases an act is not deemed a law till it has received executive approval, excepting when the enacting body readopts an act after it has been vetoed or disapproved by the executive.

**Asser, John**, a learned British ecclesiastic, originally a monk of St. David's, distinguished as the instructor, companion, and biographer of Alfred the Great, who appointed him abbot of two or three different monasteries, and finally Bishop of Sherborne, where he died in 908 or 910. His life of Alfred, written in Latin ("*Annales Rerum Gestarum Ælfredi Magni*"), is of very great value, though its authenticity has been questioned. There is an English translation in Bohn's "Antiquarian Library."

**Assets** (French, *assez*, enough), property or goods available for the payment of a bankrupt or deceased person's obligations. Assets are personal or real, the former comprising all goods, chattels, etc., devolving upon the executor as salable to discharge debts and legacies. In commerce and bankruptcy the term is often used as the antithesis of liabilities, to designate the stock in trade and entire property of an individual or an association.

**Assideans, Chasideans, or Chasidim**, one of the two great sects into which, after the Babylonish captivity, the Jews were divided with regard to the observance of the law — the Chasidim accepting it in its later developments, the Zadikim professing adherence only to the law as given by Moses. From the Chasidim sprang the Pharisees, Talmudists, Rabbinites, Cabbalists, etc.

**Assiento** (as-yen'to), the permission of the Spanish Government to a foreign nation to import negro slaves from Africa into the Spanish colonies in America, for a limited time, on payment of certain duties. It was accorded to the Netherlands about 1552, to



the Genoese in 1580, and to the French Guinea Company (afterward the Assiento Company), in 1702. In 1713 the celebrated Assiento treaty with Britain for 30 years was concluded at Utrecht. By this contract the British obtained the right to send yearly a ship of 500 tons, with all sorts of merchandise, to the Spanish colonies. This led to frequent abuses and contraband trade; acts of violence followed, and in 1739 a war broke out between the two powers. At the peace of Aix-la-Chapelle, in 1748, four years more were granted to the British; but in the Treaty of Madrid, two years later, £100,000 sterling were promised for the relinquishment of the two remaining years, and the contract was annulled.

**Assignats** (as-ē-nyä'), the name of the national paper currency in the time of the French Revolution. Assignats to the value of 400,000,000 francs were first struck off by the Constituent Assembly, with the approbation of the King, April 19, 1790, to be redeemed with the proceeds of the sale of the confiscated goods of the Church. On Aug. 27, of the same year, Mirabeau urged the issuing of 2,000,000,000 francs of new assignats, which caused a dispute in the Assembly. Vergasse and Dupont, who saw that the plan was an invention of Clavière for his own enrichment, particularly distinguished themselves as the opponents of the scheme. Mirabeau's exertions, however, were seconded by Péthion, and 800,000,000 francs more were issued. They were increased by degrees to 45,578,000,000, and their value rapidly declined. In the winter of 1792-1793 they lost 30 per cent., and in spite of the law to compel their acceptance at their nominal value, they continued to fall till in the spring of 1796 they had sunk to one three hundred and forty-fourth their nominal value. This depreciation was due partly to the want of confidence in the stability of the government, partly to the fact that the coarsely-executed and easily counterfeited assignats were forged in great numbers. They were withdrawn by the Directory from the currency, and at length redeemed by mandate at one-thirtieth of their nominal value.

**Assignee**, a person appointed by another to transact some business, or exercise some particular privilege or power. Formerly the persons appointed under a commission of bankruptcy, to manage the estate of the bankrupt on behalf of the creditors, were so called, but now trustees, or receivers.

**Assignment**, in law and commerce, the act of signing over to another, rights or property which have hitherto belonged to one's self. An assignment of estate is a transfer, or making over to another, of the right a person has in any estate. It is usually applied to an estate for life or years. It differs from a lease, for in a lease he

grants an interest less than his own, reserving to himself a reversion; while in an assignment he parts with the whole property, which from that time absolutely belongs to the assignee.

In the United States, assignment is of broader signification; it applies also to the transfer of real property by certain conveyance. In general, every right of property, real or personal, and every demand connected with a right of property, real or personal; and all choses in action, as bonds, notes, judgments, mortgages, debts, contracts, agreements, relating both to real and personal property, are assignable, and the assignment thereof will pass to the assignee a right of action in the name of such assignee against all parties liable to an action. Assignment carries with it all collateral securities held by the assignor for the collection of a debt or the fulfillment of a contract, and is subject to all the equities and charges which attached in the hands of the assignor. A personal trust, as the right of a master in his indentured apprentice, or the duties of a testamentary guardian, or the office of executor, trustee, etc., is not assignable. The validity of an assignment must be determined by the law of the State in which it was made, provided the thing assigned is subject of municipal or State law; but copyrights, patents, and government claims are governed by acts of Congress. In general, assignments should be recorded in the office prescribed by law, or are void as against those claiming under subsequent assignments. See BANKRUPTCY LAWS.

**Assiniboia**, the smallest of the four districts into which a portion of the Northwest Territories of Canada was divided in 1882. It lies immediately to the W. of Manitoba, with Saskatchewan and Alberta as its N. and W. boundaries. It is intersected by the Saskatchewan (South Branch) and the Qu'Appelle rivers, and contains much good wheat land. Some coal is mined. Area, 89,535 square miles. Pop. (1901) 67,385. Capital, Regina, on the Canadian Pacific railway, which intersects the district.

**Assiniboin**, a tribe of North American Indians, living principally in the N. W. part of the Dominion of Canada.

**Assiniboine**, a river of Canada, which flows through Manitoba and joins the Red river at Winnipeg, about 40 miles above the entrance of the latter into Lake Winnipeg, after a somewhat circuitous course of about 500 miles from the W. and N. W. Steamers ply on it for over 300 miles.

**Assisi** (as-sē'sē), a small town in Italy, in the Province of Umbria, 20 miles N. of Spoleto, the see of a bishop, and famous as the birthplace of St. Francis d'Assisi. The splendid church built over the chapel where



the saint received his first impulse to devotion is one of the finest remains of medieval Gothic architecture.

**Assizes**, a term chiefly used in England to signify the sessions of the courts held at Westminster prior to Magna Charta, but thereafter appointed by successive enactments to be held annually in every county. Twelve judges, who are members of the highest courts in England, twice in every year perform a circuit into all the counties into which the kingdom is divided (the counties being grouped into seven circuits), to hold these assizes, at which both civil and criminal cases are decided. Occasionally this circuit is performed a third time for the purpose of jail delivery. In London and Middlesex, instead of circuits, courts of *nisi prius* are held. At the assizes all the justices of the peace of the county are bound to attend. Special commissions of assize are granted for inquest into certain causes.

**Associated Press.** See PRESS ASSOCIATIONS.

**Association of Ideas**, a term used in psychology to comprise the conditions under which one idea is able to recall another to consciousness. Recently psychologists have been disposed to classify these conditions under two general heads: the law of contiguity and the law of resemblance. The first states the fact that mental states of any sort—actions, sensations, emotions, and ideas—which have occurred together, or in close succession, tend to suggest each other when any one of them is afterward presented to the mind. The second indicates that present actions, sensations, emotions, or ideas tend to recall their like from among previous experiences. Other laws have at times been enunciated, Aristotle having suggested contiguity, resemblance, and contrast; but they are reducible to these; thus, the “law of contrast or contrariety” is properly a case of continuity. On their physical side, the principles of association correspond with the physiological facts of re-excitation of the same nervous centers, and in this respect they have played an important part in the endeavor to place psychology upon a basis of positive science. The laws of association, taken in connection with the law of relativity, are held by many to be a complete exposition of the phenomena of intellect. A different point of view, which emphasizes APPERCEPTION (q. v.) reduces all cases of association to a mere general law of assimilation, according to which all conscious or nervous states having elements in common tend to flow together. J. MARK BALDWIN.

**Assollant, Alfred** (ä-sō-län'), a French novelist and political writer, born at Aubusson, March 20, 1827; taught for a number of years in Paris and other cities; then set out for America; and, having traveled

extensively over the United States, published, on his return, “Scenes From Life in the United States” (1858), a series of tales which attracted a good deal of attention. Among his numerous novels are “Two Friends in 1792” (1859), a story of the Reign of Terror; “Branças” (1859), a picture of the corruption under Louis Philippe; “Gabrielle de Chênevert” (1865), portraying the provincial nobility before the Revolution; “Pendragon” (1881), and “Plantagenet” (1885). He died in Paris, March 4, 1886.

**Assonance**, in poetry, a term used when the terminating words of lines have the same vowel sound, but make no proper rhyme. Such verses, having what we should consider false rhymes, are regularly employed in Spanish poetry; but cases are not wanting in leading British poets. Mrs. Browning not only used them frequently, but justified the use of them.

**Assos**, a ruined town on the Gulf of Edremid, from the still imposing remains of which the successful excavations, in 1881–1883, of the American Institute of Archæology have brought to light the agora, with Senate house and colonnade, a bath, theater, gymnasium, statues of heroes, and seven Christian churches.

**Assouan** (as-ö-än'), (also ESWAN; the ancient Syene), is the southernmost city of Egypt proper, on the right bank of the Nile, and beside the first or lowest cataract. Near are the islands of Philæ and Elephantine. On the left bank are catacombs. There are some remains of the ancient city, as granite columns and part of a temple. In the neighborhood are the famous granite quarries from which so many of the huge obelisks and colossal statues were cut to adorn the temples and palaces of ancient Egypt. A great dam and reservoir were completed here in 1902. Pop. about 4,000.

**Assumpsit**, a verbal promise made by anyone, or which he may in justice be held to have more or less directly made. In the former case, the assumpsit or promise is said to be explicit, and in the latter, implied. One may actually promise to pay a sum of money or build a house by a certain day, in which case the promise is deemed explicit, and an action lies against him if he violate his verbal engagement. Certain contracts are, however, so important that the law requires them to be in writing. Implied promises are such as the following: A person, when in want of certain articles, is in the habit of obtaining them at a certain shop. Having done so, it is not legally competent for him to turn around on the shopman and say, “Prove that I ever promised to pay for the articles I received.” The law rightly judges that if there was not an explicit, there was at least an implied, promise to pay for the goods,



else the shopman would not have given them. So, also, if a person contract to build a house, and, erecting it in defiance of the principle of gravity, see it tumble to pieces before his eyes, he is not allowed to plead that he knew nothing of building. His having taken the contract is held to imply that he gave himself out as competent to perform the work which he undertook to do.

**Assumption of the Virgin**, the subject of a number of paintings by the most celebrated artists in history. The following are the best known: (1) Titian: in the Accademia in Venice; represents the Virgin being carried on bright clouds to heaven, surrounded by rejoicing angels, while the apostles look up from earth in amazement; (2) Titian: another painting in the Cathedral of Verona; (3) Correggio: frescoes in the cupola of the Cathedral in Parma, Italy; (4) Rubens: painting in the Cathedral at Antwerp, Belgium; representing the Virgin being carried up to heaven, surrounded by angels, while several apostles and women are gathered at the empty tomb below; (5) Perugino: in the Accademia, in Florence; showing, in addition to the Virgin, four saints in the foreground; the representation of the Virgin is considered one of Perugino's most beautiful figures; (6) Guido Reni: a large canvas in Bridgewater House, in London; (7) Gaudenzio Ferrari: fresco in the Church of San Cristoforo, in Vercelli, Italy; showing figures of the Father, the Virgin, the angels, and the apostles; (8) Murillo: painting in the Hermitage Museum, St. Petersburg; representing the Virgin floating upward on clouds, with bands of cherubs above and below her; considered a typical display of the painter's qualities of grace and expression; (9) Guercino: a painting, also in the Hermitage Museum; showing the Virgin, with uplifted face, being borne upward on a cloud, with angel attendants, and the apostles standing about her empty tomb.

**Assyria**, an ancient Semitic kingdom of Asia, the native name of which was Ashur or Asshur, and thus also called by the Hebrews. It was intersected by the middle course of the Tigris with its two affluents, the Upper Zab and the Lower Zab, and had the Armenian Mountains on the N. and Babylonia on the S. The area was fluctuating — at first small but, though it gradually increased, it probably never exceeded about 200,000 square miles; the surface was partly mountainous, hilly, or undulating, partly a portion of the fertile Mesopotamia plain. The numerous remains of ancient habitations show how thickly this vast flat must have once been peopled; but, under the Mohammedans, it became a mere wilderness. The Assyrian conquests during the 8th and 7th centuries B. c. enlarged its boundaries,

and at one time it included Babylonia, parts of Elam, Palestine, Egypt, parts of Arabia and Asia Minor. The chief cities of Assyria in the days of its prosperity were Asshur the most ancient, then Nineveh, the site of which is marked by mounds opposite Mosul (Nebi Yunus and Koyunjik), Calah or Kalakh (the modern Nimrud), Dur-Sargina (Khorsabad), and Arbela (Arbil). Lower down the Tigris exhibits a line of ruins from Telkrit to Bagdad. Light has been thrown on the history of Assyria by the decipherment of the inscriptions obtained by excavation. The assertion of the Bible that the early inhabitants of Assyria went from Babylon is in conformity with the traditions of later times, and with inscriptions on the disinterred Assyrian monuments. The country, probably some time before the 16th century B. c., became independent. At the end of the 14th century its king, Shalmaneser, is said to have founded the city of Calah; his son Tiglath-ninip conquered the whole of the valley of the Euphrates. The following five reigns



ASSYRIAN CAVALRY FIGHT.

were chiefly occupied by wars with the Babylonians. About 1120, a date fixed by Sennacherib, 705–681 B. c., Tiglath-pileser I., one of the greatest of the sovereigns of the first Assyrian monarchy, ascended the throne, and carried his conquests to the Mediterranean on the one side and to the Caspian and the Persian Gulf on the other. At his death ensued a period of decline, which lasted over 150 years.

*Era of Grandeur.*—Under Assur-nasir-pal, who reigned from 884 to 859 B. c., Assyria once more advanced to the position of the leading power in the world, his kingdom being greater in extent than that of Tiglath-pileser. The magnificent palaces, temples, and other buildings of his reign prove the advance of the nation in wealth, art, and luxury.

*History.*—In 859 Assur-nasir-pal was succeeded by his son Shalmaneser II. (860–824), who was the first Assyrian king to have relations with Israel, and whose annals are found inscribed on the famous Black Obelisk in the British Museum, and on the bulls and slabs from his palace at Calah. His career of conquest was equally successful. He reduced Babylon to a state of vassalage, and came into hostile contact with Benhadad and Hazael of Damascus, and



with Ahab, son of Omri, and Jehu of Israel, from whom he exacted tribute, as also from the kings of Tyre and Sidon. The old dynasty came to an end in the person of Assurnirari II., who was driven from the throne by a usurper, Tiglath-pileser III., in 745, after a struggle of some years. He was the first Assyrian king mentioned by the Hebrews, identical with Pul (II Kings, xv: 9). No sooner was this able ruler firmly seated on the throne than he made an expedition into Babylonia, followed by another to the East in 744. A year later he defeated the confederate princes of Armenia, Syria, etc., and, advancing against Syria, overthrew the ancient kingdoms of Damascus and Hamath, and in 733 he placed his vassal Hosea on the throne of Samaria. A protracted campaign in Media (737-735), another in Armenia, and the expedition into Syria mentioned in II Kings, xvi, are among the most important events of the latter years of his reign. The Assyrians appear in Syria in 734 or 733 as the allies of Ahaz, called Yahuhazi or Yanhaze by the Assyrian scribes. The result of this campaign was the siege of Damascus, and the ravaging of the kingdoms E. of the Jordan. The fall of Damascus, in 733, made Syria a province of the court of Nineveh, and the tribute-lists discovered by Sir Henry Layard at Nineveh show Carchemish, Damascus, Arpad, Arvad, Hamath, Tyre, Sidon and Samaria as contributing a regular sum to the national revenue. Having reduced the West to submission the Assyrian King now attacked Chaldea, and, after a severe war, commencing in 731 B. C., he defeated and slew Ukin-ziru, the Kinziros of the Canon of Ptolemy, and was proclaimed King of Sumir and Akkad, in 729 B. C. Tiglath-pileser carried the Assyrian arms from Lake Van on the N. to the Persian Gulf on the S., and from the confines of Susiana on the E. to the Nile on the W. He was, however, driven from his throne by Shalmaneser IV. (727), who blockaded Tyre for five years, invaded Israel, and besieged Samaria, but died before the city was reduced.

*Conquests under Sargon.*—His successor, Sargon (722-705), a usurper, claimed descent from the ancient Assyrian kings. After taking Samaria and leading over 27,000 people captive, he overthrew the combined forces of Elam (Susiana) and Babylon. He defeated the King of Hamath, who, with other princes, had revolted, took him prisoner, and flayed him alive; advanced through Philistia, and captured Ashdod; then, pushing southward, totally defeated the forces of Egypt and Gaza, at Raphia (719). The revolted Armenians had also more than once to be put down. In 710 Merodach-baladan was driven out of Babylonia by Sargon, after holding it for 12 years as an independent king, and being sup-

ported by the Kings of Egypt and Palestine; his allies were also crushed, Judah was overrun, and Ashdod leveled to the ground. Sargon afterward crossed over and took Cyprus, where he left an inscription telling of his expedition. He spent the latter years of his reign in building, in the midst of which he was murdered during a revolt of the soldiers in the new palace, in 705 B. C. Sennacher-ib at once had to take up arms against Merodach-baladan, who had again obtained possession of Babylon. In 701 fresh outbreaks in Syria led him in that direction (cf. Isa. xxxvi and xxxvii). He captured Sidon and Askelon, defeated Hezekiah and his Egyptian and Ethiopian allies, and forced him to pay tribute, after which he returned to Assyria to overawe the Babylonians, Elamites, and the northern hill tribes. A second expedition into Palestine is briefly recorded in II Kings, xix, where we are told that, as his army lay before Libnah, in one night the angel of Jehovah went out, and smote in the camp of the Assyrians 185,000 men (II Kings, xix: 35). In the Babylonian account, on Dec. 20, 681, he was murdered by his two sons, Adrammelech and Sharezer, but they were defeated by their brother Esar-haddon, who then mounted the throne. Esar-haddon took the title King of Sumer and Akkad. It may have been that during a temporary residence at Babylon Manasseh was brought there a prisoner, as related in II Chron. xxxiii: 11. A son of Merodach-baladan had attempted, during the period of anarchy, to seize the throne of Babylon, but, being defeated, he fled to Elam, where he was put to death by the Elamite King, who wished to preserve the friendship of the King of Assyria. The most important event of this reign was the conquest of Egypt, about 670. It was reduced to a state of vassalage; the Ethiopian ruler, Tirhakah, was driven out and the land was divided into 20 separate kingdoms, the rulers of which were the vassals of Esar-haddon. He associated the eldest of his four sons, Asshur-banipal, with him in the government of the kingdom (669), and, one year later, this prince (the Sardanapalus of the Greeks) became king.

*Beginning of the Decline.*—In 652 a general insurrection broke out, headed by Sam-mughes, governor of Babylonia, Assur-banipal's own brother, and including Babylonia, Egypt, Palestine, and Arabia. Egypt was the only power, however, which regained its independence; fire, sword and famine reduced the rest to submission. The rebellious prince burned himself in his palace with many of his followers. Egypt declared her independence, Syria was in revolt, Elam and the N. E. provinces refused tribute, and Kandalanu, the new Viceroy of Babylon, proclaimed himself King, while his successor, Nabopolassar, father of Nebuchadnezzar, openly threw off all sem-



blance of his allegiance and declared himself king. The year of Asshur-banipal's death, and the names of his successors, are not known. Ten of his sons were named Asshur-etil-elani and Sin-shar-iskun, but no definite statements regarding them can be made. The last syrian King was Esar-haddon II. (the Sarakos of Ctesias), in whose reign Babylon definitely threw off the Assyrian yoke. There are some tablets relating to this prince which show that during his rule the N. E. provinces were invaded by a powerful confederation of Aryan and Turanian tribes, Medes, Gimmerians, and Armenians, under the command of Cyaxares. The meager character of the inscriptions about this date, and the apparent number of claimants to the throne, indicate that after the death of Asshur-banipal a period of disruption and anarchy set in, followed, about 606 B. C., by the siege and destruction of Nineveh by the combined forces of Cyaxares and Nabopolassar. After this Assyria became a Median province. The Mespila mentioned by Xenophon, in his account of the "Retreat of the Ten Thousand," (Anabasis: 3, 4, 10), was probably the Musapbi of the inscriptions, "the lower town," the acropolis having been destroyed. The art remains found by explorers on the site indicate that it was occupied in Roman and Sassanian times. Assyria became a Median province in 606 B. C., and afterward, in conjunction with Babylonia, formed one of the satrapies of the Persian Empire. In 331 B. C., at Gaugamela, near Arbela, in Assyria, Alexander defeated Darius Codomannus. In 312 B. C. Assyria became part of the kingdom of the Seleucidæ, whose capital was Seleucia, on the Tigris. It was afterward subject to the Parthian kings, whose capital was Ctesiphon, and was more than once temporarily in possession of the Romans. When the Persian monarchy of the Sassanidæ, which succeeded that of the Parthians, was destroyed by the Mohammedans, Assyria was subject to the caliphs, whose seat was at Bagdad from 762 A. D. till 1258. It has been under the Ottoman Turks from 1638, at which period it was wrested from the Persians.

*People and Language.*—The Assyrians belonged to the northern branch of the Semitic family, a race of people who spread over the country and mingled with or supplanted the original inhabitants, while their language took the place of the Akkadian, the latter becoming a dead language. Their language differed little from the Babylonian, and both retained traces of the Akkadian. There are no records of the Assyrian language dating back earlier than the 19th century B. C. It continued to be written with the cuneiform or arrow-headed characters down to the 3d century B. C. The vocabulary has a close affinity with that of the Hebrew and Phœnician, while in the

full development of the richness of synonyms it approaches nearer to the Arabic. The predominant features of the Assyrian ethnic type are the Semitic, but modified by intermixture with Akkadian and other elements.

*Religion.*—The religion of Assyria, though essentially of Babylonian origin, was much simpler, and, although polytheistic in character, was free from the multitudinous pantheon of the more ancient empire. At the head of the pantheon was the god Assur, the national deity, always invoked first in the royal inscriptions and regarded as the divine founder of the nation. He is called the holy one, the glorious chief of the

gods. He was symbolically represented by a winged circle inclosing the figure of an archer. His name does not appear in the Chaldean creation tablet, unless it is the same as the Babylonian Anshar. The Assyrian pantheon contained two principal triads, with numerous minor deities: (1) The Nature triad, whose birth is described in the creation tablet — Anu, "the father of all the gods," "the Heaven;" Bel, or Marduk (Merodack) called "lord of the world;" Ea, one of the most important gods in the pantheon, "lord of the sea, of rivers and fountains," "lord of wisdom and knowledge." (2) The Celestial triad; this triad consisted of the moon god, Sin, called the "illuminator of earth," "the god of laws;" the sun god, Shamash, "the illuminator of heaven and earth," "the great judge of heaven and earth," "the god of light," "the driver away of evil," one of the gods most worshipped in the Assyrian pantheon; and Ramman, god of storms. Other deities were Istar, a powerful goddess with various attributes — the goddess of love and war; Ninip, god of hunting (the man-bull); Nergal, god of war (the man-lion); Nabu (Nebo) the god of learning. A number of spirits, good and evil, presided over the minor operations of nature. There were set forms of regulating the worship of all the gods and spirits, and prayers to each were inscribed on clay tablets with blanks for the names of the persons using them.



ASSYRIAN CUNEIFORM  
INSCRIPTION.



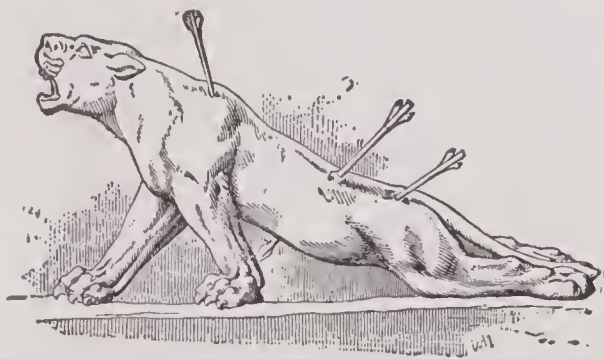
## Assyria

The morning and evening sacrifice, the offering of cakes, wines, milk, and honey, are found in the liturgies of the temple.



SCULPTURED WINGED BULL.

*Art and Industry.*—The Assyrians were far advanced in art and industry, and in civilization. They constructed large buildings, especially palaces, of an imposing character, the materials being burned or sun-dried brick, stone, alabaster, slabs for lining and adorning the walls internally and externally, and timber for pillars and roofs. These alabaster slabs were elaborately sculptured with designs serving to throw much light on the manners and customs of the people. A most characteristic feature of the palaces were gigantic figures

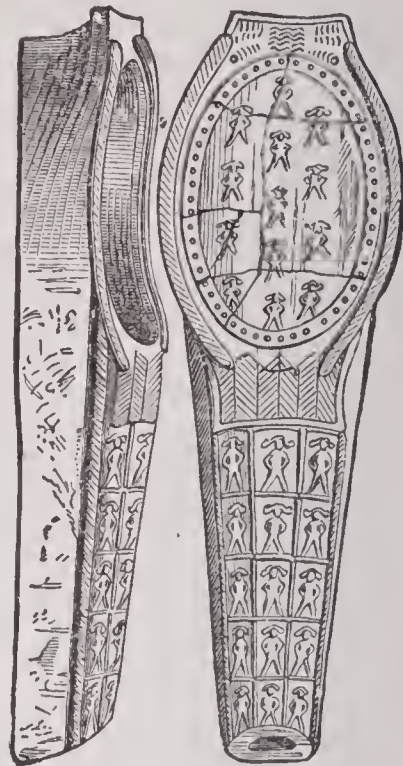


ASSYRIAN RELIEF SCULPTURE.

of winged, human headed, bulls, placed at gateways (often arched over) or other important points. Figures of lions were also similarly employed. The palaces were raised on high terraces, and often comprised a great number of apartments; there were no windows, light being obtained by carrying the walls up to a certain height and then raising on them pillars to support the roof and admit light and air. The Assyrian sculptures, as a rule, were in relief, figures in the full round being the exception. In many cases, however, as in those of winged bulls and other monsters, a com-

## Assyria

promise was attempted between the full round and relief, the heads being worked free and the body in relief, with an additional leg to meet the exigencies of different points of view. More than three-quarters of the reliefs are of warlike scenes; occasionally industrial scenes in connection with palace building are represented, and, less frequently, religious ceremonies. The artists had no conception of perspective. In hunting scenes an exceedingly high level of art is attained.



ASSYRIAN CLAY COFFIN.

The vestiges of Assyrian painting consist of fragments of stucco and glazed tiles, on which are bands of ornament, rows of rosettes and anthemions, woven strap-work, conventionalized mythic animals, and occasionally figures. In these traces of Egyptian influence are to be found, but the Assyrian figure type is, for the most part, of a more voluptuous and vigorous fullness than the Egyptian. The Assyrians understood and applied the arch; constructed tunnels, aqueducts, and drains; used the pulley, the lever, and the roller; engraved gems in a highly artistic way; understood the arts of inlaying, enameling, and overlaying with metals; manufactured porcelain, transparent and colored glass, and were acquainted with the lens; and possessed vases, jars, and other dishes, bronze and ivory ornaments, bells, gold earrings and bracelets of excellent design and workmanship. They had also silver ornamental work. Their household furniture also gives a high idea of their skill and taste.

*Assyrian Astronomy.*—The cities of Nineveh, Assur, and Arbela had each their royal observatories, superintended by astronomers-royal, who had to send in their reports to the king twice a month. At an early date the stars were numbered and named: a calendar was formed, in which the year was divided into 12 months (of 30 days each) called after the zodiacal signs, but, as this division was found to be incorrect, an intercalary month was added every six years. In every month there were five tabu days or days of restriction or prohibition, but the prohibitions were few and were not probably applied to all the people.



The Assyrians employed both the dial and the clepsydra. Eclipses were recorded from a very remote epoch, and their recurrence roughly determined. The principal astronomical work, called the "Illumination of Bel," was inscribed on more than 100 tablets, and which exists only in very fragmentary form, was a book of omens. It probably went through numerous editions, one of the latest being in the British Museum. It treats, among other things, of comets, the Polar star, the conjugation of the sun and moon, and the motions of Venus and Mars.

*Literature and Civilization.*—One of the most important results of the explorations has been the discovery in the palace of Asshur-banipal at Nineveh, of a large library consisting of many thousand tablets of baked clay inscribed with minute characters; large numbers of these are now stored in the British Museum. This library, in all probability, owes its origin to the keen political insight of Esar-haddon, but was completed by his son Asshur-banipal, whose name most of the tablets bear. In the libraries of Nineveh and other cities there are found many tablets in which Nabu (Nebo), the god of learning, and his consort, Tasmituv, are invoked and the epithets applied to him indicate that he was the Assyrian Hermes. He is called "the wise god," "the lord of illustrious birth," "the enlarger of the mind," "the writer of inscriptions." The tablets in this library were chiefly copied from more ancient originals in the temple libraries of Chaldea, each being stated to be "like its old copy," or "like the ancient tablets of Simir and Akkad." That such was the case is now demonstrated by the discovery of duplicate copies in the libraries of Babylonian cities. The library was evidently founded with some intention of preventing the youth of Assyria from going to be taught at Babylon or Borsippa, where they would be subjected to dangerous political influences, but literary feeling also had its part in collecting these works. Its educational character is shown by the discovery of a number of syllabaries, dictionaries, and text-books for instruction in the ancient Akkadian and Sumirian languages. These tablets, called by the Assyrians "tablets to be with him" (handbooks), were the class-books of the students in Nineveh, and have been the medium by which the decipherers have learned the older languages of Chaldea (Lernormant's "*Etudes Accadiennes*"). There have been found also works on mathematics, tables of square and cube roots, as well as lists of plants, metals, and precious stones, animals, and birds; records of eclipses and other astral phenomena, brief lists of laws and various contract tables.

The geographical works are limited to

lists of countries with their products, such as "Lebanon, cedar;" "Elam, horses;" "Cilicia, tin and silver," and "Arabia, camels." The section most prolific in discoveries has been that of poetic and mythological literature. In 1872 the late George Smith, of the British Museum, discovered a series of poetic legends relating to the great Chaldean hero Gilgamesh (Gizdubar, or Izdubar), the 11th tablet of which contained a legend of the deluge, very closely resembling the Hebrew account. This series of tablets was found to consist of 12 books of an epic poem, describing the labors of Gilgamesh; various episodes of his career are arranged according to the sun's passage through the signs of the Zodiac, the deluge tablet being the 11th, corresponding to the sign Aquarius. From three duplicate copies and numerous fragments, scholars have been able to obtain a nearly complete text of this important tablet, and the resemblance it bears to the Hebrew narrative is even more striking than was at first recognized. The flood is sent as a punishment for sin; the builder of the ark was called Parnapishtem, "offspring of life;" he gathers into the vessel all his male and female servants, and young men, and all the beasts of the field. The preparation of the ark occupies seven days, the rain lasts seven days, seven days are occupied in reaching the Mount Nizir (safety).

*Chronology.*—The chronology of the Assyrian empire now rests upon a firm basis, being founded on several carefully prepared chronological inscriptions. The most important of these is the "Eponym Canon," a tablet containing a list of the archons, or eponyms of Nineveh, or Calah, giving an exact chronology from 913–659 B. C. As each of these officials was in office only one year, the year was named after them; and, as the date of the Bursagalu is fixed by a solar eclipse, the dates of all the officials can be ascertained. Fragments of seven copies of it were discovered by Sir Henry Rawlinson in 1862. An historical inscription of Rimmonnirari I., dated on the side by the name of the eponym of the years, enables us to go back as far as 1330 B. C. A recent discovery has brought to light a table of Semitic Babylonian kings, arranged in dynasties, traced back as far as 2330 B. C. The dated contract tablets give us further help for the later dates. The parallel Assyrian inscriptions give much help in settling the chronology of Babylonia.

*Assyriology.*—The department which deals with Assyrian antiquities and history is entirely a modern study. Until 1842 the materials for Assyrian history were derived from the Jewish records of the Old Testament and from such comparatively late writers as Herodotus and Ktesias. In 1843–1846 M. Botta, the French consul at Mosul, made the first successful explorations at



Koyunjik and Khorsabad, and came upon the palace of Sargon, the objects thus obtained being transported to the Louvre. In 1845 and 1849, valuable researches were conducted by Ledyard at Nineveh, and copies of bas reliefs found were placed in the Boston Museum of Fine Arts, and elsewhere in the United States. The researches of Ledyard were subsequently continued by the government, and included George Smith's discoveries, above noted. More recently Mr. Rassam carried on the work of discovery. In the decipherment and translation of the cuneiform inscriptions among the most distinguished names are those of Sir Henry Rawlinson, H. Fox Talbot, George Smith, M. Jules Oppert, Dr. Schrader, Dr. Hincks, Prof. A. H. Sayce, Le Page Renouf, Prof. Terrien de la Couperie, Mr. Boscawen, Mr. Pinches, and Prof. Friedrich Delitzsch. Miss Catherine Wolfe paid the expenses of an American party to Babylon, led by the Rev. William Hayes Ward, D. D., the result of which are the purchased seals and tablets now in the Metropolitan Museum in New York. The expedition which the Germans sent to Babylon proved, by excavating an ancient Babylonian burial mound, that cremation was much employed. In the University of Pennsylvania are thousands of fragments and clay tablets which are the results of the excavations at Nippur (S. E. of Babylon), by Prof. John P. Peters, of Philadelphia, and Mr. Haynes, in 1889-1892. C. H. Toy.

**Astarte**, a genus of bivalve mollusks belonging to the family *cyprinidae*. They have 2-2 hinge teeth, and are suborbicular, compressed, thick, smooth, or concentrically furrowed shells. Tate estimated the recent species known at 20 and the fossil at 285. The former belong to the Temperate and Arctic zones, and the latter to the rocks from the Carboniferous formation upward. See also ASHTAROTH.

**Asten, Friedrich Emil von**, a German astronomer, born at Köln, 1842. From 1866, when he was graduated at the University of Bonn, and where he had the advantage of studying under the great Argelander, until 1870, he was best known as an assistant at the observatories of Bonn and Berlin, as computer on the "Berliner Jahrbuch," and as a private investigator in astronomical fields, into all of which work a remarkable degree of thoroughness and laborious research was thrown. His investigations related mostly to comets. In 1870 he went to the Imperial Russian Observatory at Pulkowa, and from then until his death in 1878 he turned out a prodigious amount of work as computer and original investigator. He will be best remembered for his work upon Encke's comet, the results of which were published in 1877, and included an elaborate discussion of all the ap-

pearances of this interesting body from 1819 to 1875.

**Aster**, a genus of plants, the type of the order *asteraceæ*, or composites. It is so called because the expanded flowers resemble stars. There is but one British species, the *A. tripolium*, sea starwort, or Michelmas daisy. In the United States these asters grow wild in the meadows and on the prairies. They grow to beautiful forms under cultivation. The popular name aster is applied to some species not of this genus. Thus the China aster is *callistephus chinensis*, and the Cape aster *agathæa amelloides*.

**Aster, Ernst Ludwig von**, a German military engineer, born in Dresden, Oct. 5, 1778. His first service was in the Saxon army. While there he attracted the attention of Napoleon by a plan for fortifying Torgau. Subsequently he entered the Russian service, and, soon after 1815, the Prussian. While in the last service he undertook the fortification of Coblenz and Ehrenbreitstein, and in 1842 was appointed General of Infantry and Inspector-General of all the Prussian fortresses. He died in Berlin, Feb. 10, 1855.

**Asteraceæ** (as-ter-as'ē-ī), formerly, an order, the fourth of five arranged under the alliance *compositæ*, or *asterales*, the others being *calyceraceæ*, *mutisiaceæ*, *cichoraceæ*, *asteraceæ*, and *cynaraceæ*. These, excluding *cynaraceæ*, constitute the *compositæ* proper. The term *asteraceæ* in this sense is called also *corymbifera*, and comprehends the larger portion of the modern *tubulifloræ*.

Now, it is a vast order, comprising the whole of the *compositæ* proper. It is placed by Lindley, in his "Vegetable Kingdom" (1846), as the last order of his campanales, or campanal alliance. It includes plants like the daisy, the thistle, the dandelion, and others, possessing what, to a superficial observer, appears like a calyx, but is in reality an involucre, surrounding a receptacle on which are situated not, as might at first sight appear, numerous petals, but many florets. Their calyxes very frequently take the form of pappus; the corollas are tubular, ligulate, or both; the stamina, four or five, syngenesious, that is, united by the anthers into a tube; their style simple; and the ovaries single, one-celled, with a solitary erect ovule. In 1846, Lindley estimated the known species at 9,000, placed in 1,005 genera. They are believed to constitute about one-tenth of the whole vegetable kingdom. They are everywhere diffused, but in different proportions in different countries; thus they constitute one-seventh of the flowering plants of France, and half those of tropical America. The order is divided into three sub-orders: (1) *tubulifloræ*; (2) *labiatifloræ*; and (3) *ligulifloræ*. All are bitter. For more specific in-



formation regarding their qualities see the sub-orders and some of the genera.

**Asteroids.** See PLANETIDS.

**Asterolepis**, a genus of ganoid fishes named on account of the starry color of its scales. A bone of a species belonging to this genus, found at Stromness, the capital of Orkney, suggested to Hugh Miller the writing of his beautiful volume entitled "Footprints of the Creator; or, the Asterolepis of Stromness." It was an elaborate argument against the development hypothesis. According to that hypothesis, the first species of any class appearing on the scene should be low in organization, and probably small in size. Mr. Miller showed that the asterolepis was large in size and high in organization, and yet it was at that time believed to be the oldest fossil vertebrate found in Scotland. His argument was subsequently weakened by the discovery that the Stromness rocks were less ancient than the Forfarshire beds, containing cephalaspis and other fish genera subsequently discovered, mostly of small size, though not of low organization.

**Asterophyllites** (-fl-ī'tez), a genus of cryptogamous plants, allied to calamites, belonging to the order *equisetaceæ*. All are fossil, and belong to the carboniferous period. Their name was given on account of the starry appearance of the verticillate foliage. Their stems were articulated and branched, and it is now known that the fossils termed *volkmannia* constituted their fructification.

**Asthma**, a chronic shortness of breath, from whatever cause it may arise. Till a comparatively recent period good medical writers used the term in this wide sense, and non-professional writers and the public do so still. Asthma, or spasmodic asthma, is "a difficulty of breathing, recurring in paroxysms, after intervals of comparatively good health, and usually accompanied by fever." It is most common in persons possessing the nervous temperament. After some precursory symptoms, it commences, often at night, with a paroxysm in which there is a great tightness and constriction of the chest. The patient breathes with a wheezing sound, and flings open the door or throws up the window in the effort to obtain more air. After a time the paroxysm passes away. Other fits of it probably succeed on subsequent days, but by no means with the regularity of intermittent fever. It is produced by a morbid contraction of the bronchial muscles. There are two leading varieties of the disease, a nervous and a catarrhal, the former of pure sympathetic and symptomatic forms, and the latter latent, humeral, and mucous chronic sub-varieties, besides an acute congestive, and an acute catarrhal, form.

**Asti** (as'tē) (*Asta Pompeia*), a city of Piedmont, Italy, in the Province of Alessandria, on the left bank of the Tanaro, 35 miles E. S. E. of Turin by rail. It is a large city, with walls considerably dilapidated, and the streets generally very narrow and irregular. It has a large Gothic cathedral, which was completed about 1348, and a royal college. There is carried on a considerable trade in silk and woolen fabrics, hats, leather, and agricultural produce. The *vino d'Asti*, a kind of Muscatel, is highly esteemed. The city is of high antiquity, having been famous for its pottery before its capture by the Gauls in 400 B. C. On the occasion of its being again taken and destroyed in an irruption of the Gauls, it was rebuilt by Pompey, and received the name of *Asta Pompeia*. In the Middle Ages, Asti was one of the most powerful republics of Upper Italy. It was captured and burned by the Emperor Frederick I. in 1155, and, after a series of vicissitudes, came into the possession of the Visconti of Naples; by them it was ceded to the French, in whose hands it remained till the middle of the 16th century, when the Dukes of Savoy acquired it. Alfieri was born here, 1749. Pop. over 17,000.

**Aston, William George**, an English author, born near Londonderry, in 1841; was educated at Queen's College, Belfast; became a student interpreter in Japan in 1864; interpreter and translator to the British Legation at Yedo, in 1870; assistant Japanese secretary at Yedo, in 1875-1882; Consul-General for Korea, in 1884; Japanese secretary at Tokio, in 1886; and was retired in 1889. He published "A Grammar of the Japanese Spoken Language," "A Grammar of the Japanese Written Language," "A Translation of the Nihongi; or, Annals of Ancient Japan," "History of Japanese Literature," etc.

**Astor, John Jacob**, an American merchant, born in Waldorf, Germany, July 17, 1763. In 1783 he came to the United States intending to engage in the selling of musical instruments; but while on the voyage was induced by a fellow passenger to engage in buying furs from the Indians and selling them to dealers. On reaching New York he entered the employ of a Quaker furrier, with whom he learned the details of the trade, and then began business on his own account. Soon afterward he became American agent for a London fur house, and, while arranging for his supplies, he opened the first wareroom for the sale of musical instruments in the United States. His success in the fur business led him to become the owner of a number of vessels, in which he shipped furs to London and brought merchandise therefrom. In furtherance of a scheme for becoming independent of the Hudson's Bay Company and



## Astor

establishing a thoroughly American system of fur trading, he sent out expeditions to open up intercourse with the Indians on the Pacific coast, by which the present city of Astoria at the mouth of the Columbia river in Oregon was planted in 1811. An interesting outline of his projects in this connection is given in Washington Irving's "Astoria." Mr. Astor acquired large wealth, invested heavily in real estate in New York city; and at his death left a fortune estimated at \$20,000,000, and the sum of \$400,000, with which to found a public library in New York city. He died March 29, 1848. See NEW YORK PUBLIC LIBRARY.

**Astor, John Jacob**, an American capitalist, born in Rhinebeck, N. Y., July 13, 1864; son of William, grandson of John Jacob, and cousin of William Waldorf Astor; was graduated at Harvard University in 1888; spent three years in European travel; and then became manager of the family estate. In 1897 he built the Astoria Hotel in New York, adjoining the Waldorf Hotel, which had been built by his cousin, and subsequently the two were united under the name of the Waldorf-Astoria Hotel, probably the most costly building of its kind in the world. He was appointed Colonel on the staff of Gov. Morton; was commissioned a Lieutenant-Colonel of Volunteers in May, 1898, and served on inspection and staff duty in the United States and Cuba till the surrender of Santiago. He presented the United States Government with a completely equipped mountain battery which cost over \$75,000, and which was sent to the Philippine Islands, and rendered the government valuable services in other directions during the war with Spain. He published "A Journey to Other Worlds; a Romance of the Future" (1894).

**Astor, William Backhouse**, an American capitalist, born in New York city, Sept. 19, 1792; eldest son of John Jacob Astor; was associated with his father in business; increased the family fortune to \$45,000,000; and gave \$550,000 to the Astor Library. He died in New York, Nov. 24, 1875.

**Astor, William Waldorf**, capitalist, born in New York city, March 31, 1848; received a private education; was admitted to the bar in 1875. He was elected to the New York Assembly in 1871, and to the Senate in 1879; was defeated for Congress in 1881, and was United States Minister to Italy in 1882-1885. On the death of his father, John Jacob Astor, in 1890, he became the head of the Astor family, and inherited a fortune said to aggregate \$100,000,000. He removed to England in 1890; became the owner of the "Pall Mall Gazette" and "Pall Mall Magazine;" and

## Astragalomancy

was naturalized a British subject on July 1, 1899. He published "Valentino" (1885), and "Sforza" (1889), both romances.

**Astoria, Ore.**, a city, port of entry, and county-seat of Clatsop Co., in the N. W. corner of the State, on the S. shore of the estuary by which the Columbia river enters the Pacific Ocean, and 9 miles from its mouth. The Astoria and Columbia River R. R. connects it with Portland, 101 miles S. E., while the 5 miles of water front is made available for ocean steamers by a jetty, which has opened a commodious channel. Foreign and coast lines of steamers are thus in constant traffic. Astoria was founded in 1811 as a fur-trading station by John Jacob Astor (*q. v.*). It was occupied by the English from 1813 to 1818 as Fort St. George, and, being in disputed territory, was not in American control until 1846; it was chartered in 1876. Its present trade is extensive salmon catching and canning, employing about \$2,000,000 capital, with an output of 15,000,000 cans annually. It has great can-factories, iron-works, lumber and flouring mills, breweries, etc., and is a point of export for large amounts of lumber and agricultural produce. Pop. (1900) 8,381; (1910) 9,599.

**Astor Place Riot**, a fatal affray which took place in New York City, May 10, 1854, in which the participants were the partisans of the actors, Edwin Forrest and William C. Macready. Twenty-two were killed and 36 wounded.

**Astræa** (as-trē'a), in Greek mythology, the daughter of Zeus and Themis, and goddess of justice. During the golden age she dwelt on earth, but on that age passing away she withdrew from the society of men and was placed among the stars, where she forms the constellation Virgo. The name was given to one of the asteroids, discovered in 1845. It revolves round the sun in 1,511.10 solar days, and is about 2½ times the distance of the earth from the sun.

**Astræidæ**, in zoölogy, a family of radiated animals belonging to the class *Polypi* and the order *Helianthoida*. It is especially to this family that the formation of coral reefs is to be attributed. It contains the genera *Astræa*, *Meandrina*, etc.

**Astragal**, in architecture, a small semi-circular molding, with a fillet beneath it, which surrounds a column in the form of a ring, separating the shaft from the capital.

**Astragalomancy** (Greek, *astragales*, in the plural = dice, and *manteia* = divination), a pretended divination performed by throwing down small dice with marks corresponding to letters of the alphabet, and observing what words they formed. It was



practiced in the temple of Hercules, in Achaia.

**Astragalus**, the upper bone of the foot, supporting the tibia; the huckle, ankle, or sling bone. It is a strong, irregularly-shaped bone, and is connected with the others by powerful ligaments.

**Astragalus**, a genus of papilionaceous plants, herbaceous or shrubby, and often spiny. *A. gummifer* yields gum tragacanth.

**Astrakhan** (as-tra-kan'), a Russian city, capital of the government of the same name, on an elevated island in the Volga, about 30 miles above its mouth in the Caspian, communicating with opposite banks of the river by numerous bridges. It is the seat of a Greek archbishop and has a large cathedral, as well as places of worship for Mohammedans, Armenians, etc. The manufactures are large and increasing, and the fisheries (sturgeon, etc.), very important. It is the chief port of the Caspian, and has regular steam communication with the principal towns on its shores. Pop. (1897) 113,001, composed of various races. The government has an area of 91,327 square miles. It consists almost entirely of two vast steppes, separated from each other by the Volga, and forming for the most part arid, sterile deserts. Pop. (1897) 994,775.

**Astrakhan**, a name given to sheep-skins with a curled woolly surface obtained from a variety of sheep found in Bokhara, Persia, and Syria; also a rough fabric with a pile in imitation of this.

**Astral Spirits.** The star (Greek, *astron*) and fire worship of the Eastern religions rested on the doctrine that every heavenly body is animated by a spirit, forming, as it were, its soul; this doctrine passed into the religio-physical theories of the Greeks and Jews, and even into the Christian world. In the demonology of the Middle Ages, astral spirits are conceived of sometimes as fallen angels, sometimes as souls of departed men, sometimes as spirits originating in fire and hovering between heaven, earth and hell, without belonging to any one of these provinces. Much curious lore was connected with this notion.

**Astringents**, substances which produce contraction and condensation of the muscular fiber: for instance, when applied to a bleeding wound they so contract the tissues as to stop the hemorrhage. The contraction thus produced is different from that effected by an ordinary stimulant, and from that caused by the administration of a tonic. They may be divided into (1) those which exert a tonic influence, as tannin combined with gallic acid; also sulphuric, acetic acids, etc.; (2) those which have a sedative effect, as the salts of lead; and (3) those which operate chemically, as chalk or other variety of carbonate of lime. Astringents are useful in various diseases,

**Astrolabe**, in its etymological sense, any instrument for taking the altitude of a star or other heavenly body, a definition which would include not merely the astrolabe properly so called, but also the sextant, the quadrant, the equatorial, the altitude and the azimuth circle, the theodolite, or any similar instrument. But, practically, the word is limited to the three following significations: (1) A planisphere, a stereographic projection of the sphere upon the plane of one of its great circles. This may be either the plane of the equator, in which case the eye is supposed to be at the Pole; or the plane of the meridian, in which case the eye is considered to be at the point of intersection of the equinoctial and the horizon. (2) An armillary sphere or any similar instrument. This type of astrolabe was in use among astronomers at least from the early part of the 2d century A. D., if not even from the 2d or 3d century B. C. (3) A graduated circle, with sights attached, in use early in the 18th century for taking the altitude of the heavenly bodies at sea. It was ultimately superseded by Hadley's quadrant, introduced to public notice about 1730.

**Astrology**, originally a discourse concerning the stars; subsequently the true science of astronomy; now the pseudo science which pretends to foretell future events by studying the position of the stars, and ascertaining their alleged influence upon human destiny. Natural astrology professes to predict changes in the weather from studying the stars and judicial or judiciary astrology to foretell events bearing on the destiny of individual human beings or the race of mankind generally.

In the infancy of the world, when the stars were assumed to be, as they seemed, sparkles of light, whose diminutiveness so markedly contrasted with the hugeness of the earth, it was a perfectly legitimate conjecture or hypothesis that one main function which the shining speck served in the economy of nature might be to influence human destinies. Hence, the Chinese, the Egyptians, the Chaldeans, the Romans, and most other ancient nations, with the honorable exception of the Greeks, became implicit believers in astrology. It was partly the cause and partly the effect of the prevalent worship of the heavenly bodies. The "star-gazers," sarcastically referred to by Isa. xlvii: 13, were evidently astrologers: so also were what are called in the margin "viewers of the heavens;" but the Hebrew word rendered "astrologers" in Dan. i: 20; ii: 2, 27; iv: 7; v: 7, is a much vaguer one, meaning those who practice incantations, without indicating what the character of these incantations may be. The later Jews, the Arabs, with other Mohammedan races, and the Christians in medieval Europe, were all great cultivators of astrology.



The ordinary method of procedure in the Middle Ages was to divide a globe or a planisphere into 12 portions by circles running from pole to pole, like those which now mark meridians of longitude. Each of the 12 spaces or intervals between these circles was called a "house" of heaven. The sun, the moon and the stars all pass once in 24 hours through the portion of heavens represented by the 12 "houses;" nowhere, however, except at the equator, are the same stars uniformly together in the same house. Every house has one of the heavenly bodies ruling over it as its lord.

The houses symbolize different advantages or disadvantages. The first is the house of life; the second, of riches; the third, of brethren; the fourth of parents; the fifth of children; the sixth, of health; the seventh, of marriage; the eighth, of death; the ninth, of religion; the tenth, of dignities; the eleventh, of friends; and the twelfth, of enemies. The houses vary in strength, the first one, that containing the part of the heavens about to rise, being the most powerful of all; it is called the ascendant. while the point of the ecliptic just rising is termed the horoscope. The important matter was to ascertain what house and star was in the ascendant at the moment of a person's birth, from which it was deemed possible to augur his fortune. It followed that all people born in the same part of the world at the same time ought to have had the same future, an allegation which experience decisively contradicted. Even apart from this, astrological predictions of all kinds had a fatal tendency to pass away without being fulfilled; and when, finally, it was discovered that the tiny-looking stars were suns like that irradiating our heavens, and the earth not the center of the universe, but only a planet revolving around another body, and itself much exceeded in size by several of its companions, every scientific mind in Europe felt itself unable any longer to believe in astrology, which has been in an increasingly languishing state since the middle of the 17th century. It still flourishes, however, in Asia and Africa.

**Astronomy**, the science that treats of all the heavenly bodies, including the earth, as related to them. It is the oldest of the sciences, and the mother of those generally called exact mathematics, geodesy and physics. The problems presented in the motions and forces of the solar system have taxed the powers of the ablest mathematical minds of all the ages, and have been the primary cause of the development of this powerful engine of investigation. The mission of astronomy in this direction is by no means ended. The development of a pure mathematical theory which shall fully represent the moon's motion is still a desidera-

tum, while the geodist must yet furnish a more exact value of the figure and dimensions of the earth to suit the demands of the astronomer as a base-line with which to measure the depths of space. In the opposite direction, likewise, the constantly increasing revelations of the spectroscope, in what has been called the new astronomy, are the spur of the brightest minds among the mathematical physicists and chemists to tell us what is an atom, and what is the nature of the motions and forces at play among the last divisible units of so-called matter.

Astronomy may to-day be broadly divided into two branches, mathematical and physical, and these are almost synonymous with two terms recently introduced, the old and the new astronomy, as defined by the statement that the old tells us where the heavenly bodies are, the new, what they are. This, of course, is a very incomplete statement of the whole scope of the old astronomy, which, has, moreover, told us something of what these bodies are so far as it could be revealed by inspection of their appearance in the field of the telescope. But this is very little compared with what the new has brought to light, by means of the spectroscope, polariscope, thermopile and bolometer. The characteristic feature of the instruments and methods of the new *versus* the old astronomy, is that the new deals with some special form of radiant energy, measuring or analyzing the vibrations transmitted throughout all space by means of the elastic medium called ether.

Under the two broad divisions stated above, mathematical astronomy would include the following divisions, which are not, however, mutually exclusive: Spherical astronomy, which treats of angles and directions on the celestial sphere; practical astronomy, treating of the instruments, methods of observation, and of calculation employed to get at the facts and data of astronomy; theoretical astronomy, which deals with the orbits, tables and ephemerides of the sun, moon, planets and comets, including the effect of their mutual attractions, and gravitational or mechanical astronomy, which treats of the forces (principally gravitation) at work in space and the motions resulting therefrom. This last was formerly called physical astronomy, but the name has been monopolized by the new astronomy within the last few decades, and must now be reserved for it. This second branch, likewise called astronomical physics and astro-physics, attempts to answer the question of what the heavenly bodies are, the nature and constitution of their interiors, surfaces, atmosphere, their temperatures and radiations, and the effect of these radiations upon other bodies, and all allied questions arising out of these. Its princi-



pal instrument, the spectroscope, has likewise furnished data otherwise unattainable in the field of mathematical astronomy, viz., the determination of the motion to or from us of the heavenly bodies by displacement of the lines of their spectra due to this motion.

*History.*—The Chinese, Hindus, Chaldæans, Egyptians, and Greeks investigated the heavens long before the Christian era. In China astronomy was intimately associated with State politics; the Indians, Chaldæans and Egyptians made it a matter of religion. The Greek historians attribute the earliest knowledge of astronomical science to the Chaldæans and Egyptians. They say that the former discovered the Saros or cycle of 223 lunations, nearly equal to 18 years, by which they predicted the return of previously observed eclipses and made use of other empirical cycles or periods. Aristotle had transmitted to him from Babylon, by order of Alexander the Great, a catalogue of eclipses observed during 1,903 years preceding the Macedonian conquest of that city. Ptolemy gives six of the eclipses from this catalogue, but the earliest does not extend further back than 720 B. C.

Thales (640 B. C.), the founder of the Ionic school, laid the foundation of Greek astronomy. The successors of Thales held opinions which, in many respects, are wonderfully in accordance with modern ideas. Anaximander, it is said, held that the earth moved about its own axis, and that the moon's light was reflected from the sun. To him is also attributed the belief in the plurality of worlds. Anaxagoras, who transferred the Ionic school from Miletus to Athens, is said to have offered a conjecture that the moon had hills and valleys.

*Pythagoras and his Successors.*—Pythagoras (500 B. C.) promulgated the true theory that the sun is the center of the planetary world, and that the earth revolves round it. But the views of Pythagoras met with little or no support from his successors until the time of Copernicus. Between Pythagoras and the advent of the Alexandrian school, nearly two centuries later, among the most prominent names in astronomical annals is that of Meton, who introduced the Metonic Cycle, consisting of 125 months of 30 days each, and of 100 of 29 days, making a period of 6,940 days, nearly equal to 19 solar years. This was accepted throughout Greece, and was engraved in golden letters in tablets of brass, whence the name Golden Number; and this has been the basis of the calendars of modern European nations.

To the Alexandrian school, owing its existence to the Ptolemies, we are indebted for the first systematic observations in astronomy. The Alexandrian system was inferior to the Pythagorean notions, but

it had the merit of being founded on a long and patient observation of phenomena, a principle which finally brought about its own destruction, while the previous theories were the result of pure hypothesis. The most interesting circumstances connected with the early history of the Alexandrian school are the attempts made to determine the distance of the earth from the sun and the magnitude of the terrestrial globe. Aristarchus of Samos, whom Humboldt called the pioneer of the Copernican system, was the author of an ingenious plan to ascertain the sun's distance by measuring the angle between the sun and the moon at the time when the moon is just half illuminated by the sun. Though correct in theory, the measurement of the angle was subject to such error that the distance deduced was far too small, though much nearer the truth than anything which had been taught up to that time.

Hipparchus of Bithynia (160-125 B. C.) was a theorist, a mathematician, and an observer. He catalogued no less than 1,081 stars. He discovered the precession of the equinoxes; he determined the mean motion as well as the inequality of the motion of the sun, and the length of the year; also the mean motion of the moon, her eccentricity, the equation of her center, and the inclination of her orbit; and he suspected the inequality afterward found by Ptolemy (the evection). After the death of Hipparchus, astronomy languished for nearly three centuries, no essential advance being made, though a few men are reported as making some observations, and the Roman calendar was reformed by Julius Caesar.

*Ptolemaic System.*—Ptolemy (130-150 A. D.), besides being a practical astronomer, was accomplished as a musician, a geographer, and a mathematician. His most important discovery in astronomy was the evection of the moon. He also was the first to point out the effect of refraction. He was the founder of the false system known by his name, and which was universally accepted as the true theory of the universe until the researches of Copernicus exploded it. The Ptolemaic system placed the earth, immovable, in the center of the universe, making the entire heavens revolve round it in the course of 24 hours. The work by which he is best known, however, is the collection and systematic arrangement of the ancient observations in his great work, the "*Megale Syntaxis*," which gives a complete *résumé* of the astronomical knowledge of the day. This work was translated into Arabic in the first part of the 9th century, and was called by the Arabs the "*Almagest*," and by this name it is known to-day in its various translations into Greek and Latin. The most important part of it is the seventh and eighth books, which con-



tain the catalogue of stars which bears Ptolemy's name, though it is only a compilation of the catalogue of Hipparchus with the positions brought up to the time of Ptolemy. These latter are in use to-day, though the gaps between them have been filled up in some cases by more modern asterisms. The advance of astronomy almost ceased after the death of Ptolemy, and his "Almagest," together with the false system of the universe which it taught, continued to be the recognized authority in Europe for the next 14 centuries.

*Arabian Astronomy.*—To the Arabs we owe the next advances in astronomy. They began making observations 762 A. D. For four centuries the Arabs prosecuted the study of the science assiduously. They had little capacity for speculation, and throughout held the Greek theories in superstitious reverence. The most illustrious of the Arabian school were Albategnus, or Al Batani (880 A. D.), who discovered the motion of the solar apogee, and who was also the first to make use of sines and versed sines instead of chords; and Ibn-Yunis (1000 A. D.), an excellent mathematician, who made observations of great importance in determining the disturbances and eccentricities of Jupiter and Saturn, and who was the first to use cotangents and sectants. Likewise, at about the same time, Abul Wefa discovered the third inequality in the moon's motion, the variation, and determined its amount. About four centuries later, in the first half of the 15th century, lived Ulugh Begh, a Tartar prince, who made important additions to astronomical knowledge.

The revival of astronomy in Europe may be said to have begun with George Purbach, who translated the "Almagest" at Vienna. His pupil, John Muller, translated into Latin the works of Ptolemy and the conics of Apollonius, built an observatory at Nuremberg, and equipped it with instruments of his own invention. He died in 1476. Nuremberg also produced John Werner, who first explained the method of finding the longitude at sea by measuring the distance between a fixed star and the moon, and who made other important astronomical determinations.

*Copernican Theory.*—Copernicus (1473–1543) exploded the Ptolemaic idea, and promulgated a correct theory. His system is in some part a revival of the opinions said to have been held by Pythagoras. It makes the sun the immovable center of the universe, around which all the planets revolve in concentric orbits, Mercury and Venus within the earth's orbit, and all other planets without it. He was broken down in body and mind when his work "On the Revolutions of the Heavenly Bodies" was brought to him in proof. He died May 24, 1543.

Decidedly the most industrious observer and eminent practical astronomer from the time of the Arabs to the latter half of the 16th century was Tycho Brahe (1546–1601). Tycho's system, which made the sun move round the earth, and all the other planets round the sun, explained all natural phenomena then observed equally well, while it must have appeared more probable than the crude, and, at that era, undemonstrable theories of Copernicus. He made the first table of refractions, and discovered the variation and annual equation of the moon, the inequalities of the motion of the nodes, and of the inclination of the lunar orbit. He also demonstrated that the region of the comets is far beyond the orbit of the moon, and he determined the positions of 777 stars with an accuracy far surpassing anything before done in that line.

Galileo Galilei was the contemporary of Kepler, and, as his discoveries were of a more popular character, he obtained a more immediate fame and reputation. In the interval between the great discoveries of Kepler and Galileo and those of Newton various astronomers made valuable additions to astronomical knowledge or invented new apparatus for observing the heavenly bodies. Perhaps the greatest of these was the invention of logarithms by Lord Napier. In 1603, John Bayer, of Augsburg, published his "Uranometria," or maps of the 48 constellations which had been handed down from Hipparchus through Ptolemy in the "Almagest," and, on these maps, he for the first time assigned to the individual stars the letters that are used to-day. The researches of Descartes gave a new help to mathematical analysis. Horrox observed the transit of Venus in 1639, the first ever seen by man.

The most accurate determinations of the positions of the heavenly bodies made without the help of the telescope were those of Hevelius, a rich citizen of Dantzic, who gave his life and wealth to astronomy, working steadily for more than 40 years. The catalogue of stars which bears his name, and by whose numbers in the different constellations the individual stars are still called to-day with the distinguishing letter "H," is the greatest of the results of his labors.

Newton's fame rests on his discovery of the law of gravitation, announced in the "Principia" in 1687. This discovery is perhaps the grandest effort of human genius of which we have any record. Newton also made the important discovery of the revolution of comets around the sun in conic sections, proved the earth's form to be that of an oblate spheroid, gave a theory of the moon and tides, invented fluxions and wrote on optics. While the foundations of gravitational astronomy were thus broadly laid by Newton, Flamsteed, the first



astronomer-royal at Greenwich, and Halley were greatly improving and extending the practical department of the science. To Flamsteed we are indebted for numerous observations on the fixed stars, on planets, satellites and comets, and for a catalogue of 2,884 stars. His "*Historia Cælestis*" formed an new area in sidereal astronomy. Dr. Halley, who succeeded Flamsteed as astronomer-royal, discovered the accelerated mean motion of the moon, and certain inequalities in Jupiter and Saturn, but he is most famed for his successful investigations into the motions and nature of comets. His successor was Dr. Bradley, who in the year of Newton's death, made the important discovery of the aberration of light, which furnishes the most conclusive proof we have of the earth's annual motion.

While Bradley was at work at Greenwich, at the middle of the 18th century, Lacaille, a celebrated French astronomer, undertook a voyage to the Cape of Good Hope to determine the sun's parallax, by observations of Mars and Venus simultaneously with similar ones in Europe, and to form a catalogue of southern circumpolar stars. In a single year and single-handed he observed the positions of over 10,000 stars and computed the places of 1,942 of them. The latter half of the 18th century was marked by the brilliant work of Sir William Herschel, who discovered the planet Uranus and its four satellites, and two additional satellites of Saturn; determined the direction of the motion of the solar system in space; resolved the Milky Way into countless myriads of stars, and opened up a boundless field of discovery and research among the nebulae and double and multiple stars. His success was due to his remarkable skill in polishing and figuring his own mirrors, by which he produced telescopes (reflectors) far more powerful than any in use before.

Many other lesser lights added to the brilliancy of the 18th century. Maskelyne perfected the method of reducing observations of lunar distances at sea for the determination of longitudes, and had tables of lunar distances first published in the British "*Nautical Almanac*." Delambre, besides a large amount of other exceedingly valuable work, left, in the six large quarto volumes of his "*Historie*," a monument of profound research into the history of astronomy, from the earliest days, giving an abstract of all the important publications that had ever been issued. Lalande observed the positions of by far the largest number of stars that had been catalogued up to the end of the 18th century. These were afterward reduced and published by Baily in a catalogue which contains over 47,000 star positions. Mayer, besides making a valuable catalogue of zodiacal stars at about the

same time as those of Bradley and Lacaille, perfected lunar tables which were for many years the most accurate in existence. The 18th and 19th centuries were astronomically connected by the work of Piazzini in the observatory established at Palermo in 1790, where he formed a catalogue of stars more accurately observed than any preceding him, with the exception of Bradley's, and where he ushered in the 19th century by discovering, on the night of Jan. 1, 1801, a new planet, the first of the numerous belt of planetoids between Mars and Jupiter.

*Modern Astronomy.*—Friedrich Wilhelm Bessel contributed more than any other to the solid advancement of the science in the 19th century. Bessel combined in an extraordinary degree the qualities of an able mathematician and a skillful observer. Before mentioning particularly any of the other prominent astronomers of the early part of the 19th century, the celebrated optician Fraunhofer, who contributed so much to their success, deserves special notice. In connection with his experiments on light for the further perfection of his lenses, Fraunhofer was led to the discovery of the host of lines of the solar spectrum, of which he counted 600 and mapped 324, and which are to-day known as the "Fraunhofer Lines."

Friedrich Georg Wilhelm Struve (1793–1864) rendered his name immortal by the accurate determination, with the 9½ inch Dorpat refractor, of the position-angles, distances, colors and relative brightness of 3,112 double and multiple stars, about 2,200 of which were new discoveries. Friedrich Wilhelm August Argelander (1799–1875) ranks next to Bessel among the great astronomers of the 19th century. A pupil of the latter, he thoroughly imbibed the ideas of exactitude in astronomical observations for which his great master was pre-eminent, and he carried them out in all his subsequent work. His first work was the observations, made while his observatory at Bonn was being completed, for the formation of the "*Uranometria Nova*," the accepted standard of stellar magnitudes. With the completion of the Bonn Observatory he took up the extension of Bessel's zone observations, northward, to within 10° of the Pole and southward to —31° of declination. He then took up, and, with the help of two or three assistants carried to completion, that prodigious work, the "*Bonner Durchmusterung*" (the "*Bonn Muster*" or "*Survey*," generally quoted as the "*D. M.*"), a complete catalogue, with accompanying maps, of all the stars down to the ninth magnitude, and many of the tenth, which are situated between —2° of declination and the North Pole, and containing in all more than 320,000 stars.

In the southern hemisphere little had



been done since Lacaille swept over its heavens in zones with his little  $\frac{1}{2}$ -inch telescope in 1751–1752. John F. W. Herschel (1792–1871), following in the footsteps of his father, who had so thoroughly explored the northern heavens, took advantage of this, and, in 1834, after eight years of work reviewing the work of the elder Herschel in England, he began at the Cape of Good Hope a similar survey of the southern heavens, using an 18-inch reflector of his own construction. With this, in the course of four years, he accumulated a vast store of material, in the way of new double and multiple stars, nebulae and star-clusters, photometric measures of stellar brightness, “soundings” or “star-gauges” in the Milky Way, to show the laws of the distribution of the stars in space, all of which form the starting point of our knowledge of the southern heavens in these respects, as the work of his father had been that of the northern. The work of Sir George Biddell Airy (1801–1892) next deserves attention. Appointed in 1835 to the directorship of the Royal Observatory of Greenwich, he first carried to completion the great work begun at his suggestion two years before—the complete reduction, on a uniform system, of all the Greenwich planetary observations from 1750 onward. The later years of his life were entirely absorbed in a struggle with that mountain of difficulties for all mathematicians: the theory of the moon’s motion.

The greatest event of the century was the discovery of the planet Neptune. The work of Lagrange and Laplace in the domain of gravitational astronomy was continued and vastly extended in the 19th century by several eminent mathematicians and astronomers, notably by Leverrier. His life was devoted to the perfection of the theory of the planetary motions. Adams, the equal sharer with him in the glory of the discovery of Neptune, has also made very important additions to our knowledge in the same field, and in the United States we have, in the persons of Simon Newcomb and George W. Hill, their worthy successors and collaborators. The amount of work which Newcomb published in the line of fundamental star places, the discussion of old eclipses and occultations, with their bearing on the theory of the moon’s motion, the motion of Mercury, etc., was prodigious. As superintendent of the “American Ephemeris and Nautical Almanac” he carried out a comprehensive revision of the whole system on a scale before unattempted. In this he was assisted by Hill, whose profound and thorough work in the realm of celestial mechanics was at once a model of mathematical elegance and of rigorous analysis.

The theory of the moon’s motion, or the

lunar theory, as it is generally called, has from the beginning attracted the attention of the ablest mathematical investigators, and is likely to do so for some generations to come, before its difficult problems shall have been settled. In the 19th century the names of Carlini, Damoiseau, Plana, Adams, Pierce, Newcomb and Hill are well known in connection with various parts of this work, but the two who stand out prominently before all others are Hansen and Delaunay. In various other branches of gravitational astronomy, several names deserve special mention. Olbers, besides being the discoverer of several comets and of the second and fourth planetoid, is best known for his development of the best method of computing cometary orbits. Encke, a pupil of Gauss, and a natural-born geometer and computer, developed the best methods of applying the method of least squares to computation, determined a value of the solar parallax, which stood a long time as giving the accepted value of 95,000,000 miles as the distance of the sun, but is best known for the discovery of the remarkably short period of the comet which bears his name, and which has given rise to so much discussion of the question of a resisting medium in space. This same work was continued by Friedrich Emil von Asten, after Encke’s death, and carried on by Backland, of Pulkova, since Von Asten’s death (Aug. 15, 1878).

*Recent Discoveries.*—Hall’s detection of the two minute and remarkable satellites of Mars ranks next to that of Neptune as the most brilliant of the century. It was not an accidental picking up of easily visible object in sweeps, but the result of a well planned and careful search at the most favorable time, the opposition of 1877, after the erection of the 26-inch refractor of the United States Naval Observatory. Hall also kept up systematically the observation of the difficult satellite systems of Saturn, Uranus, and Neptune after taking charge of the 26-inch Washington refractor, and in this, too, he was for some time alone, so that the future discussions of the motions and perturbations in these systems will rest almost entirely on his work as a starting-point. Next came the discovery of the fifth satellite of Jupiter, by Prof. Edward E. Barnard, of the Lick Observatory, Sept. 9, 1892. This was followed by the discovery, March 18, 1899, of the ninth satellite of Saturn, by Prof. William H. Pickering, of the Harvard Observatory.

The work done at Cordoba, in the Argentine Republic, by Dr. Benjamin Apthorp Gould and his assistants in 1870, must next be mentioned. Dr. Gould began the observations for a uranometry of the southern heavens, to include all stars down to the seventh magnitude. This great work con-



tains the names, positions, and magnitudes, to the nearest 10th, of 7,730 stars situated between— $10^{\circ}$  and the South Pole, and the magnitudes, to the nearest quarter, of more than 1,000 others, mostly companions of these, or situated in clusters, the joint light of which equaled a seventh magnitude star. The accompanying maps are a marvel of clearness and accuracy.

*The New Astronomy.*—The spectroscope has been the principal instrument of investigation in the new astronomy. After the work of Kirchhoff and Bunsen, the next important step was the investigation, with the diffraction spectroscope, by Angstrom and Thalen, of the formation of the so-called normal spectrum, in which the distances of the lines are proportional to their wave-lengths. The map of the solar spectrum constructed in this way has been the standard for the wave-lengths of the Fraunhofer lines, until within a very few years. The work of Rowland at the Johns Hopkins University, photographing directly the spectrum formed from his concave mirror-gratings (partly invented by him), has so far exceeded the Angstrom maps that the latter may now be considered displaced. The phenomena attending the solar eclipses and of comets offered a new field for the spectroscope, and in this a host of names at once claim attention, principal among which are those of Young, Hale, director of Yerkes, Keeler of Lick's, Vogel, Secchi, Huggins, Lockyer, Janssen, and Langley.

The simultaneous and independent discoveries by Lockyer and Janssen in connection with the Indian solar eclipse of August, 1868 (that the solar prominences, or hydrogen clouds surrounding the sun, can be studied at any time without the help of an eclipse), revolutionized the methods of studying that part of the sun's surroundings. To-day it is part of the duties of some of those who give their time principally to solar observation to map the fantastic-shaped clouds that rise from the base of the chromosphere. This work is generally done in the widened red line of hydrogen, the Fraunhofer "C." Tacchini, in Italy, became the most assiduous observer of these phenomena. We have also learned considerable as to atmospheres surrounding some of the planets from the investigations of Vogel in the spectra of the light reflected from them. The normal spectrum of sunlight is modified by the absorption in passing twice through the planet's atmosphere. Such differences from the solar spectrum indicate something as to the constitution of these atmospheres and their extent and density. The changes in the spectra of comets as they approach to, and recede from, the sun, are also very instructive and interesting.

Photometry, or the measurement of the

brightness of the different heavenly bodies, so far as its results are concerned, is properly classed under the new astronomy. It has, however, been employed from the earliest times, without instrumental assistance, in classifying the stars into a scale of magnitudes, and in later days in observation of the changes in the light of the variable stars. Argelander first placed it upon a firm basis in his investigations of variables, instituting the method of estimating small differences of brightness by steps, or grades, between two other stars, one brighter and the other fainter. As far as accuracy is concerned this method has not been much improved upon in any of the most modern ways of making the observations.

*Solar Investigations.*—There remains to be noticed the subject of the quantitative measurement of radiant energy in its various forms. It is one of the most interesting and important branches of the new astronomy. It includes the determination of the amount and the effects of the energy which we receive from the sun upon which all life and power upon the earth depend. Only its most important results can here be noticed, and these in the briefest way.

Sir John Herschel and Pouillet were the first to measure the amount of heat which we receive from the sun by noting the increase in the temperature of a given amount of water upon which a given beam of sunlight is allowed to fall for a certain time. Using various forms of equivalent apparatus, Waterston, Ericson, Secchi, Crova, Violle, Langley, and others have made different determinations of the so-called "solar-constant," or the amount of radiant energy which falls upon a square meter of surface at the upper limits of the atmosphere. Langley's result, determined in his expedition to Mount Whitney, is the most accurate, and makes this constant somewhere near 30 calories (a calorie being defined as the amount of heat that will raise the temperature of 1 kilogram of water from  $0^{\circ}$  to  $1^{\circ}$  C.). The principal difficulty connected with the work is the determination of the amount of solar radiation that is absorbed by the atmosphere of the earth. It was principally to investigate the amount and character of this that Langley's Mount Whitney expedition was undertaken. The result was the determination of the fact that our previous estimates of solar radiation were too small, and also that the atmosphere of the earth exercises a very marked selective absorption on radiations of different wave-length.

Pickering, Secchi, Vogel, and Langley have been the principal investigators in this field. Vogel measured the absorption of the different parts of the sun's disk for the different colors of light, and found, just



as in the case of the earth's atmosphere, that much more of the blue end of the spectrum is cut off at the edge of the sun than at the center. Young, in his work, "The Sun," after carefully weighing the results of these different observers, concludes that, according to the present state of our knowledge of the subject, if the solar atmosphere were removed, we should receive probably from two to five times as much light from it as at present, and this is as near as we can set the limit on account of the uncertainty as to the depth of the solar atmosphere and as to the law by which the absorption is governed. One of the most striking experiments in the measurement of the intrinsic brightness of the sun, and of the amount of heat that we receive from it as compared with that from terrestrial sources was made by Langley at Pittsburg in 1878. He compared the sun directly with the white-hot surface of molten steel in a Bessemer converter, a surface whose brightness is such that when a dazzling stream of molten iron is poured in front the iron appears "deep brown by comparison, presenting a contrast like that of dark coffee poured into a white cup." Yet the surface of the sun was shown to be, foot for foot, more than 5,000 times as bright as the surface of the molten steel, and this, too, through the smoky sky of Pittsburg, and with every advantage given to the steel in the comparison. At the same time observations with the thermopile showed that the surface of the sun was giving off, foot for foot, more than 87 times as much heat as the molten steel in the converter.

The most remarkable work of all in the domain of radiant energy has been that of Langley with his bolometer. By means of this instrument minute amounts of such radiations, which were entirely beyond the reach of all previous experiments, can be detected and accurately measured. With this instrument of his own invention Langley went into fields before untrodden. We are accustomed to think of bodies which radiate heat as hot. But with his delicate bolometer Langley was able to measure the amount of energy in the spectrum of melting ice as it radiated its heat to the colder surroundings of a Pittsburg winter's air. By a comparison with the spectrum of lunar radiations he found that the temperature of our satellite's surface, even under the two weeks' shining of the sun, is probably below that of freezing water.

*Further Progress.*—In summarizing the growth of astronomy during the 19th century, we enumerate the researches of Henderson, Winnecke, Brunnow, Gill, and Elkin in stellar parallax; the double-star discoveries and measures of Struve (Otto), Dawes, Dembowski, Burnham, and Stone; the discoveries of comets by Pons, Tuttle, Tempel,

Swift, Brooks, Barnard, and many others; the discovery and cataloguing of nebulae by Herschel, Lassell, Tempel, Swift, Stone, and Dreyer; the elaborate work of Carrington on sun spots and the positions of northern circumpolar stars; the charting of faint ecliptic stars by Chacornac, the Henry brothers, and especially Peters; Chandler's important work in variable stars and in variation of latitude; the work of Schmidt on various stars and in selenography; the discovery of difficult planetary satellites by Lassell and Bond; the spectroscopic researches of Young, Schuster, Draper, Thollon, and Lohse; the determinations of the velocity of light by Fizeau, Foucault, Michelson, and Newcomb; Gill's work upon the parallax of Mars and some of the asteroids; Elkin's thorough remeasurement of the position of the stars of the Pleiades with the heliometer; Darwin's investigation of the entirely new subject of the bearing of tidal friction upon the development of planetary and satellite systems and Stone's observations at the Cape, resulting in the formation of the "Cape Catalogue," which ranks next to the work of Gould in furnishing us exact positions of the stars of the southern heavens. Harkness' work upon the reduction of the American observations of the transit of Venus should also be noted.

*Instruments.*—The history of the progress of astronomy in the 19th century would be incomplete without a mention of the remarkable opticians and mechanics whose handiwork has made it possible. We have already mentioned Fraunhofer. Pre-eminent among them all are the names of the late Alvan Clark, of Cambridge, Mass., and his sons, George B. and Alvan G. Their latest masterpieces are the huge 36-inch objective of the Lick telescope, and that of the Yerkes instrument. See CLARK, ALVAN. Next to them in rank are the Henry brothers, of Paris, and Grubb, of Dublin, but their glasses are by no means so numerous or so large.

In another line, that of the construction of instruments of precision, the Repsolds, of Hamburg, stand pre-eminent. For years the diffraction gratings of Rutherford, of New York, far excelled anything of the kind produced in Europe. They have been surpassed only by the exquisite ones of Rowland, of Johns Hopkins University. The preparation of the surfaces of the metal for the reception of the ruling for these latter gratings was the work of Brashear, of Allegheny. In the matter of the polishing of optical surfaces, the figuring of lenses, and the ruling of gratings, American artisans have excelled all others from their first attempts. Only in the production of instruments of precision and in the making of optical glass do they still yield superiority to European artisans. In the latter branch



Chace, of Birmingham, formerly, and later Feil and Mantois of Paris, have the credit of producing the glass disks from which all the large objectives have been made. The obtaining of a satisfactory disk of crown-glass for the 36-inch Lick glass was the labor of several years on the part of Feil, and only after a long series of failures.

Among the modern successes in instrument construction may be included the 36-inch silver-on-glass reflector made by Common, of Ealing, England, for his own use. Loewy's invention of the different forms of the equatorial coude, or elbow equatorial, which are so convenient in manipulation, and of the new instrument methods of determining the constants of refraction and aberration, are deserving of mention. Warner and Swasey, of Cleveland, have also solved the difficult question of the successful construction and mounting of the huge domes that cover the great modern telescopes.

*Celestial Photography.*—As early as 1840 Dr. John W. Draper, of New York, obtained a few photographs of the moon about an inch in diameter. In 1845, at Cambridge, Mass., Bond obtained photographie impressions of Vega and Castor, and in 1850 obtained the picture of the moon, whose exhibition in London induced Warren de la Rue to take up the subject of celestial photography. The latter built an observatory devoted exclusively to this work, and introduced and developed many improvements in instruments and methods. He also constructed for the Kew Observatory the first heliograph for taking instantaneous pictures of the sun. Successful photography of the spectra of the stars was first attained by Dr. Huggins.

The most recent successes of photography as an adjunct to the new astronomy have been photographs of stellar spectra by Pickering at the Harvard University Observatory, and the photographie normal spectrum of the sun recently completed by Rowland at the Johns Hopkins University.

**Astronomy in the 19th Century.** One hundred years ago, Sir William Herschel, then in the zenith of his fame, was interesting the whole world by his wonderful discoveries. With his great reflectors he made a step forward in the size and power of the telescope greater than any before or since. Although his greatest and best instrument would be considered extremely imperfect at the present time, those which it superseded were hardly more than what we should now call spy glasses. Herschel was so far the greatest figure of the time in astronomical science, and his work so overshadowed that of his contemporaries on the Continent, that the work of everyone else at the time seems unimportant in comparison. Yet not only were great successors of Herschel coming on the stage, but important additions to our

knowledge of the heavens were being made outside of England. William Herschel's son, John, was a lad of eight years. In France, Arago, a boy of 14, was fitting himself for the École Polytechnique. At Paris, Lalande, the leading astronomer of France, was actively preparing a catalogue of the fainter stars with an instrument which would now be consigned to the junkshop. But it was the first attempt that had ever been made to determine accurately the positions of the many thousand telescopic stars invisible to the naked eye, and in consequence the "Histoire Céleste" is still one of the classics of the astronomical investigator. In Germany, Olbers combined the professions of physician and astronomer, and Bessel, a youth of 16, was clerk in a mercantile house.

The first day of the century was marked by a discovery of capital interest and importance. The wide gap between the planets Mars and Jupiter had been a source of wonder, and the conviction that there must be a planet in it had become so strong that an association of astronomers was formed to search for it. But, on January 1, 1801, before they got to work, Piazzi, the Italian astronomer of Palermo, found Ceres. The year following Olbers discovered Pallas, and propounded his celebrated theory that the newly-formed bodies were fragments of a shattered planet, more of which might be found. This anticipation was amply justified by the result, though the theory of a shattered planet has long been rejected. By 1868 the number reached 100. When the sky was systematically watched 100 more were found. When the process of photographing the stars was perfected, so many new ones were found on the photographie plates that it is almost impossible to follow them up. About 450 have had their orbits mapped out.

In this country, David Rittenhouse, almost the only American of Revolutionary times who has a place in scientific history, had been dead four years when the century began, and there was no one to take his place. He was one of the committee of the American Philosophical Society that made an extensive and well-planned set of observations on the transit of Venus in 1769. But the period following the Revolution was not favorable to the development of scientific research, and, so far as important additions to natural knowledge are concerned our country might almost have been counted outside the civilized world. It is curious to trace the development of the scientific spirit among us in mathematics. A periodical called the "Mathematical Correspondent" was established by William Lenhart in 1804. The long title states that it is to be adapted to the present state of learning in America. In the preface to the volume, presumably accompanying the first



number, it is stated that a number of this work containing one sheet of paper will be regularly published four times a year. In each number a prize question will be proposed, and whoever gives the best solution of that question one month previous to the next succeeding number shall receive a handsome silver medal, on which is the following inscription:

"From the editors of the 'Mathematical Correspondent' to A — B —, as a reward for his mathematical merit."

Some time during the year it is announced that the prize medal (value \$6) has been awarded to Robert Adrain, Reading, Pa., and would be delivered by G. Baron, No. 24 Cedar street, New York, to any person authorized to receive the same. The problems and questions in the book were about of the order with which a pupil in the high school might now concern himself. The patrons were evidently supposed to know something of arithmetic, elementary geometry, and trigonometry, and to have some idea of Newton's fluxions. This was America's contribution to mathematical science when Laplace, Lagrange, and Euler had done most of their work.

The first American after the Revolution to acquire eminence in any department of astronomical science was Nathaniel Bowditch. A Boston ship-captain by profession, he first prepared his "Navigator," the standard work of the sailor through most of the century. He mastered the great work of Laplace, and made it accessible to students by a translation and commentary explaining the processes in detail. So far as practical astronomy was concerned, it might be regarded as non-existent among us during at least the first third of the century. We know little more of it than that Robert Treat Paine, grandson of the signer of the Declaration of Independence, used to compute eclipses and publish the results in the "American Almanac" and the Boston "Advertiser."

About 1840, Dr. Lardner paid a visit to this country and remained several years, delivering public lectures, which, though not of a high order when measured by the standard of today, were much above any our people had then heard. We may take a remark with which he opened one of his discourses as a starting-point from which to measure the progress since made. He announced that the credulity of his hearers would be taxed to the utmost limit when they were told that astronomers were able to weigh the planets. For him this was the last word of astronomy. We may take it for granted that if a hearer had arisen in the audience and said that he not only believed this, but believed that, by the time another generation had passed, men would determine of what substances the sun and stars were composed, and distinguish those

which had much iron in their constitution or hydrogen in their atmosphere from those which had not, the lecturer would have replied that he himself could not believe such a thing possible. And yet, it was only a generation before the spectroscope, in the hands of Kirchhoff, Bunsen, and Huggins, was doing this very thing.

But progress did not stop here. Had Kirchhoff or Bunsen been told that in another generation the instrument they first applied to research would be so used that we should discover absolutely invisible planets, revolving around stars so distant that even the effects they produce in changing the position of the star would be imperceptible in the most powerful telescope, — that not a trace of the effect could indeed be made evident to the vision — such an outcome might well have seemed incredible even to them. And yet this very thing is being done by our spectroscopists of today. If we could communicate with an inhabitant of one of these invisible planets, we could tell him more of the motions of the world on which he lives than men knew of the motion of our earth before the time of Copernicus.

During the first half of the century, the advance of astronomical science consisted principally in a form of development which goes on without any striking discovery, and therefore has little interest for the general public. When bright comets appeared they were carefully studied by observers, at the head of whom were Bessel and Olbers. It was thus found that the tail of a comet was not an appendage carried along with it, like the tail of an animal, but merely a stream of vapor arising from it and repelled by a force residing in the sun. The discovery of telescopic comets by observers, here and there, continually added to the number of these bodies known. Most of them were found to be moving in such orbits that they would require thousands of years, perhaps tens of thousands, to return to the sun, if, indeed, they ever reappeared. But this, though the general rule, is far from being universal. From time to time comets were found moving in closed orbits and performing their revolution in periods of a few years, mostly between 3 years and 10. Several of the orbits passed quite near to that of Jupiter. If, in such a case, the comet and the planet chanced to be together at the point of intersection, the orbit of the former would be completely altered, so that the comet might never be seen again.

*Vice versa*, it was found that comets of long period falling from unknown distances in the celestial spaces might be caught, as it were, by the planet Jupiter and set to moving in small orbits with a short period. Thus new comets are from



time to time adopted in the solar system, while old ones are liable to fade away and disappear entirely. The last and best-ascertained case of this kind was in 1886, when a comet was discovered by Brooks, with a period of seven years, which had been made a member of the family by the attraction of Jupiter a few years before. Of more than 20 periodic comets whose orbits have been well ascertained, it is more or less probable that several will never be seen again. The most notable and best-established case of the disappearance of comets was that of Biela's comet, which was observed at various returns from 1772 till 1852. During this interval it had performed 12 revolutions. At the returns of 1846 and 1852 it was separated into two parts, and has never been seen as a comet since the latter date.

One of the noteworthy discoveries of the third quarter of the century was that of the relation between comets and shooting stars. The first discovery of this relation came about in a curious way. The researches of H. A. Newton and others had made it quite clear that shooting stars were due to the impact of countless minute bodies revolving around the sun in various orbits and now and then encountering our atmosphere. It was also known that the great November meteoric showers must be due to a stream of such bodies. One astronomer computed the orbit of the November meteors; and another quite independently published the orbit of a comet which appeared in 1866. A third astronomer, Schiaparelli, noticed that the two orbits were practically the same. The conclusion was obvious. The minute bodies which caused the shower moved in the path of the comet and were portions of its substance which had from time to time separated from it. The disappointing failure of the shower in 1899 and 1900 can have but one cause—a small change in the orbit of the meteoric swarm caused by the attraction of the planets. Nor has the comet associated with them shown itself; it was perhaps dissipated like that of Biela's.

Apart from this, the question of the constitution of comets is still an unsolved mystery. Their spectrum is that of a body which shines by its own light. But no one can explain how a body in the cold and vacuous celestial spaces can so shine. The brighter comets may have a more or less massive nucleus. Yet it is not certain that the nucleus is entirely opaque. In 1882, the astronomers at the Cape of Good Hope enjoyed an opportunity which no one of their brethren ever enjoyed before or since; that of seeing a comet enter on the disk of the sun. Unfortunately, the sun disappeared from view a very few minutes afterward. But not a trace of the comet

could be seen on the sun as a spot. It was seemingly quite transparent to the solar rays. That the fainter comets have no nucleus and are merely composed of a collection of foggy particles seems certain. How are these particles kept together through so many revolutions? This question has not yet been satisfactorily answered.

The Greenwich Observatory was taken in charge by Airy in 1834. He immediately instituted a great improvement in its organization and work, but it was not till 1850 that he acquired for it new instruments of great importance. He was the founder of what has sometimes been called the Greenwich system: the astronomers of an institution taking a part like those of soldiers in an army, making all their observations on a plan prescribed by the authority, and rarely using their own discretion in any way. The mathematical theory of the motions of the planets, and especially of the moon, received its greatest improvement from the hands of Hansen, born about 1795. He may fairly rank as the greatest of celestial mechanicians since the time of Laplace. Toward the middle of the century, he prepared the first tables of the moon which could satisfy the requirements of modern astronomical theory. These were published by the British government in 1857, and have now formed the basis of astronomical ephemerides for nearly half a century.

The most striking event of the mid-century period, and one which in the popular mind must long hold its place as among the greatest of intellectual achievements, was the computation by Leverrier of the position of an unknown planet from its attraction on Uranus. The speedy discovery of the planet on the very night it was first looked for was, for the public, a proof of the absolute correctness of gravitational theories that surpassed all others. It was as a first and bold attempt to sail into an unknown sea; yet, as in the case of Columbus and the Atlantic, its repetition would not now be generally considered a difficult matter.

With the discovery of Neptune and with the advance in the art of astronomical observation, improvements in the theories of the movements of the planets were necessary. The greatest step forward in this direction was taken by Leverrier. Among the results of his work was the discovery that the perihelion of Mercury moves more rapidly than it should under the influence of gravitation. This excess of movement has been abundantly proved by observation since his time, but its cause is still one of the greatest mysteries of gravitational astronomy.

As a general rule, it may be said that during the last half century the Germans



have been the leaders in astronomical research. Their work on the subject has been more voluminous than that of any other nation. The leading astronomical journal of the world is still that of Germany. But when we consider not quantity of work, but the special importance of particular works, precedence has, from one point of view passed to America. While, perhaps, we still have fewer students pursuing astronomy in the United States than in Germany, the number of men among us who have acquired the highest distinction and most skillfully made applications of this science is greater than in any other country. The rapidity of progress from small beginnings is very remarkable.

In 1832, Professor Airy delivered, before the British Association for the Advancement of Science, an address on the progress of astronomy, which soon acquired celebrity. The state of astronomy in different countries was reviewed. America was dismissed with the remark that he was not aware of any observatory existing in that country. In the revival of astronomy among us and its advance to its present position in popular favor, one agency has not been esteemed so highly as it deserves. Contemporaneous with the visit of Dr. Lardner were the lectures of Prof. Ormsby M. Mitchell. With unsurpassed eloquence he explained the wonders of astronomy to audiences intensely interested in the novelties of the subject. From a scientific point of view the lectures were probably not of a high order, nor could it be said that Mitchell himself, active and enthusiastic though he was, was a profound astronomer. Yet it may well be said that to him is due the ability of our astronomers since that time to secure the public support necessary to the erection of the fabric of their science.

A few years after Airy's address, little college observatories were founded at Williams College and at the Western Reserve College, Ohio. These were doubtless a stimulus to students, but can hardly have added to astronomical science. When the Wilkes Exploring Expedition was being organized, it was found necessary to have a continuous series of observations made at home during the absence of the expedition which, compared with those made on the ships, would enable the navigators to determine the longitudes of the lands they discovered. A little wooden structure, erected by Captain Gilliss for this purpose, on Capitol Hill, Washington city, was in some sort the beginning of our National Observatory.

The actual foundation of the latter was almost contemporaneous with that of the Harvard Observatory, both being commenced about the year 1843. The Harvard

Observatory was placed under the direction of William C. Bond, who had, for many years, made observations first at his own house in Dorchester, and then on top of a house at Cambridge. At Washington the Naval Observatory was placed under the charge of Lieutenant Maury. After getting its instruments in operation, he devoted himself almost entirely to those researches on ocean currents, which, so long as the commerce of the world was carried on mostly in sailing vessels, were of the first importance. But the institution soon acquired astronomical celebrity in other ways. Here Sears Cook Walker made the first thorough investigation of the orbit of Leverrier's newly discovered planet, and showed that it had been twice observed by Lalande as far back as 1795, but without its character being suspected. Here also the device of recording the transits of stars by means of the chronograph and determining the longitude of places by telegraph found their first application.

New observatories, some founded in connection with colleges, others by private individuals, now sprang up rapidly among us in every quarter. Twenty-four were enumerated by Loomis in 1856. What figure the number has now reached it is impossible to say. Whatever it may be, it marks rather the interest taken by the intelligent public in astronomical science than the actual progress of knowledge. The number of these institutions which have actually made important contributions to astronomical knowledge is naturally very small. It is to a few leading ones that most of the progress is due.

Two of these have put almost a new face upon astronomical science. These are the Harvard Observatory at Cambridge and the Lick Observatory of California. The former, while a respectable institution from its foundation, and made famous by the works of the Bonds, had never commanded the means necessary to prosecute astronomical research on a large scale. When Pickering assumed the directorship in 1875, he devoted his energies to those branches of research which are now known under the general term of astro-physics, being concerned with the physical constitutions of the heavenly bodies rather than with their motions. The extension of his work was made possible by very large additions to the endowment of the observatory. It thus became one of the best-supported institutions of the kind in the world. Photometry and spectroscopy have been its main subjects. With the aid of a branch established in Arequipa, Peru, the magnitudes of all the stars in the heavens visible to the naked eyes, as well as many fainter ones, have been determined. Among its remarkable discoveries have been those of new



stars. It was formerly known that at long intervals, sometimes more than a century, sometimes less, stars apparently new blazed out in the sky. Really the star was not new, but was an old and very small one of which the light was temporarily multiplied hundreds of thousands of times. A system of constantly photographing the heavens showed that such objects appear every few years, only they do not generally attain such brilliancy as to be noticed by the unassisted eye.

The success of the Lick Observatory in a different, yet not wholly dissimilar, direction must be regarded as one of the most extraordinary developments of our time. Commencing work about the beginning of 1888, under the direction of Holden, and supplied with the greatest telescope that human art had then produced, the observations of Burnham and Barnard excited universal interest, both among astronomers and the public. The discovery of a fifth satellite of Jupiter, perhaps the most difficult object in the heavens, was made there by Barnard in 1892. Later, the optical discovery of the companion of Procyon, an object known to exist from its attraction on that star, was made by Schaeberle. But its most epoch-making work is due in still more recent years to Campbell, by measurements of the motion of stars in the line of sight with the spectro-

scope. The possibility of measuring such motions was first demonstrated by Huggins, some 30 years ago, and was applied both by him and by the observers at Greenwich. Then a great step forward was made by photographing the spectrum instead of depending on visible observation. This step was mostly developed by Vogel, at the Potsdam Observatory, near Berlin. In the case of the variable star, Algol, Vogel was thus enabled to show that the fading away of its light at regular intervals of something less than three days was really a partial eclipse of the star by a dark body revolving around it. He also showed that three other bright stars varied in their motions to and from the earth in a way that could arise only from the revolution of massive but invisible bodies around them.

Now, at the Lick Observatory, Campbell, armed with the best spectrograph that human art could make, the gift of D. O. Mills, has, by the introduction of every refinement of his method, brought into these measures a degree of precision never before reached. The cases of variable motion, as found by him, are so numerous as to indicate that isolated stars may be the exception rather than the rule. It is true that up to the present time he detects variation in only about one star out of 13 which he observes. But it is only in the

exceptional cases, where the planet is almost as massive as the star itself, that the motion can be detected. It is not at all unlikely that, for every spectroscopic binary system (as these pairs of objects are now called) we can detect, quite a number may exist in which the revolving planet is too small to affect the motion of the star.

Taking a comprehensive view of the future of sidereal research, the most noteworthy feature is the convergence of the most dissimilar lines of investigation toward the greatest of problems, that of the structure of the universe. Utility shows signs of being evolved from what has hitherto seemed an incoherent diversity among tens of millions of bodies. We now look upon the Milky Way not only as a whole in itself but as forming in some way the foundation of the universe. The telescope and the spectroscope, the balance of the chemist and the diversified apparatus of the physical laboratory, are assaulting the skies, with a prospect of results that no man can yet forecast. Thus, with the beginning of a new century, astronomy, the oldest of the sciences, seems to be entering upon a new career, with a prospect of a life before it the end of which no man can foresee.

SIMON NEWCOMB.

**Astruc, Jean** (as-trük'), a French physician, born March 19, 1684; was educated at Montpellier, and acquired high reputation as an anatomist. He was the author of "Venereal Diseases," and other medical works. The work, however, which has immortalized him is purely theological and is entitled "Conjectures as to the Original Materials of Which Moses Seems to Have Availed Himself in Composing the Book of Genesis" (Brussels, 1753). In this work he divides the book of Genesis into two parts, on the ground of the use of Elohim (God) or Yahveh (Jehovah). He holds that these two names for the Deity point to the fact that Genesis was compiled from two parallel, independent documents. His memoir forms the origin of modern criticism on the Pentateuch. He died in Paris, March 5, 1766.

**Astura** (as-tö'ra), a maritime village of Italy at the mouth of a river of the same name, 40 miles from Rome. In its little harbor a high tower is said to stand on the site of the villa of Cicero, where he was slain by order of Antony B. C. 43. Here, also, in 1268, after the battle of Tagliacozzo, Conradin, the last of the Hohenstaufen family, was betrayed.

**Asturias** (as-tö'rê-az), or **Oviedo**, a northern Province of Spain, washed on the N. by the Bay of Biscay; area, 4,091 square miles; pop. 595,420. The low hills of Leon and Old Castile rise gradually to the mountain-chain which forms the S. boundary, and which is but a prolongation of the Pyrenean



## Astyages

system. The N. slopes are broken by steep and dark valleys or chasms, which are among the wildest and most picturesque in Spain. The chief rivers are the Nalon, Navia, and Sella. Agriculture is the chief industry. The coasts have good fisheries, but poor harbors. Asturias abounds in rich mines, which as yet are indifferently wrought. The chief minerals of the province are copper, iron, lead, cobalt, arsenic, antimony, and coal of excellent quality. A railway from Gijon connects Asturias with Leon and the Spanish railway system. The chief towns are Gijon, Aviles, Llanes, and Luarca. Oviedo, the capital, has, since 1833, given its name to the whole Province. The eldest son of the Spanish King has the title of Prince of Asturias, professedly an imitation of the English Prince of Wales, having been taken at the solicitation of the Duke of Lancaster in 1388, when his daughter married the eldest son of Juan I. The Romans had great difficulty in subduing Asturias, about 22 B. C. Later it offered an asylum to the Goths, whose prince, Pelayo, bravely withstood the Arabs (718 A. D.); his successors carried on the contest successfully, and became Kings of Leon in the 10th century.

**Astyages** (as-tī'a-jēz), son of Cyaxares, the last King of Media, reigned 594-559 B. C. In the latter year he was dethroned by Cyrus, who, according to Herodotus, was his grandson. An old tradition has it that Astyages, having no male heir, married his daughter, Mandane, to Spitames, a Median, whom he declared his successor, and so aroused the jealousy of the other great nobles; that the Persian Cyrus revolted in 559, and defeated Astyages, whom he took prisoner, but afterward appointed Governor of Hyrcania; and that Spitames was slain, and Mandane then became the wife of Cyrus.

**Asuncion** (as-ūn'shōn), or **Assumption**, the capital of the Republic of Paraguay; on a terrace skirting the left bank of the Paraguay river; has connection by steamers with Buenos Ayres, and a railway with Paraguari. It has a cathedral (1845) and a college. Its trade has recovered from the effects of the war with Brazil in 1865-1870; the principal articles of commerce being leather, tobacco, sugar, manioc, and maté or Paraguay tea. It was founded on Aug. 15, 1537, the feast of the Assumption. Pop. (1905) 60,259.

**Atacama** (at-a-kä'ma), the name, formerly, of two provinces, (1) Chilean and (2) Bolivian; most of the latter was transferred to Chile in 1884. (1) A northern Province of Chile, with an area of 39,400 square miles, and a population (1895) of 76,566. About 1,000 silver and 250 copper mines are worked, and gold is also found in considerable quantities. Salt deposits cover sometimes 50 square miles. Copper, to the value

## Atahualpa

of over \$7,500,000 annually, is the chief export to England. Capital, Copiapo; pop. 9,916. (2) The Bolivian Department, extended as far N. as Peru, and E. to Argentine Republic and the Department of Potosi. In 1861 its area was put down as 70,181 square miles, and its population as 5,273. No trustworthy figures are published regarding the small portion, no longer a Province, still retained by Bolivia; all that part of the district W. of the Andes was ceded, in 1884, to the Chilians, and formed into the Department of Antofagasta, with an area of 60,770 square miles, and a population stated (1892) at 36,220. The recently discovered mines of Caracoles are said to be the most productive silver mines in the world. The former capital, Cobija (pop. 2,380), was long the only port in the district; but the rival port of Antofagasto, founded in 1870, had by 1894 attained a population of 7,946. The Desert of Atacama extends through both Provinces, but, since the war of 1879, has belonged entirely to Chile. From the steep, almost inaccessible coast, the land rises in rocky plateaus, broken at intervals by precipitous mountain-chains. Generally speaking, the soil is not at all sandy, but rocky; and the scanty rainfall of the district affords an additional reason for the growth of only the hardiest of desert plants, and for the frequency and extent of its dry salt marshes. In the war it was treated as important, owing to its silver and saltpetre works, which have, to some extent, peopled its once desert solitudes.

**Atacamite**, an orthorhombic, translucent mineral, classed by Prof. Dana under his oxychlorids. The hardness is 3 to 3.5; the sp. gr., 3.7 to 4.3; the luster verging from adamantine to vitreous; the color bright green, with an apple green streak. It is massive or pulverulent. Composition: Chlorine, 15.51 to 16.33; oxide of copper, 50 to 66.25; copper, 13.33 to 56.46; water, 16.91 to 22.60. It occurs in Atacama, in Chile; in Australia; in Africa; in Spain; and at St. Just, in Cornwall.

**Atahualpa** (at-a-whal'pa), the last Inca of Peru, was the son of the 11th Inca, Manco Capac. His mother was of royal lineage, and through her he inherited the kingdom of Quito. With his elder brother Huascar, who succeeded to the throne of the Incas in 1523, he remained at peace for five years; but, on his being summoned to acknowledge the dependency of his kingdom on that of Peru, he prepared for war, entered the dominions of Huascar with 30,000 men, defeated him in a pitched battle, and thrust him into prison. Three years afterward, Pizarro captured the island of Puna, and Huascar, hearing in prison of the victorious stranger, sent ambassadors to Puna requesting assistance. The Inca also pro-



## Atalanta

posed an interview with the Spaniard, and thus was brought about for Pizarro the long desired opportunity of meddling in the affairs of Peru. By an act of base treachery, he succeeded in obtaining possession of the person of the Inca. His subsequent procedure was summary in the extreme. Huascar had been put to death by order of his brother, and now Atahualpa was declared guilty of treason to the Spanish crown, and sentenced to be burned alive, in 1533. The sentence was commuted to strangulation, in consideration of his professing Christianity and receiving baptism.

**Atalanta**, the daughter of Zeus and Clymene, celebrated for her skill in archery, was a native of Arcadia. She slew the Centaurs, Rhœcus and Hylæus, who were about to offer violence to her; sailed to Colchis with the Argonauts, and was afterward present at the chase of the Calydonian boar, which she was the first to wound; hence Meleager



ATALANTA.

awarded to her the prize. Another Atalanta, daughter of Schœneus, King of Seyros, was renowned for her beauty, and swiftness in running. She required each of her lovers to run a race with her. Her admirer was to run before, unarmed, while she followed him with a dart. If she could not overtake him, she was his own; but if he were outrun, he was doomed to death, and his head to be set up at the goal. Many had fallen victims in the attempt, when Hippomenes, the son of Magareus, by the aid of Venus, overcame her. The goddess

gave him three golden apples, which he threw behind him, one after the other, as he ran. Atalanta stopped to pick them up, and Hippomenes reached the goal before her. Her former reserve now gave place to such ungovernable passion that the chaste Ceres, becoming offended, changed both the parties into lions, and compelled them from that time to draw her chariot.

**Atavism**, in biology, the tendency to reproduce the ancestral type in animals or plants which have become considerably modified by breeding or cultivation; the reversion of a descendant to some peculiarity of a more or less remote ancestor.

**Ataxia**, in medicine, irregularity in the animal functions, or in the symptoms of a disease. See LOCOMOTOR ATAXIA.

## Atcheen

**Atbara** (at-bar'a), the most northerly tributary of the Nile. It rises in the Abyssinian highlands, receives several large tributaries, and enters the Nile about 18° N.

**Atchafalaya** (ach-a-fal-ā'a), ("Lost Water"), a river of the United States, an outlet of the Red river, which strikes off before the junction of that river with the Mississippi, flows southward, and enters the Gulf of Mexico by Atchafalaya Bay. Its length is 250 miles.

**Atcheen** (also ACHEEN or ATCHIN; called by the Dutch ATJEH), until 1873 an independent State in the N. W. part of Sumatra, now a Province of the Dutch Indies, with an area of 20,471 square miles, and a pop. (est. 1901) of 110,800. The surface is divided into an eastern and a western half by the mountain chain which traverses the whole island, and which rises in Abong-Abong to 11,000 feet. On both sides are numerous stretches of level or undulating soil, watered by small but deep streams, and admirably adapted for arboriculture, gardening, and the cultivation of rice. The flora and fauna agree with those of Sumatra: pepper and areca nuts are produced in Atcheen. The natives employ themselves in agriculture, cattle rearing, trade, fisheries, weaving cloth, and working in gold, silver and iron. In appearance, dress, character and manners, they are distinct from the rest of the inhabitants of Sumatra. Of darker color and lower stature than the latter, they are also more active and industrious, good seamen and soldiers; but they are treacherous, revengeful, bloodthirsty, immoral and inordinately addicted to opium. Their ethnological place is not yet settled; their speech, according to Van der Berg, belongs to the Polynesian family. The capital of the government is Kota Radja or Atcheen, in the northwestern extremity, situated on a stream navigable by boats, about 4½ miles from its port Oleh-leh, with which, since 1876, it has been connected by a railway. Formerly a large and flourishing city, it was almost entirely destroyed during the war, but is now beginning to revive. It contains a Dutch garrison of 2,000 men.

During the earlier half of the 17th century Atcheen was a powerful sultanate, with supremacy over several islands and a part of the Malay Peninsula. Its power gradually declined; but an attempt was made by the treaty between the English and the Dutch, in 1824, to reserve its independence. The inevitable war, however, broke out in 1873, and ended as inevitably, though not without a desperate resistance, in the conquest and annexation of the sultanate. Yet, in 1895, the resistance was not wholly overcome; and it was calculated that the enterprise had cost \$100,000,000 and 80,000 lives.



## Atchison

**Atchison**, city and county-seat of Atchison co., Kan.; on the Missouri river and the Atchison, Topeka and Santa Fé, the Burlington Route, the Chicago, Rock Island and Pacific and the Missouri Pacific railroads; 25 miles N. by N. W. of Leavenworth. The city is an important commercial center, by reason of its excellent river and extensive railroad facilities, and has a wholesale trade of more than \$50,000,000 per annum. It exports largely grain, flour, live stock, and dressed meats, and has more than 50 important manufacturing establishments. There are gas, electric light, sewer, water and electric railway plants; several public parks; a noteworthy bridge across the Missouri river; an attractive Union depot; 2 National banks; and daily, weekly and monthly periodicals. Atchison is the seat of the State Soldiers' Orphans' Home, of Midland College (Lutheran) and St. Benedict's College (Roman Catholic), and has a public library, public high and graded schools, and a number of high graded private schools. Pop. (1890) 13,963; (1900) 15,722; (1910) 16,429.

**Atchison, David R.**, an American legislator, born in Frogtown, Ky., Aug. 11, 1807; was educated for the bar, and began practicing in Missouri, in 1830. He was elected to the Legislature in 1834 and 1838; was appointed judge of the Platte County Circuit Court; and, in 1843, while holding this office, was appointed United States Senator to fill a vacancy. He was twice elected to the last office, and during several sessions was President pro tem. of the Senate. During Sunday, March 4, 1849, he was the legal President of the United States, as Gen. Taylor, the President-elect, was not sworn into office until the following day. Senator Atchison became conspicuous in the slavery debates and in the Kansas-Nebraska struggle, because of his strong pro-slavery views. The city of Atchison, Kan., was named after him. He died in Clinton county, Mo., June 26, 1886.

**Ate** (ā'tē), in Greek mythology, the goddess of hate, injustice, crime and retribution. At the birth of Hercules she led Zeus to make a rash oath, in consequence of which she was hurled from Olympus to the earth, where she still worked mischief. The Litai, daughters of Zeus, followed her, and, if prayed to, repaired the evil she had perpetrated.

**Ateles** (at'ē-lēs), a genus of South American monkeys, of the division with long prehensile tails, to which the name Sapajou is sometimes collectively applied. The head is round, and the facial angle about 60 degrees; the limbs are remarkably long and slender, upon which account the English name of spider-monkey is sometimes used as a generic designation; the fore-limbs are

## Athabasca

either destitute of a thumb or have a rudimentary one.

**Atelier** (at-el-yā'), in French, a workshop; a studio; more especially applied to an artist's work-room. **Ateliers Nationaux**, or National Workshops: Since 1845, it has been the custom in France, during severe winters, or in times of distress caused by stagnation of trade, to open temporary workshops, in order to give employment to mechanics who were out of work. These workshops were called Ateliers de Charité, until 1848, when the Provisional Government of the Republic reopened a vast number of these establishments under the name of Ateliers Nationaux. They were under the control of a department called "The Committee of the Government for the Workmen;" they were all, however, badly organized, and failed calamitously. The principle on which they were conducted was, that every workman should have a living provided for him on a fixed scale. The result was, that workmen soon left private employers, and entered the national workshops. The numbers who flocked in soon became alarming. More than 100,000 men enrolled themselves, and insubordination soon began to show itself. Danger was imminent, and the National Assembly ordered the dissolution of the ateliers nationaux, an act which became the pretext for the terrible insurrection which ensanguined Paris in June, 1848.

**Atellanæ Fabulæ** (at-el-an'ē[ī] fab'-ō-lē[ī], called also Oscan plays), a kind of light interlude, in ancient Rome, performed, not by the regular actors, but by freeborn young Romans; it originated from the ancient Atella, a city of the Oscans.

**Ateshga** (at-esh'ga), a sacred place of the Guebres or Persian fire-worshippers, on the peninsula of Apsheron, on the W. coast of the Caspian, visited by large numbers of pilgrims, who bow before the sacred flames which issue from the bituminous soil.

**Atha** (ät'ä), a daring impostor in the reign of the Caliph Mehedy, or his predecessor, Al-mansur. He taught the doctrine of metempsychosis, and claimed to be himself an incarnation of divinity. He had lost one of his eyes, on account of which he always wore a veil, whence he received the epithet of Mokanna. Atha is the hero of Moore's "Veiled Prophet of Khorassan" in "Lalla Rookh."

**Athabasca**, a river, lake and district of Canada. The ATHABASCA RIVER rises on the E. slopes of the Rocky Mountains in the district of Alberta, flows in a N. E. direction through the district of the same name, and falls into Lake Athabasca after a course of about 600 miles. LAKE ATHABASCA, or Lake of the Hills, is about 190 miles S. S. E. of the Great Slave Lake, with which it is



## Athabascan Indians

connected by means of the Slave river, a continuation of the Peace. It is about 200 miles in length from E. to W., and about 35 miles wide at the broadest part, but gradually narrows to a point at either extremity. The district of ATHABASCA, formed in 1882, lies immediately E. of British Columbia and N. of Alberta; area about 251,300 square miles. It is intersected by the Athabasca and Peace rivers and, as yet, has a scanty population. The name is also given to a family of Indians.

**Athabascan Indians**, a linguistic stock of North American Indians, extending from British North America and Alaska to Mexico, who derive their name from Lake Athabasca in British North America. The locations of this Indian family are best given under three groups: Northern, Pacific and Southern. (1) The Northern group includes all the Athabascan tribes of Alaska and British North America, among which are the Ah-tena, K'naiakhotana, Kutchin, Kaiyvh-khotana, Koyu-khotana, Montagnais, Una-khotana, Montoguards and Takulli. (2) The Pacific group consists of the tribes inhabiting the present States of Washington, Oregon, and California, to which regions they migrated upon the advent of the white man. Among the tribes of this division are Chasta Costa, Kaltsera tunne, Hupa, Chetco, Kenesti, Kwatami, Kwalhio-kwa, Micikqwutme, Mikono tunne, Owilapsh, Qwinetunnetun, Teeeme, Naltunne, Saiaz, Teetlestea tunne, Tolowa, Glatakanai, Yukitee and Tutu. (3) The Southern group, which is the best known, is composed of the various Apache, Navajo and Lipan tribes, who inhabit Oklahoma, Arizona, New Mexico, and Mexico. The number of these Indians is about 32,000, of whom over 8,000 from the northern group; less than 1,000 the Pacific group; and about 23,000 the southern group. Some of the Oregon tribes have fought against the United States, but the more notable foes have been the Apaches of the southern division.

**Athaliah**, daughter of Ahab, King of Israel, and wife of Jehoram, King of Judah, was born about 927, and died about 878 B. C. She was a woman of abandoned character, and fond of power; who, after the death of her son Ahaziah, opened her way to the throne by the murder of every prince of the royal blood. She reigned six years; in the seventh, the high-priest Jehoiada placed Joash, the young son of Ahaziah, on the throne of his father. This prince had been preserved and brought up secretly in the temple by Jehosheba, the sister of Joram and wife of Jehoiada. Athaliah, attracted by the noise of the people, who were crowding to the coronation of Joash, entered with them into the temple, where the ceremony was going on. At the sight of the new king, surrounded by

## Athanasius

priests, Levites, great officers of the kingdom, and the joyful people, she was beside herself; she tore her hair and cried out "Treason!" Jehoiada ordered her to be immediately led from the temple by the officers, and commanded that all who should offer to defend her be slain; and she was put to death, at the gate of her palace, without opposition. The altars of Baal, which she had erected, were thrown down, and the worship of the true God restored (II Kings, xii: 13-18). On this story, Racine has written his best tragedy, considered as the *chef-d'œuvre* of the French school of tragic poetry.

**Athanasian Creed**, a formulary or confession of faith, said to have been drawn up by Athanasius, Bishop of Alexandria, in the 4th century, to justify himself against the calumnies of his Arian enemies. That it was really composed by this father seems more than doubtful; and modern divines generally concur in the opinion of Dr. Waterland, that it was written by Hilary, Bishop of Arles, in the 5th century. It is certainly very ancient; for it had become so famous in the 6th century as to be commented upon, together with the Lord's Prayer and Apostles' Creed, by Venantius Fortunatus, Bishop of Poitiers. It was not, however, then styled the Athanasian Creed, but simply the Catholic Faith. It is supposed to have received the name of Athanasius on account of its agreeing with his doctrines, and being an excellent summary of the subjects of controversy between him and the Arians. The true key to the Athanasian Creed lies in the knowledge of the errors to which it was opposed. The Sabellians considered the Father, Son and Holy Spirit as one in person; this was "confounding the persons;" the Arians considered them as differing in essence; this was "dividing the substance;" and against these two errors was the creed originally framed. This creed was used in France about the year 850; was received in Spain about 100 years later, and in Germany about the same time. It was both said and sung in England in the 10th century: was commonly used in Italy at the expiration of that century, and at Rome a little later. This creed is appointed to be read in the Church of England.

**Athanasius, St.**, (ath-a-nā'shē-us), one of the fathers of the Christian Church, born at Alexandria about 296 A. D. He distinguished himself by his eloquence at the Synod of Nice (325), where his efforts were instrumental in securing the acceptance of the Nicene Creed. The creed which bears his name was supposed to have been formulated by him, but the term Athanasian was not applied to it until some centuries after his death. He became Patriarch of Alexan-



## Atharvana

dria in 328, being afterward deposed and reinstated five times. His chief works, including "Orations Against the Arians" and "Festal Letters," appeared in an English translation by Archibald Robertson (New York, 1892). He died in Alexandria, May 2, 373.

**Atharvana** (at-ä'van-è), the fourth of the Indian Vedas. Its language is more modern than that of the other three. The Sanhitá, or collection of prayers and invocations, is comprised in 20 books. The number of verses is stated as 6,015; the sections more than 100; and the hymns upward of 760. The theological treatises, regarded as 52 in number, called Upanishads, are appended to the Atharvan Veda.

**Atheism**, literally, disbelief in a God, if such an attainment is possible; or, more loosely, doubt of the existence of a God; practically, a denial that anything can be known about the supernatural, supposing it to exist. Among the Greeks atheism consisted in a denial or non-recognition of the gods of the State. Socrates was put to death for asserting the superiority of the Divine wisdom to the other gods, as the ruler and disposer of the universe, thus contradicting Greek mythology, which assigned that office to Zeus. In Latin times atheism still continued to be a negation, with no pretension to rank as a system. Voltaire speaks of it as having destroyed the republic, and says that it was factious in the time of Sulla and of Cæsar, and slavish under Augustus and Tiberius. It was closely akin to that cultured unbelief which extensively prevailed at the Roman Curia during the early part of the renaissance. Macaulay is very severe on the "men who, with the Latinity of the Augustan age, acquired its atheistical and scoffing spirit." The atheism of the 18th century was a protest against the persecution of fanaticism; and, like its predecessors, put forward little or nothing to replace the system it attempted to destroy. The atheism of the 19th century may be taken to include every philosophic system which rejects the notion of a personal Creator; in this sense it ranks as a genus, of which Atomism, Pantheism, Positivism, etc., are species. Strictly, it is the doctrine that sees in matter the sole principle of the universe. Popularly, atheism consists in the denial of a God; this view is probably founded on the mistranslation of Ps. xiv: 1, and liii: 1, which should be "The fool hath said in his heart, No God for me"—i. e., he willfully rejects God, at the same time knowing that He is.

**Athel**, or **Æthel**, an Old English word meaning noble, eminent not only in blood or by descent but in mind; frequently a part of Anglo-Saxon proper names.

**Atheling**, a title of honor among the Anglo-Saxons, meaning one who is of noble

## Athena

blood. The title was gradually confined to the princes of the blood royal, and in the 9th and 10th centuries is used exclusively for the sons or brothers of the reigning king. It was first conferred on Edgar by Edward the Confessor, his grand-uncle, who bestowed it when he designed to make him successor to himself on the throne.

**Atheling, Edgar.** See EDGAR ATHELING.

**Athelney**, formerly an island in the midst of fens and marshes, now drained and cultivated, in Somersetshire, England, about 7 miles S. E. of Bridgwater. Alfred the Great took refuge in it during a Danish invasion, and afterward founded an abbey there.

**Athelstan, Adelstan, Æthelstan, or Ealstan**, an Anglo-Saxon King, the son and successor of Edward the Elder, and grandson of Alfred the Great; born in 895, and, on Edward's death, in 925, was chosen king by the people of Mercia, and Wessex. Northumbria, Scotland, and the British States of Cumberland, Wales and Cornwall, acknowledged him as their superior lord, and his alliance was courted by all the princes of Western Europe. Louis IV. of France was protected by Athelstan during the usurpation of Raoul, and recovered the throne by his aid. The Emperor Otho the Great married his sister Elgiva. In 937, Constantine of Scotland, and other princes, formed a league against Athelstan, who totally defeated them. He died at Gloucester, A. D. 941.

**Athena** (ath-ē'na), or **Athene**, a Greek goddess, identified by the Romans with Minerva, the representative of the intellectual powers; the daughter of Zeus (Jupiter) and Metis (that is, wisdom or cleverness). According to the legend, before her birth Zeus swallowed her mother, and Athena afterward sprang from the head of Zeus



ATHENA.



with a mighty war shout and in complete armor. In her character of a wise and prudent warrior she was contrasted with the fierce Ares (Mars). In the wars of the giants she slew the famed Enceladus. In the wars of the mortals she aided and protected heroes. She is also represented as the patroness of the arts of peace. The sculptor, the architect, and the painter, as well as the philosopher, the orator and the poet, considered her their tutelar deity. She is also represented among the healing gods. In all these representations she is the symbol of the thinking faculty, the goddess of wisdom, science, and art; the latter, however, only in so far as invention and thought are comprehended. In the images of the goddess a manly gravity and an air of reflection are united with female beauty in her features. As a warrior she is represented completely armed, her head covered with a gold helmet. As the goddess of peaceful arts she appears in the dress of a Grecian matron. To her insignia belong the ægis, the Gorgon's head, the round argive buckler; and the owl, the cock, the serpent, an olive branch, and a lance were sacred to her. All Attica, but particularly Athens, was sacred to her, and she had numerous temples there. Her most brilliant festival at Athens was the Panathenæa, participated in by all the tribes of the City-State. Races, gymnical exercises, and imitations of naval fights were exhibited with great splendor, and there were contests in music, declamation, and the drama. Prisoners were released from the prisons, and gold crowns were conferred on men of distinguished merit.

**Athenæum** (ath-en-ē'um), or **Atheneum**, a public place frequented by professors of the liberal arts, and where rhetoricians declaimed, and the poets read aloud their works. At Athens these assemblies first took place in the temple of Minerva, whence the name. The Athenæum at Rome was founded upon the Capitoline Hill, by the Emperor Hadrian. It was a school or college, furnished with a complete staff of professors for the several branches of study. Like its Athenian prototypes, this establishment was frequented by the Roman orators, poets and other learned men, who there declaimed their compositions, the emperors themselves frequently honoring the assemblies by their presence. At a subsequent period, another celebrated Athenæum was erected at Lyons. These institutions generally appear to have retained their high reputation until the 5th century. At the present time, the term has been revived as a name for certain establishments connected with learning, as well as for clubs and libraries. It is also the not inappropriate title of several literary journals published in various countries.

**Athenæus** (ath-e-nē'us), a Greek writer of the 3d century, reputed to have been born at Naucratis in the Nile Delta, and to have lived at Alexandria and afterward at Rome. He is famous for one work, his "Feast of the Learned," a series of books giving with little connection or literary art a vast assemblage of quotations from nearly 800 writers and 2,400 distinct writings, covering practically every department of ancient learning. It has been valued by scholars of all succeeding times as a treasure-house of quotation and anecdote.

**Athenagoras** (ath-en-ag'ō-ras), a Platonic philosopher of Athens, a convert to Christianity, who wrote a Greek Apology for the Christians, addressed to the Emperor Marcus Aurelius, in 177, one of the earliest that appeared.

**Athenais** (ath-en-ā'is), an Athenian lady of distinguished beauty and learning, who, in 421 A. D., became the wife of the Emperor Theodosius II., and assumed the name of Eudocia.

**Athenodorus**, the son of Agesander, a Greek sculptor of the Rhodian school, who, with his father and Polydorus, executed the celebrated group of the "Laocoon," the best specimen now extant of the third stage of sculpture in Greece, during which the highest display of execution was successfully coupled with the utmost pathos of conception. Athenodorus is supposed to have lived about 220. B. C.

**Athens**, anciently the capital of Attica and center of Greek culture, now the capital of the Kingdom of Greece. It is situated in the central plain of Attica, about 4 miles from the Saronic Gulf or Gulf of Ægina, an arm of the Ægean Sea running in between the mainland and the Peloponnesus. It is said to have been founded about 1550 B. C. by Cecrops, the mythical Pelasgian hero, and to have borne the name Cecropia until under Erechtheus it received the name of Athens in honor of Athene.



COIN OF ATHENS.

**Topography.**—The Acropolis, an irregular oval crag, 150 feet high, with level summit 1,000 feet long by 500 in breadth, was the original nucleus of the city, which, according to tradition, was extended by Theseus when Athens became the head of the confederate Attic States. The three chief eminences near the Acropolis—the Areopagus to the N. W., the Pnyx to the S. W.,



and the Museum to the S. of the Pnyx — were thus included within the city boundary as the sites of its chief public buildings, the city itself, however, afterward taking a northerly direction. On the E. ran the Ilissus and on the W. the Cephissus, while to the S. W. lay three harbors — Phalerum, the oldest and nearest; the Piræus, the most important; and Munychia, the Piræan Acropolis. At the height of its prosperity the city was connected with its harbors by three massive walls (the “long walls”).

*Architecture.*—The architectural development of Athens may be dated from the rule of the Pisistratids (560–610 B. C.), who are credited with the foundation of the huge temple of the Olympian Zeus, completed by Hadrian seven centuries later, the erection of the Pythium or temple of Pythian Apollo, and of the Lyceum or temple of Apollo Lyceus — all near the Ilissus; and to whom were due the inclosure of the academy, a gymnasium and gardens to the N. of the city, and the building of the Agora with its Portico or Stoa, Bouleuterium or Senate-house, Tholus and Prytanium. With the foundation of Athenian democracy under Clisthenes, the Pnyx or place of public assembly, with its semicircular area and cyclopean wall, first became of importance, and a commencement was made to the Dionysiac theater (theater of Dionysus or Bacchus) on the S. side of the Acropolis.



ATHENE PARTHENOS.

*Reconstruction.*—After the destruction wrought by the Persians in 480 B. C., Themistocles reconstructed the city upon practical lines and with a larger area, inclosing the city in new walls  $7\frac{1}{2}$  miles in circumference, erecting the N. wall of the Acropolis, and developing the maritime re-

sources of the Piræus; while Cimon added to the southern fortifications of the Acropolis, placed on it the temple of Wingless Victory, planted the Agora with trees, laid out the Academy, and built the Theseum on an eminence N. of the Areopagus; his brother-in-law, Pcisianax, erecting the famous Stoa Poecile, a hall with walls covered with paintings (whence the Stoics got their name). Under Pericles the highest point of artistic development was reached. An odeium was erected on the E. of the Dionysiac Theater, for the recitations of rhapsodists and musicians; and with the aid of the architects Ictinus and Mnesicles and of the sculptor Phidias the Acropolis was perfected. Covering the whole of the W. end rose the Propylæa, of Pentelic marble, and consisting of a central portico with two wings in the form of Doric temples. Within, to the left of the entrance, stood the bronze statue of Athena Promachus, and beyond it the Erechtheum, containing the statue of Athena Polias; while to the right, on the highest part of the Acropolis, was the marble Parthenon, or temple of Athene Parthenos, the crowning glory of the whole. Statues and shrines occupied the rest of the area, which was for the time wholly appropriated to the worship of the guardian deities of the city. In the interval between the close of the Peloponnesian War and the battle of Chæronea, few additions were made. Then, however, the long walls and Piræus, destroyed by Lysander, were restored by Conon, and under the orator, Lycurgus, the Dionysiac temple was completed, the Panathenaic stadium commenced, and the choragic monuments of Lysicrates and Thrasyllus erected. Later on Ptolemy Philadelphus gave it the Ptolemæum near the Theseum, Attalus I. the stoa N. E. of the Agora, Eumenes II. that near the great theater, and Antiochus Epiphanes carried on the Olympium. Under the Romans, it continued a flourishing city, Hadrian in the 2d century adorning it with many new buildings. Indeed, Athens was at no time more splendid than under the Antonines, when Pausanias visited and described it.

*The City in Decline.*—But after a time Christian zeal, the attacks of barbarians, and robberies of collectors, made sad inroads among the monuments. About 420 A. D. paganism was totally annihilated at Athens, and when Justinian closed even the schools of the philosophers, the reverence for buildings associated with the names of the ancient deities and heroes was lost. The Parthenon was turned into a church of the Virgin Mary, and St. George stepped into the place of Theseus. Finally, in 1456, the place fell into the hands of the Turks. The Parthenon became a mosque, and in 1687 was greatly damaged by an explosion at the siege of Athens by the Venetians.



## Athens

Enough, however, remains of it and of the neighboring structures to abundantly attest the splendor of the Acropolis; while of the other buildings of the city, the Theseum and Horologium, or Temple of the Winds, are admirably preserved, as also are the Pnyx, Panathenaic stadium, etc.

**Modern Athens.**—Soon after the beginning of the War of Liberation, in 1821, the Turks surrendered Athens, but captured it again in 1826–1827. It was then abandoned until 1830. In 1835 it became the royal residence, and made rapid progress. The modern city mostly lies northward and eastward from the Acropolis, and consists mainly of straight and well built streets. Among the principal buildings are the royal palace, a stately building with a façade of Pentelic marble (completed in 1843), the university, the academy, public library, theater, and observatory. The university was opened in 1836, and has 1,400 students. There are valuable museums, in particular the National Museum, and that in the Polytechnic School, which embraces the Schliemann collection, etc. These are constantly being added to by excavations. There are four foreign archæological schools or institutes, the French, German, American, and British. Tramways have been made in the principal streets, and the city is connected by railway with its port, the Piræus. Pop. (1895) 111,486.

**Athens**, city and county-seat of Clarke co., Ga.; on the Oconee river, and the Central of Georgia, the Georgia, the Northeastern of Georgia, and the Seaboard Air Line railroads; 67 miles E. of Atlanta, the State capital. It is in a cotton growing region; has a large trade in that staple; and contains cotton and woolen, cotton seed oil, bobbin, and hosiery mills, iron works, furniture factories, and other industrial plants. It is the seat of the University of Georgia, the State College of Agriculture and Mechanic Arts, Lucy Cobb Institute, Knox Institute, Jeruel Academy, and a State Normal School. There are electric light and street railway plants, a National bank, several hotels, and daily, weekly, and monthly periodicals. The assessed property valuation exceeds \$5,000,000. Pop. (1890) 8,639; (1900) 10,245; (1910) 14,913.

**Athens, American School at**, an institution for classical study, founded in Athens, Greece, in 1882; a branch of the Archæological Institute of America, managed by a committee representing various colleges in the United States which contribute to its support. The building was erected by means of private subscriptions, on grounds donated by the Greek Government, and the institution has an endowment of \$50,000. Besides studying the remains of Greek civilization and art, the school has engaged in fruitful excavations at Eretria and Argos.

## Athletes

**Atherine**, a pretty little fish, from five to six inches long, called also the sandsmelt. It is the *A. presbyter* of Cuvier. It is found along the southern coasts of Europe, occupying a region distinct from that in which the smelt (*osmerus eperlanus*) occurs. It is used as food. There is an American species, the *menidia notata*, commonly called silversides.

Of the form *atherina*, a genus of fishes of the order *acanthopterygii* and the family *mugilidæ* (mulletts). Several species are known in the Mediterranean and elsewhere. The young, which congregate together, are the aphyes of the ancients. Now, in the S. of Europe, they are called nonnat.

**Atherstone, Edwin**, an English poet, born in Nottingham, England, about 1788; was the author of "The Last Days of Herculaneum" and "The Fall of Nineveh." In addition to these poems, he wrote "Israel in Egypt" and "The Handwriting on the Wall." He died Jan. 29, 1872.

**Atherton, George William**, an American educator, born in Boxford, Mass., June 20, 1837; was brought up in a cotton mill, and afterward on a farm; worked his way through Phillips Exeter Academy and Yale College; was Professor of Political Economy and Constitutional Law in Rutgers College, N. J., in 1869–1882; admitted to the bar of New Jersey in 1878; and became President of the Pennsylvania State College in 1882. He died July 24, 1906.

**Atherton, Gertrude Franklin**, an American author, born in San Francisco, Cal.; daughter of Thomas L. Horn and Gertrude Franklin, and great-grandniece of Benjamin Franklin; was educated in California and Kentucky, and married the late George H. B. Atherton. She began her literary work while living in San Francisco, in 1878, and has made a specialty of describing Spanish life in California as it was previous to 1846. Her publications include "The Randolphs of Redwood," "What Dreams May Come," "The Doomswoman" (1892); "Before the Gringo Came" (1894); "A Whirl Asunder" (1895); "His Fortunate Grace" (1897); "American Wives and English Husbands" (1898); "The Californian" (1898); "A Daughter of a Vine" (1899); "Senator North" (1900), etc.

**Athletes**, combatants who took part in the public games of Greece. The profession was an honorable one; tests of birth, position, and character were imposed, and crowns, statues, special privileges, and pensions were among the rewards of success. In April, 1896, the ancient Olympic games were revived at Athens (the 776th Olympiad) under the personal patronage of the King of Greece, who presented crowns of victory to 44 contestants, of whom 11 were from the United States, the largest num-



ber of victors from any country. The widespread interest in the games led to the formation of an international committee to arrange for future contests, the first one taking place in Paris during the Exposition of 1900. Athletic sports are now more numerous and popular than ever before, and among their particularly interesting features are the participation of women in many of them, and an increasing tendency to promote international contests.

**Athlone**, a town in Ireland, on both sides of the Shannon, chiefly in Westmeath, 80 miles W. of Dublin by rail. The Shannon is crossed by a fine bowstring and lattice iron bridge of two arches, 175 and 40 feet span. Athlone Castle, founded in the reign of King John, was one of the chief military positions in Ireland. In the war of 1688 it was unsuccessfully besieged by William III. in person, but was afterward taken by Gen. Ginkell. The fortifications cover 15 acres, and contain barracks for 1,500 men. Pop. (1901) 6,617.

**Athol**, a town in Worcester co., Mass., on Miller's river, and the Boston and Albany and Fitchburg railroads; 44 miles N. W. of Worcester. It contains several villages, has electric railways connecting with the suburbs, and is principally engaged in the manufacture of cotton warps, shoes, sewing silk, fine mechanical tools, matches, organ cases, pocket-books, billiard tables, and furniture. The town has 2 National banks, public library, high school, several weekly and monthly periodicals, and a property valuation exceeding \$4,000,000. Pop. (1890) 6,319; (1900) 7,061; (1910) 8,536.

**Athor, Hathor, or Hether**, an Egyptian goddess, identified with Aphrodite or Venus. Her symbol was the cow bearing on its head the solar disk and hawk feather plumes. Her chief temple was at Denderah. From her the third month of the Egyptian year derived its name.

**Athos, Mount, or Hagion-Oros, or Monte-Santo**, a famous mountain of Turkey in Europe, on a peninsula projecting into the Ægean Sea, between the Gulfs of Contesa and Monte-Santo. It rises abruptly from the water to a height of 6,349 feet above sea level, and in its lower parts is covered with forests of pine, oak, chestnut, etc., above which towers a bare conical peak. Athos has been famous both in ancient and modern times. Herodotus states that the fleet of Mardonius, the Persian general, in attempting to double this mountain, was reported to have lost more than 300 ships and 20,000 men. When Xerxes invaded Greece he determined to guard against the recurrence of a similar disaster by cutting a canal across the peninsula of such dimensions as to admit of two triremes passing abreast; of which great work the traces still

remain. In modern times, Athos has been occupied for an extended period by a number of monks of the Greek Church, who live in a sort of fortified monasteries, in number about 20, of different degrees of magnitude and importance. These, with the farms or *me'ochis* attached to them, occupy the whole peninsula: hence it has derived its modern name of Monte-Santo. These monasteries are situated in positions of strikingly romantic beauty. Some of them belong to Russians, others to Bulgarians and Servians. Except the produce of their own farms and vineyards, and the sale of crosses and beads, they depend chiefly on the oblations of pilgrims, and on the alms collected by their brethren in other parts. They pay an annual tribute to the Porte, and admit no females upon the peninsula. Most of these monasteries possess valuable manuscripts; and they suffered severely from the exactions of the Turks during the Greek Revolution.

**Atitlan** (at-it'lan), a lake and mountain of Central America, in Guatemala. The lake is about 24 miles long and 10 broad; the mountain is an active volcano, 12,160 feet high.

**Atkinson, Edward**, an American political economist, born in Brookline, Mass., Feb. 10, 1827; was educated in private schools and at Dartmouth College. He has become widely known by his papers and pamphlets on trade competition, banking, railroading, fire prevention, the money question, tariff, etc. Soon after the battle in Manila Bay, he was elected vice-president of the Anti-Imperialist League. After it became evident that the United States Government would take possession of the Philippine Islands, as a fruit of the war, the League issued three pamphlets, entitled "Criminal Aggression by Whom?" "The Cost of the National Crime," and "The Hell of War and Its Penalties." Early in 1899, Gen. Elwell S. Otis, commander of the army in the Philippines, notified the War Department that a large number of seditious pamphlets, mailed in the United States, had been received by officers and men under his command. An official investigation showed that Mr. Atkinson was actively concerned in the work of the League, and the Postmaster-General was instructed to notify him and postmasters throughout the United States that the mails would be closed to the further transmission of these or similar documents. In consequence of this action, Mr. Atkinson published a statement to the effect that the pamphlets complained of had been reprinted from Government publications, and that, therefore, they were to be considered as public property. Among his publications are "The Distribution of Products" (1885); "Industrial Progress of the Nation" (1889); "The Science of Nu-



trition" (1892); "Taxation and Work" (1892); "Every Boy His Own Book" (1893), etc. He died Dec. 11, 1905.

**Atkinson, George Francis**, an American botanist, born in Raisinville, Mich., Jan. 26, 1854; was graduated at Cornell University in 1885; Associate Professor of Entomology and General Zoology in the University of North Carolina, in 1886-1888; Professor of Zoology and Botany in the University of South Carolina; and Botanist of the State Experiment Station in 1888-1889; Professor of Biology in the Alabama Polytechnic Institute, and Biologist of the Experiment Station in 1889-1892; became Professor of Botany in Cornell University, and Botanist of the Experiment Station there in 1896. He is a member of numerous scientific societies, and author of "Biology of Ferns," "Elementary Botany," and many technical papers.

**Atlanta**, city and capital of the State of Georgia and of Fulton county; on the Atlanta and West Point, the Central of Georgia, the Georgia, the Seaboard Air Line, the Southern, and the Western and Atlantic railroads; 171 miles N. by W. of Augusta. The city is not only the largest in the State, but, commercially and historically, is one of the most important in the Southern States. It occupies a site 1,100 feet above sea level, at the base of the Blue Ridge Mountains, and near the Chattahoochee river. The city is nearly midway between the Atlantic Ocean and the Mississippi river, and from this fact, as well as its exceptional railroad connections and its situation among the mountains, it has received the popular name of "The Gate City." It has a most enjoyable climate and a perfect, natural drainage.

*Business Interests.*—Atlanta occupies a foremost place among the manufacturing centers of the country, its development in this line, since the close of the Civil War, being one of the wonders of American industrial enterprise. According to the United States census of 1900, there were 395 manufacturing establishments reported, employing \$16,085,114 capital, and 10,148 persons; paying \$3,957,840 for wages and \$8,571,194 for materials; and having a combined output valued at \$16,721,899. The principal manufactures are cotton, sheeting and drilling, bag and flour sacks (the largest mill of its kind in the country), cotton yarn, twine, cordage, warps, cotton seed oil, foundry and machine shop products, railroad cars, agricultural implements, and fertilizers. The city is a leading trade and wholesale jobbing center for Georgia, Florida and Alabama, with an average annual wholesale trade of over \$26,000,000, and a retail trade of \$12,000,000. It is also a large cotton receiving and shipping point,

between 250,000 and 300,000 bales being handled annually. There are 2 National and several State banks; branch offices of 16 of the largest fire, and 20 of the largest life, insurance companies in the world; a large number of building and loan associations; and nearly 50 daily, weekly, monthly, and other periodicals. The assessed property valuations exceed \$53,000,000, and the total bonded debt is about \$3,000,000.

*Public Interests.*—The city has an area of 11 square miles; 200 miles of streets, of which 64 miles are paved; a system of water works, owned by the State, that cost \$1,200,000, with 107 miles of mains; and a sewer system with 85 miles of piping. The streets are lighted by electricity, at a cost of over \$70,000 per annum; the police department cost annually about \$150,000, and the fire department, about \$111,000. There is a public school enrollment of over 15,000, and annual expenditures for public education of over \$150,000. The annual cost of maintaining the city government exceeds \$1,250,000. Atlanta is the seat of the Georgia Institute of Technology, Agnes Scott Institute, Washington Seminary, Atlanta Baptist, Clark, and Atlanta Universities, Morris Brown College, Gammon Theological and Spelman Seminaries, Atlanta and Southern Medical Colleges, Southern Military and Female Colleges, the Georgia College of Eclectic Medicine, and other institutions. Among the local attractions are the State Capitol that cost \$1,000,000, Grant, Piedmont, and Red Wood Parks, and Fort McPherson, one of the most complete military posts in the country.

*History.*—Atlanta was first settled under the name of Terminus, in 1845. Subsequently it was known as Marthasville, and in 1847 it was incorporated under its present name. The city had a large and most disastrous share in the Civil War. After being besieged by the Federal army, under General Sherman, and bombarded for 40 days, it was captured Sept. 2, 1864. General Sherman rested here till November following, when, before starting on his famous march to the sea, he burned the city. After the war, the State recuperated more rapidly than any other one in the South that had been exposed to the fury of the war. In 1881 an exposition of the Cotton States, and in 1895, a great Cotton States and International Exposition were held here, the last in Piedmont Park, in which the United States and many of the Northern States, besides European and South American countries, took part. Pop. (1900) 89,872; (1910) 154,839. J. C. WOODWARD.

**Atlanta, The**, a single-screw, steel, protected cruiser, belonging to the United States navy; 3,189 tons displacement; length, 270 feet 3 inches; breadth, 42 feet; mean draft, 17 feet; horse power, 4,030; main battery,



## Atlanta University

six 6-inch and two 8-inch breech-loading rifles; secondary battery, two 6-pounder, four 3-pounder, and four 1-pounder rapid-fire guns; two 47-millimeter Hotchkiss revolving guns, and two Gatlings; speed, 15.6 knots; crew, 19 officers and 265 men; cost, \$805,711.64.

**Atlanta University**, a co-educational (non-sectarian) institution, in Atlanta, Ga., opened in 1869; has grounds and buildings valued at over \$260,000; endowment, \$75,000; scientific apparatus, over \$12,000; income, about \$60,000; faculty, 20; students, nearly 400; volumes in the library, 13,000; graduates, over 625.

**Atlantes**, in architecture, colossal statues of men used instead of pillars to support an entablature. Roman architects called them *telamones* (Greek). When statues of women support an entablature, they are generally called caryatides.

**Atlantic City**, a city and noted seaside resort in Atlantic co., N. J.; on a long, sandy island, known as Absecom Beach; 60 miles S. E. of Philadelphia, with which it is connected by steam railroad. The island stretches along the coast for 10 miles; has an average width of  $\frac{3}{4}$  of a mile, and is from 4 to 5 miles from the mainland. At the N. end is the Absecom Light, well known to coastwise sailors. The city has several miles of bathing beach, a magnificent promenade on the ocean front, nearly 100 hotels and boarding houses, electric lights, public schools, churches of the principal denominations, 3 National banks, and daily, weekly, and monthly periodicals. It is probably the first all-the-year-round resort in the United States, its splendid climate giving it a large popular patronage even in the dead of winter. The assessed property valuation exceeds \$14,000,000. Pop. (1890) 13,055; (1900) 27,838; (1910) 46,150; (in summer) 150,000.

**Atlantic Ocean**, the name given to the vast expanse of sea lying between the W. coasts of Europe and Africa, and the E. coasts of North and South America, and extending from the Arctic to the Antarctic Seas. Its greatest breadth is between the W. coast of Northern Africa and the E. coast of Florida in North America, the distance here being 4,150 miles. If the Gulf of Mexico, in reality one of its bays, be included, it will extend to 5,000 miles. Its least breadth, which is between Norway and Greenland, is about 930 miles. Between Cape St. Roque, Brazil, and Sierra Leone, the breadth is 1,730 miles. Its superficial extent has been estimated at 25,000,000 square miles. From the number and extent of its inlets, gulfs, and bays, its coast-lines are of great length, the E. being upward of 32,000 miles, and the W. upward of 55,000. Its principal inlets and bays are Baffin and Hudson bays, the Gulfs of Mex-

## Atlantic Ocean

ico, Honduras, and San Juan, the North Sea or German Ocean, the Bay of Biscay, and the Gulf of Guinea. The principal islands, N. of the equator are Iceland, the Faroe and British islands, the Azores, Canaries, and Cape de Verd islands, Newfoundland, Cape Breton, and the West India islands; and S. of the equator, Ascension, St. Helena, Trinidad, Columbus, and Tristan da Cunha, the last three being mere rocks.

The great currents of the Atlantic are of two kinds, drift currents and the stream currents. Drift currents are produced by the wind, either by the perpetual or trade winds, or by prevailing winds. Those having the former origin are constant, running always in the same direction, and generally with a nearly equal velocity; those having the latter are not so constant, neither do they always run in the same direction, nor at a similar rate. The drift currents produced by the trade winds are found between the tropics; those resulting from prevailing winds, N. and S. of the parallels of 30°. Stream currents are due indirectly to the influence of winds, being produced by drift currents, of which they are continuations. As these currents travel for great distances they meet with many obstacles in their course, which result in changes of direction. A stream current may thus be successively propelled by different currents, or consist in the combination of different stream currents. A third kind of currents is produced by the flow of the water to restore the level disturbed by other currents. This is called a current of indraught. The great currents of the Atlantic are the Gulf Stream, the equatorial current—which may be divided into the main equatorial current, the N. equatorial current, and the S. equatorial currents, the North African and Guinea current, the South connecting current, the Southern Atlantic current, Cape Horn current, Rennel current, and the Arctic current.

The Gulf Stream is a continuation of the main equatorial current, and partly of the N. equatorial current, both W. drift currents produced by the trade winds. The former passes across the Atlantic to the American coast, upon which it strikes from Cape St. Roque to the Antilles. On being turned by the coast it runs along it at a rate of 30 to 50 miles per day, and sometimes at a higher speed, till it enters the Gulf of Mexico, from which having previously received part of the waters of the N. equatorial current, it issues between Florida and Cuba under the name of the Gulf Stream. It afterward flows nearly parallel to the coast of the United States, separated from it by a belt of cold water. Off Cape Hatteras it spreads into an expanding channel, reaching a breadth of 167 miles, and consisting of three warm sections with two cold belts interposed. On passing Sandy



Hook it turns E. and continues to be recognizable, partly by a blue color derived from the silt of the Mississippi, till about lon.  $30^{\circ}$  W., where, with a greatly diminished temperature, it is found flowing nearly due E.

The equatorial current, so called from its being under the line, commences on the W. coast of Africa, about lat.  $10^{\circ}$  S., or nearly opposite St. Paul de Loando. From this point it pursues a N. W. direction till it makes lon.  $0^{\circ}$ , when it proceeds due W. on both sides of the equator, till it arrives at Cape St. Roque in South America, when it is divided into two branches, one running along the Guiana coast, and into the Gulf of Mexico, as already mentioned, the other along the coast of Brazil, and so called the Brazil current. The latter is reinforced by the S. equatorial current, which, however, is not distinctly separable from the main equatorial current. The length of the equatorial current, from the coast of Africa to Cape St. Roque, is 2,500 miles. Its breadth near the commencement is 185 miles; opposite Cape Palmas, 420; and before dividing, about lon.  $31^{\circ}$  or  $32^{\circ}$  W., it is 510. Its average velocity, which is greater in summer than in winter, is from 25 to 30 miles a day.

The North African and Guinea current originates between the Azores and Cape Finisterre in Spain. It flows in a S. E. direction, and after sending a mass of water into the Mediterranean it pursues a S. course to Cape Mesurada, S. of Sierra Leone, keeping at a considerable distance from the land. It then flows rapidly for 1,000 miles due E. to the Bight of Biafra, where it seems to mingle with the equatorial current. It is led from the W. by the Guinea counter current, a back flow of water between the main and the N. equatorial currents. The S. connecting current strikes across the South Atlantic from the Brazil current, then turns N., and finally joins the great equatorial current.

The South Atlantic or South African current originates N. of the Cape of Good Hope, from which it flows in a N. W. direction, at a rate of from 15 to 30 miles a day, and eventually merges into the equatorial current. Cape Horn current flows constantly from the Antarctic and South Seas into the Atlantic Ocean, its general direction being E. N. E. and N. E. Rennel current, which is possibly a continuation of the Gulf Stream, enters the Bay of Biscay from the W., curves round its coast, and then turns N. W. toward Cape Clear in Ireland. The Greenland or Arctic current runs along the E. coast of Greenland to Cape Farewell; having doubled this cape, it flows up toward Davis Strait, from which it receives an inflow of water, and then turns to the S. along the coast of Labrador, and continues along the coast of the United States, from which it separates the Gulf

Stream by a cold band of water. Immense masses of ice are borne S. by this current from the Polar seas, and carried into warmer regions, where they gradually dissolve and disappear.

In the interior of the North Atlantic there is a large area comparatively free from currents, lying between  $20^{\circ}$  and  $30^{\circ}$  N. and  $30^{\circ}$  to  $60^{\circ}$  W. It is called the Sargasso Sea, from the large quantity of sea weed which drifts into it. A similar area exists in the South Atlantic, to which the same name is occasionally applied by analogy, though it is destitute of sea weed. It extends between  $20^{\circ}$  and  $30^{\circ}$  S. and  $0^{\circ}$  and  $25^{\circ}$  W. Besides the surface currents, recent investigation has established the existence of a general oceanic circulation, consisting of an under current of cold water flowing from the poles to the equator, and an upper current of warm water from the equator to the poles.

The winds of the Atlantic are not peculiar to that ocean, but identical with those that prevail in the same latitudes in the other seas around the globe. The most remarkable of these are the perennial or trade winds, which blow constantly in one direction, namely, from E. to W., or nearly so. The tract of the trade winds to the N. of a zone, which is almost always found on the N. side of the equator, is called the region of the N. E. trade wind, from blowing one or two points N. of E.; that to the S., the region of the S. E. trade wind, from blowing S. of E. The N. E. trade wind blows with less steadiness than the S. E., but toward the West India islands it keeps generally steady between E. and N. E. The trade winds are constant only at a considerable distance from land, and become more steady the greater the expanse of water over which they blow.

The greatest depth yet discovered in the Atlantic is to the N. of the island of Porto Rico, in the West Indies, namely, 27,366 feet. Formerly depths of 40,000 or 50,000 feet were reported, but this was owing to defective sounding apparatus. The geography of the ocean bed is now pretty well known, especially in the North Atlantic. Cross-sections of the North Atlantic between Europe and America show that its bed may be represented as exhibiting two great valleys lying in a N. and S. direction, and separated by an intervening ridge. Each of these valleys is about 500 miles in width. The mean depth of the E. valley is about 14,000 or 15,000 feet, and it can be traced from the equator to the latitude of the Faroes, where it terminates, or over an extent of 3,700 miles. The W. valley has a maximum depth of 16,800 feet, and can be traced from the latitude of the Azores as far N. as Greenland, where it bifurcates, the deeper portion pointing N. up Baffin's bay. The submarine ridge divid-



ing these two valleys appears to be very uniform in depth below the surface, having 1,600 fathoms of water above it from the Azores to the latitude of the Hebrides. It then rises gradually till at last it culminates in Iceland. On this plateau the Atlantic telegraph cables have been laid, and from it the first specimens of deep-sea mud were brought up. This was found on examination by the microscope to consist to a large extent of calcareous shells (Foraminifera), not water-worn, but quite perfect, showing that the water at such depths can have little or no motion. No sandy particles were found in the mud. The South Atlantic is not so well known as the North, but so far as soundings yet prove it has not a greater depth than the latter, the greatest depth found being 2,900 fathoms, in lat. 28° S. It would appear to be separated from the North Atlantic by a rocky ridge, on which rest the islands of Ascension, Fernando de Noronha, and St. Paul. The saltness and specific gravity of the Atlantic differ in various parts, and gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. In the neighborhood of the British Isles the salt has been stated at one thirty-eighth of the weight of the water.

**Atlantic Telegraph**, lines laid on the bed of the Atlantic Ocean. The union of the Old and New Worlds by means of the electric telegraph, probably the boldest feat of electric engineering ever projected, was first suggested by Prof. Morse in 1843. Various reasons prevented his ideas taking practical shape, the principal obstacle being the unknown depth of the Atlantic and the supposed rocky nature of the bottom. When, however, Lient. Maury of the United States navy discovered that between Ireland and Newfoundland the bed of the ocean was nearly level and covered with soft ooze, and Cyrus W. Field and others had thoroughly discussed the practical methods, a company was formed for the purpose, in 1856, to which the Governments of Great Britain and the United States gave liberal guarantees. This company, after a fruitless attempt to lay an electric cable in 1857, finally succeeded in 1858. The cable, 2,500 miles long, and weighing one ton per mile, was composed of seven fine copper wires, cased in gutta-percha, contained in a casing of hemp, saturated with pitch, beeswax, and oil, the outer sheath being composed of 18 strands of seven iron wires each. It was taken, in equal portions, on board H. M. S. "Agamemnon" (91 guns), and the United States frigate "Niagara," spliced in mid-ocean, and finally landed; the one end by the "Agamemnon" at Valentia, Ireland; the other by the "Niagara," at Trinity Bay, Newfoundland.

The result was not encouraging. The cur-

rent obtained through the wire was so weak that a congratulatory message from the Queen to the President, consisting of 90 words, took 67 minutes to transmit. After a few more messages, the cable became useless. In consequence of this failure, it was not until 1865 that capital was found to make another attempt. This time the cable was made still heavier, and the whole length, 2,300 miles, weighing 4,000 tons, was shipped on board one vessel, the "Great Eastern." The paying-out journey was commenced at Valentia, but when the vessel was 1,064 miles from that port, the cable broke from an accidental strain. After a fruitless effort to fish up the broken cable from the bottom, it was abandoned for the season. In 1866 another line, so modified in construction as to be both lighter and stronger than the previous one, was successfully laid by the "Great Eastern." The 1865 cable was then, by means of the same vessel, grappled for, and brought up from a depth of two miles, spliced, and completed to Trinity Bay.

The practicability of laying an electric wire across the Atlantic being thus demonstrated, many lines have been projected, and several of them carried out. In 1869 a French company laid a line from Brest to St. Pierre to the S. of Newfoundland. In 1873 a line was begun from Lisbon to Pernambuco, in South America. This line, by means of a duplicate line from London to Lisbon, brings Great Britain into direct communication with the whole of South America. Other two cables were laid from Valentia to Trinity Bay in 1874 and 1875. One from Penzance to St. Pierre was laid in 1879; another from England to Panama was completed in 1882; and in 1884 Messrs. Bennett and Mackay's line was laid from Valentia to Torbay in Nova Scotia.

This multiplicity of Atlantic telegraph lines has had the usual effect of competition, in reducing the rates for the transmission of messages. When the first line was opened for messages, the rates were \$100 for 20 words of five letters each, and \$10 for every five letters extra. The following year those rates were halved, and by successive reductions, have since reached an average rate of 25 cents per word. To obviate the costliness of long messages as far as possible, several code and cipher schemes have been devised for transmitting lengthy messages by a comparatively small number of words. These schemes, subject to certain regulations, have been accepted by the post-offices and telegraph companies. The whole Atlantic system is worked in connection with the ordinary telegraph system of the world, and, with the lines to India and Australia, may be said to bring the uttermost ends of the earth within speaking distance.



**Atlantides**, a name given to the Pleiades, which were fabled to be the seven daughters of Atlas or of his brother Hesperus.

**Atlantis**, or **Atlantica**, an island, said by Plato and others to have once existed in the ocean immediately beyond the Straits of Gades; that is, in what is now called the Atlantic Ocean, a short distance W. of the Straits of Gibraltar. Homer, Horace, and some others made two Atlanticas, distinguished as the Hesperides and the Elysian Fields, and believed to be the abodes of the blessed. Plato states that an easy passage existed from the one Atlantis into other islands, which lay near a continent exceeding in size all Europe and Asia. Some have thought this America. Atlantis is represented as having ultimately sunk beneath the waves, leaving only isolated rocks and shoals in its place. Geologists have discovered that the coast-line of Western Europe did once run farther in the direction of America than now; but its submergence seems to have taken place long before historic times, so that the whole ancient story about Atlantis was probably founded on erroneous information, or arose from a clever guess put forth by a man of lively imagination. "The New Atlantis" is the title which Lord Bacon gives to a literary fragment, in which he sketched out an ideal commonwealth.

**Atlantosaurus**, a gigantic fossil reptile, order *dinosauria*, obtained in the upper Jurassic strata of the Rocky Mountains, attaining a length of 80 feet or more.

**Atlas**, an extensive mountain system in North Africa, starting near Cape Nun, on the Atlantic Ocean, traversing Morocco, Algiers and Tunis, and terminating on the coast of the Mediterranean; divided generally into two parallel ranges, running W. to E., the Greater Atlas lying toward the Sahara, and the Lesser Atlas toward the Mediterranean. The principal chain is about 1,500 miles long, and the principal peaks rise above or approach the line of perpetual congelation; Miltin, in Morocco, being 11,400 feet high, and another peak in Morocco 11,500 feet high. The highest elevations are, perhaps, over 13,000 feet. Silver, antimony, lead, copper, iron, etc., are among the minerals. The vegetation is chiefly European in character, except on the low grounds and next the desert.

**Atlas**, in Greek mythology, the name of a Titan whom Zeus condemned to bear the vault of heaven. The same name is given to a collection of maps and charts, and was first used by Gerard Mercator in the 16th century, the figure of Atlas bearing the globe being given on the title-pages of such works.

**Atlas**, in anatomy, is the name of the first vertebra of the neck, which supports the

head. It is connected with the occipital bone in such a way as to permit of the nodding movement of the head, and rests on the second vertebra, or axis, their union allowing the head to turn from side to side.

**Atlee, Washington Lemuel**, an American surgeon, born in Lancaster, Pa., Feb. 22, 1808; became noted as a pioneer in ovariectomy and the removal of uterine fibroid tumors, and published "Ovarian Tumors" (1873); "Struggles and Triumphs of Ovariectomy" (1875), and a prize essay on "Fibroid Tumors of the Uterus" (1876). He died Sept. 6, 1878.

**Atmidometer**, an instrument invented by Babington, for measuring the evaporation from water, ice, snow, etc. It consists of two glass or metal bulbs, one of them placed above the other, with which it communicates by a narrow neck. The instrument being immersed in a vessel of water through a circular hole in which the steam rises, distilled water is gradually poured into the pan above, causing it to sink to the point at which the zero of the stem is on a level with the cover of the vessel. As then the water in the pan gradually evaporates, the steam slowly ascends, the amount of evaporation being indicated in grains on the graduated scale.

**Atmolysis**, a method of separating the constituent gases of a compound gas (such as atmospheric air) by causing it to pass through a vessel of porous material (such as graphite); first made known in August, 1863, by the discoverer, the late Prof. T. Graham, F. R. S.

**Atmometer**, an instrument invented by Sir John Leslie for measuring the quantity of moisture exhaled in a given time from any humid surface. It consists of a very thin ball of porous earthenware, from one to three inches in diameter, having a small neck firmly cemented to a long and rather wide tube of glass, to which is adapted a brass cap with a narrow collar of leather to fit closely. It is filled with distilled or pure water, and its cap screwed tightly. It is then suspended out of doors in a situation where it is exposed freely to the action of the wind, but is sheltered from rain. As the water evaporates from the external surface of the ball, it transudes through its porous substance, and the waste is measured by the corresponding descent of the liquid in the stem. To test the amount of this descent, there is a finely-graduated scale. When the water has sunk to the bottom of the stem, the latter requires to be filled anew.

**Atmosphere**, literally, the air surrounding our planet, and which, as the etymology implies, is, speaking broadly, a "sphere" (not, of course, a solid, but a hollow one). With strict accuracy, it is a hollow spheroid.



## Atmospheric Absorption

Its exact height is unknown. At 2.7 miles above the surface of the earth, half its density is gone, and the remainder is again halved for every further rise of 2.7 miles. Some small density would remain at 45 miles high. At 80 miles, this would have all but disappeared. But from sundry observations, made at Rio Janeiro and elsewhere, on the twilight arc, M. Liais infers that the extreme limit of the atmosphere is between 198 and 212 miles. In the lower strata of the atmosphere, the temperature falls at least a degree for every 352 feet of ascent; hence, even in the tropics, mountains of any considerable elevation are snow-capped. The atmosphere appears to us blue, because, absorbing the red and yellow solar rays, it reflects the blue ones. It revolves with the earth, but being extremely mobile, winds are generated in it, so that it is rarely long at rest. (For its composition, see AIR.) Evaporation, continually at work, sends into it quantities of water in a gaseous state; clouds are formed, and in due time descend in rain. The atmosphere always contains free electricity, sometimes positive and sometimes negative. There appears to be no atmosphere around the moon; but the case seems different with the sun, Venus, Mars, Jupiter, and Saturn.

Figuratively, any pervading intellectual, moral, religious, or other influence by which one is surrounded; as in the expression, "He lives in an atmosphere of suspicion."

**Atmospheric Absorption**, a term applied to the action of the atmosphere in cutting off or absorbing in a greater or less degree radiant energy of certain wavelengths. A part of the lines seen in the solar spectrum are due to this action of the atmosphere, and many of them are due to the presence of water-vapor, which causes the appearance of certain groups of lines or rain-bands, whose intensity varies with the amount of the vapor. These have been utilized to a limited extent to assist in weather-predictions, but not very generally. Other groups of lines are due to the oxygen of the air. Also in a general way it has been known that our atmosphere cuts off the blue end of the spectrum more than the red end, causing the red appearance of the sun or moon at the time of rising or setting, when the light is transmitted through a much greater extent of the atmosphere. But it was not till the United States Signal Service expedition to Mt. Whitney, in charge of Prof. Langley, that the amount of this selective absorption was shown to be so great that, if we could see the sun from above our atmosphere where it would have been submitted to no such action, it would probably appear of a distinctly bluish tint instead of white or yellowish as it now does. The atmosphere of the sun itself also acts in a

## Atmospheric Railway

similar way, the light from its edges being not only fainter, but redder, than that from the center.

**Atmospheric Engine**, an engine in which the piston was forced down by the pressure of the atmosphere, when the steam, which caused it to rise, was condensed so as to produce a near approach to a vacuum in the cylindrical chamber beneath it. Such was Newcomen's engine, constructed in 1705, and subsequently improved by Smeaton, Brindley, and others, till superseded by Watt's single-acting engine, which was a genuine steam-engine. The atmospheric engine was used only for pumping water.

**Atmospheric Pressure**, the pressure exerted by the atmosphere, not merely downward, but in every direction. It amounts to 14.7 pounds of weight on each square inch, which is often called in round numbers 15. On a square foot it is  $\approx 2,160$  pounds, or nearly a ton. It would act upon our bodies with crushing effect were it not that the pressure, operating in all directions, produces an equilibrium. If any gas or liquid press upon a surface with a force of 15 pounds on a square inch, it is generally described as having a pressure of one atmosphere; if 60 pounds, of four atmospheres; if 120 pounds, of eight atmospheres, and so on.

**Atmospheric Railway**, a railway in which the propulsive force designed to move the carriages along is that of the atmosphere. The notion of such a method of locomotion seems first to have suggested itself, in the latter part of the 17th century, to the French physician, Papin, whose name is forever associated with the celebrated digester. In 1810, Mr. Medhurst published a work entitled "A New Method of Conveying Letters and Goods by Air." His proposal was to construct a close tunnel, in which the carriages — the last of them provided with a piston fitting the tunnel — should be propelled by air forced in behind them. Vallance, of Brighton, in 1825, recommended, as an improvement on this plan, the exhaustion of the air in front. About 1835, Henry Pinkus, an American, residing in England, patented a scheme for placing the carriages in the open air, but connecting them below with a small tunnel, having a narrow slit above, with ingeniously constructed apparatus to render the tunnel temporarily air-tight, notwithstanding the slit. Not much was done to carry out the patent; and Pinkus' scheme of what he called a pneumatic railway was considered as having failed, when, in 1840, Messrs. Clegg and Samuda brought forward a somewhat similar project under the name of the "Atmospheric Railway." An experimental fragment of line laid down near Wormwood Scrubs, just outside of London, on the Great Western line, was successful,



as was one designed for actual use from Kingstown to Dalkey, in Ireland, another between London and Croydon, and a third in South Devon; all, however, have been since abandoned. For passengers at least, and to a great extent even for the transmission of letters, the railways of the ordinary type, on which steam is the impelling force, have triumphantly held their own against the innovation of the atmospheric or pneumatic railway, and all that now remains of the latter method of propulsion are the pneumatic dispatch tubes, used for transmitting parcels to short distances.

**Atmospheric Unsteadiness**, a term used by astronomers and geodesists to describe the tremors and undulations by which the images of any objects in the field of view of a telescope are distorted, blurred, and made to dance, vibrate, and boil, to a greater or less degree. It is greatest at the horizon and least at the zenith. Its causes are probably due to the unequal density of the different strata of air through which the rays of light come to the eye or the telescope, introducing irregularities in the refraction, and also interference among the rays of light of different wave-length that have come by very slightly different paths. The latter, however, is more probably the cause of the twinkling or scintillations, making the stars appear to change in brightness and color to the naked eye. This unsteadiness is the stumbling-block in the way of much further progress in astronomical research, so far as accuracy and precision are concerned, and improvement is more to be looked for now in the discovery of better sites for observatories than in the making of larger telescopes.

**Atoll**, the name applied by geologists and others to any one of the Lagoon Islands, or annular coral reefs found in the Pacific and the Indian Oceans, the Red Sea, and some other parts of the tropics. An atoll is a ring of coral rock, oval rather than circular in form. One reaches 88 miles in its longer, by 20 in its shorter, diameter; but in general, they are of much more limited dimensions. On the top of the coral rock, which rises but slightly above the sea level, is vegetation of some luxuriance—the coconut being the most conspicuous plant. On the convex circumference of the ring is a beach of white sand, exterior to which is a line of breakers, and a few feet beyond them the unfathomable ocean. The ring of land, which is less than half a mile across, encircles a lagoon of comparatively still water, which, from reflection, is of a bright but pale green color. In the view of Mr. Darwin, now almost universally adopted, there was once an island, possibly even containing high land, in the place now occupied by the lagoon. It was surrounded by a fringing reef of living coral close to the

shore. As, from geological causes, it slowly subsided into the deep and disappeared, the coral animals built up to the surface of the water, and formed the ring of rock constituting the modern island. In the larger atolls there are generally two or three breaks in the ring, affording ship channels into the lagoon; these mark the spots where fresh water, discharged from the old subsiding land into the sea, prevented the coral animals, which are marine, from locating themselves or building.

**Atom**, in mental philosophy, a particle of matter so infinitely small that it cannot again be subdivided; the idea of a divided atom—that is, of a division of that which cannot be divided—being self-contradictory. It is a mental conception simply; for the senses cannot take cognizance of anything so minute.

In natural philosophy, one of the exceedingly minute ultimate particles of matter, aggregates of an immense number of which, held in their place by molecular forces, constitute all material bodies.

In chemistry, the smallest particle into which an element can be divided. An atom cannot exist in a separate state, but unites with one or more atoms to form a molecule. The atoms of different elements have definite relative weights fixed and invariable for each, the weight of an atom of hydrogen being regarded as unity.

**Atomic Heat**, a term introduced by M. Regnault. The atomic heat of the elements in a solid state is nearly a constant quantity, the mean value being 6.4. This number is obtained by multiplying the specific heat of an element by its atomic weight. The atomic heat of an element represents the quantity of heat which must be imparted to or removed from atomic proportions of the several elements, to produce equal variations of temperature.

**Atomic Philosophy**, in mental and natural philosophy, the doctrine of atoms, originally broached by Leucippus, afterward developed by Democritus, and which underwent further modifications at the hands of Epicurus. It represented atoms as possessed of gravity and motion, and attributed to their union the formation of all things. Democritus is reported to have said that they come together in different order and position like the letters, which, though they are few, yet, by being placed in conjunction in different ways, produce innumerable words.

**Atomic Theory**, a theory first propounded by John Dalton in his "New System of Chemical Philosophy," published in 1807. He stated that the atoms of each element were incapable of being subdivided, and each had a definite relative weight, compared with that of hydrogen as 1; that



Atomic Volume

the composition of a definite chemical compound is constant; that if two elements, A and B, are capable of uniting with each other in several proportions, the quantities of B which unite with a given quantity of A usually bear a simple relation to one another. If an element A unites with certain other elements B, C, D, then the quantities B, C, D, which combine with A, or simple multiples of them, represent the proportions in which they can unite among themselves. Dalton supposed that one element replaced another atom for atom, but it has since been found that one atom of an element can replace one or more atoms of another element, according to their respective atomicities.

**Atomic Volume**, in chemistry, a term introduced by Graham in lieu of the phrase "specific volume," used by Dr. Kopp. It signifies the volume or measure of an equivalent or atomic proportion in different substances. It is obtained by dividing the molecular weight of a compound by its specific gravity. The specific gravity of a compound gas or vapor referred to hydrogen as unity, is equal to half its atomic weight; therefore, the atomic volumes of compound gases or vapors referred to hydrogen as unity are, with few exceptions, equal to 2. The densities of isomorphous solid compounds are proportional to their molecular weights, that is, they have equal atomic or specific volumes. The differences of specific or atomic volume of organic liquids are often proportional to the differences between the corresponding chemical formulæ. Thus liquids whose formulæ differ by  $n\text{CH}_2$ , differ in specific or atomic volume by  $n$  times 22.

**Atomic Weights**, the proportions by weight in which the various elementary substances unite together. It is necessary that one element be selected as the starting-point of the series and an arbitrary sum affixed to it, so that thereby all the other elements can have their sums awarded to them, according to the proportional amounts in which they combine with each other. The second law mentioned under the atomic theory explains the manner in which this can be done, and how far the numbers are arbitrary. One list of atomic weights is that derived by assigning the value 1 to the atomic weight of hydrogen. According to what is known as "Prout's hypothesis," the various chemical elements are all products of the condensation of hydrogen. The hydrogen standard, therefore, was formerly regarded as the most satisfactory. Experiments of high accuracy demonstrated, however, that, hydrogen being assumed as the unit, the values of the atomic weights are not necessarily, as had been supposed, integral numbers. Oxygen is now employed as a standard, with its atomic weight = 16.

Atomic Weights

The following table gives in the first column the values based on the atomic weight of hydrogen, in the second those based on that of oxygen:

ELEMENTARY SUBSTANCES, WITH THEIR SYMBOLS AND ATOMIC WEIGHTS.

| NAME OF ELEMENT              | Symbol. | ATOMIC WEIGHTS. |        |
|------------------------------|---------|-----------------|--------|
|                              |         | H=1             | O=16   |
| Aluminium . . . . .          | Al      | 27.5            | 27.1   |
| Antimony (Stibium).....      | Sb      | 120.0           | 120.0  |
| Argon.....                   | A       |                 | 40.0   |
| Arsenic.....                 | As      | 75.0            | 75.0   |
| Barium.....                  | Ba      | 137.0           | 137.4  |
| Bismuth.....                 | Bi      | 208.0           | 208.5  |
| Boron.....                   | B       | 11.0            | 11.0   |
| Bromine.....                 | Br      | 80.0            | 79.96  |
| Cadmium . . . . .            | Cd      | 112.0           | 112.0  |
| Cesium.....                  | Cs      | 133.0           | 133.0  |
| Calcium... . . . .           | Ca      | 40.0            | 40.0   |
| Carbon.....                  | C       | 12.0            | 12.0   |
| Cerium . . . . .             | Ce      | 138.0           | 140.0  |
| Chlorine.....                | Cl      | 35.5            | 35.4   |
| Chromium.....                | Cr      | 52.5            | 52.15  |
| Cobalt.....                  | Co      | 59.0            | 59.0   |
| Columbium.....               | Cl      | 94.0            | 94.0   |
| Copper (Cuprum).....         | Cu      | 63.0            | 63.4   |
| Erbium . . . . .             | Er      | 169.0           | 166.0  |
| Fluorine.....                | F       | 19.0            | 19.0   |
| Gallium.....                 | Ga      | 69.0            | 70.0   |
| Germanium.....               | Ge      |                 | 72.0   |
| Glucium (Beryllium).....     | G       | 9.03            | 9.1    |
| Gold (Aurum) . . . . .       | An      | 196.7           | 197.2  |
| Helium.....                  | He      |                 | 4.0    |
| Hydrogen . . . . .           | H       | 1.0             | 1.01   |
| Indium.....                  | In      | 113.4           | 114.0  |
| Iodine.....                  | I       | 127.0           | 126.85 |
| Iridium.....                 | Ir      | 193.0           | 193.5  |
| Iron.....                    | Fe      | 56.0            | 56.0   |
| Lanthanum.....               | La      | 139.0           | 138.0  |
| Lead (Plumbum).....          | Pb      | 207.0           | 206.9  |
| Lithium.....                 | Li      | 7.0             | 7.03   |
| Magnesium.....               | Mg      | 24.0            | 24.36  |
| Manganese... . . . .         | Mn      | 55.0            | 55.0   |
| Mercury (Hydrargyrum)...     | Hg      | 200.0           | 200.3  |
| Molybdenum.....              | Mo      | 96.0            | 96.0   |
| Neodymium . . . . .          | Nd      |                 | 144.0  |
| Nickel.....                  | Ni      | 58.8            | 58.17  |
| Nitrogen . . . . .           | N       | 14.0            | 14.14  |
| Osmium.....                  | Os      | 191.0           | 191.0  |
| Oxygen.....                  | O       | 16.0            | 16.0   |
| Palladium.....               | Pd      | 106.5           | 106.0  |
| Phosphorus . . . . .         | P       | 31.0            | 31.0   |
| Platinum.....                | Pt      | 197.0           | 194.8  |
| Potassium (Kalium) . . . . . | K       | 39.0            | 39.15  |
| Praseodymium.....            | Pr      |                 | 140.0  |
| Rhodium.....                 | Rh      | 104.0           | 103.0  |
| Rubidium.....                | Rb      | 85.0            | 85.4   |
| Ruthenium.....               | Ru      | 104.0           | 101.7  |
| Samarium.....                | Sa      |                 | 150.0  |
| Scandium . . . . .           | Sc      |                 | 44.1   |
| Seelenium.....               | Se      | 79.0            | 79.1   |
| Silicon.....                 | Si      | 28.0            | 28.4   |
| Silver (Argentum).....       | Ag      | 108.0           | 107.93 |
| Sodium (Natrium).....        | Na      | 23.0            | 23.05  |
| Strontium.....               | Sr      | 87.5            | 87.6   |
| Sulphur . . . . .            | S       | 32.0            | 32.06  |
| Tantalum . . . . .           | Ta      | 182.0           | 183.0  |
| Tellurium . . . . .          | Te      | 127.0           | 127.0  |
| Thallium . . . . .           | Tl      | 204.0           | 204.1  |
| Thorium . . . . .            | Th      | 231.0           | 232.0  |
| Tin (Stannum).....           | Su      | 118.0           | 118.5  |
| Titanium.....                | Ti      | 48.0            | 48.1   |
| Tungsten (Wolfram).....      | W       | 184.0           | 184.0  |
| Uranium.....                 | U       | 240.0           | 239.5  |
| Vanadium.....                | V       | 51.2            | 51.2   |
| Ytterbium.....               | Yb      |                 | 173.0  |
| Yttrium.....                 | Y       | 89.0            | 89.0   |
| Zinc . . . . .               | Zn      | 65.0            | 65.4   |
| Zirconium.....               | Zr      | 90.0            | 90.6   |



**Atonement**, in theology, the sacrificial offering made by Christ in expiation of the sins, according to the Calvinists, of the elect only; according to the Arminians, of the whole human race. In the authorized version of the Old Testament, the word atonement occurs not less than 58 times in the text, and once in the margin; all but five of the places in which it is found being in the Pentateuch. It signifies —

1. Expiation of sin by means of a typical sacrifice, generally of a victim, offered in faith.

“For the life of the flesh is in the blood: and I have given it to you upon the altar to make an atonement for your souls: for it is the blood that maketh an atonement for the soul.” (Lev. ii: 11.)

“And one kid of the goats for a sin-offering, to make an atonement for you.” (Num. xxix: 5.) (See also Lev. i: 4; iv: 35; x: 17; xv: 10, 33, 34; Num. viii: 21; xvi: 46; xxv: 13; II Sam. xxi: 3; II Chron. xxix: 24, etc.)

2. The removal, by a sacrificial offering, of ceremonial impurity (Lev. xii: 7, 8). In this sense the term was sometimes used of inanimate things — namely, of the altar (Exod. xxix: 36, 37; Lev. xvi: 18); of a house infected with the leprosy (xiv: 53); of the holy place, on account of the sins of the worshippers (xvi: 16); of the holy of holies (ver. 33); of the tabernacle of the congregation (ibid), and of the work of the Temple (Neh. x: 33).

3. Ransom.

“Then he is gracious unto him and saith, Deliver him from going down into the pit: I have found a ransom [in margin, atonement].” (Job xxxiii: 24.)

4. In one place atonement is used for what was, in its essential features, a thank-offering (Num. xxxi: 50).

(a) Atonement money: Money paid for purposes of atonement.

“And thou shall take the atonement money of the children of Israel.” (Exod. xxx: 16.)

(b) The Day of Atonement, or the Great Day of Atonement, was on the 10th of the seventh month. (For details regarding it, see Lev. xxiii: 26–32; xxv: 9).

In the New Testament, the word occurs only once, viz., in Rom. v: 11:

“And not only so, but we also joy in God through our Lord Jesus Christ, by whom we have now received the atonement” (in the margin, reconciliation).

The Greek word is *katallagen* = (1) the exchange of one thing for another, as, for instance, money for an article; (2) a change from enmity to friendship; reconciliation; from *katallasso* = (1) to change money; (2) to change a person from enmity to friendship; to reconcile. The marginal rendering is evidently correct. And in II Cor. v: 18, 19, the same Greek substantive is twice rendered “reconciliation,” and the same Greek verb, also twice, “reconcile.”

**Atossa**, daughter of Cyrus, 530 B. C.; was successively married to Cambyses, Smerdis, one of the Magi, and Darius, son of Hydaspes, the last of whom she incited to invade Greece. The word served as a poetical name given by Pope, in his “Moral Essays,” to Sarah, Duchess of Marlborough.

**Atrato** (at-rä'to), a river of Colombia, interesting because it has repeatedly been made to bear a part in schemes for a ship-canal across the Isthmus of Panama. Rising on the Western Cordillera at an altitude of 10,560 feet, above sea-level, it runs 305 miles northward through low, swampy country, and falls by several mouths, interrupted by bars, into the Gulf of Darien. It is navigable by steamers for fully 250 miles, being 750 to 1,000 feet wide, and 8 to 70 feet deep. A route, surveyed by the United States Government in 1871, proposed to connect the Atrato and the Jurador, flowing into the Pacific, by a canal 48 miles long. At the Paris International Congress (1879), for deciding the best route for the inter-oceanic canal, that route was, with various others, discussed and rejected in favor of De Lesseps' line from Limon to Panama. Gold-dust is found in and about the Atrato. See PANAMA.

**Atrauli** (at-rou'lē), a town of British India, in the Northwest Provinces, 16 miles N. E. of Aligarh. Founded about the 12th century, it is well built, with wide streets, a good bazaar, and an abundant supply of water.

**Atrek** (ā-trek'), a river of Persia, rising in Khorassan, among the Hazār Masjid Mountains, and thence flowing nearly 350 miles westward to the Caspian Sea, from Shatt downward along the boundary with the Russian Empire. Its width at the mouth is usually only 30 feet, but in the spring tides it overflows its banks to a width of over two miles.

**Atreus** (āt'rös), the son of Pelops and Hippodamia. He and his brother Thyestes murdered their half-brother Chrysippus, from jealousy of the affection entertained for him by their father. Thereupon, they fled to Eurystheus, with whose daughter, Ærope, Atreus united himself, and, after the death of his father-in-law, became King of Mycene. Thyestes, yielding to an unlawful passion for the wife of his brother, dishonored his bed, and had two sons by her. Atreus, after the discovery of this injury, banished Thyestes with his sons. Thirsting for revenge, Thyestes conveyed away secretly a son of his brother, and instigated him to murder his own father. This design was discovered, and the youth, whom Atreus thought to be the son of his brother, was put to death. Too late did the unhappy father perceive his mistake. A horrible revenge was necessary to give him consolation.



## Atriplex

He pretended to be reconciled to Thyestes, and invited him, with his two sons, to a feast; and after he had caused the latter to be secretly slain, he placed a dish made of their flesh before Thyestes, and, when he had finished eating, brought the bones of his sons, and showed him, with a scornful smile, the dreadful revenge which he had taken. At this spectacle, the poets say, the sun turned back in his course, in order not to throw light upon such a horrible deed.

**Atriplex**, a genus of plants belonging to the order *chenopodiaceæ* (chenopods). Eight species are indigenous, and one or two more partially naturalized, in Great Britain. Of the former may be mentioned the *A. laciniata*, or frosted sea-orache; the *A. babingtoni*, or spreading fruited; the *A. patula*, or spreading halberd-leaved; the *A. angustifolia*, or narrow-leaved orache; and the *A. littoralis*, or grass-leaved sea-orache. The leaves may be used as pot herbs.

**Atrium**, in ancient times, the hall or principal room in an ancient Roman house. It communicated with the street by the vestibule and the front door. There was in the center of its ceiling a large aperture, called *sompluvium*, designed to admit light. As glass was not then in use, the same opening permitted the ingress also of rain; hence its name *compluvium*. Beneath it there was scooped out in the pavement a cistern called *impluvium*. In a large house, rooms opened into the atrium from all sides, and were lighted from it.

In medieval times, till the 12th century, a covered court, somewhat on the model of the ancient atrium, constructed in front of the principal doors of an edifice. After the 12th century, the churchyard.

**Atropa**, a genus of plants belonging to the order *solanaceæ*, or nightshades. It contains the well-known species, *A. belladonna*, or deadly nightshade. It is three or more feet high, has its ovate leaves paired, large and small together, drooping lurid purple flowers, and blackberries of the size of a small cherry, which if eaten produce delirium, dilation of the pupils of the eyes, and death. The flowers and fruit are both powerful medicinal agents. It is largely used by the homœopathic school.

**Atrophy**, a wasting of the flesh due to some interference with the nutritive processes. It may arise from a variety of causes, such as permanent, oppressive and exhausting passions, organic disease, a want of proper food or of pure air, suppurations in important organs, copious evacuations of blood, saliva, semen, etc., and it is also sometimes produced by poisons, for example, arsenic, mercury, lead, in miners, painters, gilders, etc. In old age the whole frame except the heart undergoes atrophic change, and it is of frequent occurrence in infancy as a consequence of improper, un-

## Attachment

wholesome food, exposure to cold, damp or impure air, etc. Single organs or parts of the body may be affected irrespective of the general state of nutrition; thus local atrophy may be superinduced by palsies, the pressure of tumors upon the nerves of the limbs, or by artificial pressure, as in the feet of Chinese ladies.

**Atropin** or **Atropine**, a crystalline alkaloid obtained from the deadly nightshade (*atropa belladonna*). It is very poisonous and produces persistent dilation of the pupil.

**Atropos**, the eldest of the Fates, who cuts the thread of life with her shears.

**Attaché** (at-a-shā), a military, naval or subordinate member of the diplomatic service attached to an embassy or legation.

**Attachment**, in law, the taking into the custody of the law the person or property of one already before the court, or of one whom it is sought to bring before it. Attachment of person: A writ issued by a court of record, commanding the sheriff to bring before it a person who has been guilty of contempt of court, either in neglect or abuse of its process or of subordinate powers. Attachment of property: A writ issued at the institution or during the progress of an action, commanding the sheriff or other proper officer to attach the property, rights, credits or effects of the defendant to satisfy the demands of the plaintiff. The laws and practice concerning the attachment vary in different countries.

In the United States attachment may be defined as the taking into the custody of the law the person or property of one who is already before the court, or of one whom it is sought to bring before the court; also a writ for this purpose. To some extent it is of the nature of a criminal process. In some States a plaintiff can at the beginning of an action to recover money attach the property of the defendant as a security for the payment of the judgment expected to be recovered; and in case of recovery the property is applied in satisfaction of the judgment. But the more usual rule is that there can be no seizure of property, except in specified cases, till the rights of the parties have been settled by judgment of the court. The exceptions are chiefly in cases where the defendant is a non-resident or a fraudulent debtor, or is attempting to conceal or remove his property. In some States, attachments are distinguished as foreign and domestic—the former issued against a non-resident having property within the jurisdiction of the State, the latter against a resident in the State; jurisdiction over the person or property being necessary for an attachment. An attachment issued under a State law which has not been adopted by Congress, or by a rule of court, cannot be sustained in a United States court. Money due to a sea-



## Attack

man for wages is not attachable in the hands of a purser, the purser being a distributing agent of the government, and in no sense the debtor of the seaman.

**Attack**, the opening act of hostility by a force seeking to dislodge an enemy from its position. It is considered more advantageous to offer than to await attack, even in a defensive war. The historic forms of attack are: (1) The parallel; (2) The form in which both the wings attack and the center is kept back; (3) The form in which the center is pushed forward and the wings kept back; (4) The famous oblique mode, dating at least from Epaminondas, and employed by Frederick the Great, where one wing advances to engage, while the other is kept back, and occupies the attention of the enemy by pretending an attack. Napoleon preferred to mass heavy columns against an enemy's center. The forms of attack have changed with the weapons used. In the days of the pike, heavy masses were the rule, but the use of the musket led to an extended battle front to give effect to the fire. The advance in long and slender lines which grew out of this has been not less famous in the annals of British attack than the square formation in those of defense.

**Attainder**, the legal consequences of a sentence of death or outlawry pronounced against a person for treason or felony, the person being said to be attainted. It resulted in forfeiture of estate and "corruption of blood," rendering the party incapable of inheriting property or transmitting it to heirs; but these results now no longer follow. Formerly persons were often subjected to attainder by a special bill or act passed in Parliament. In the United States, the Federal Constitution declares that "No bill of attainder shall be passed, and no attainder of treason, in consequence of a judicial sentence, shall work corruption of blood or forfeiture except during the life of the person attainted."

**Attaint**, a writ at common law against a jury for a false verdict, now obsolete in England.

**Attalea**, a genus of American palms, comprising the piassava palm, which produces coquilla nuts.

**Attalus** (at'ā-lus), the names of three kings of ancient Pergamus, 241-133 B. C. the last of whom bequeathed his kingdom to the Romans. They were all patrons of art and literature.

**Attâr, Ferid eddin** (ät-tär'), a celebrated Persian poet, born near Nishapur in 1119; died about 1229(?). Son of a spicer, he followed his father's trade (whence his surname of Attâr), but afterward became a dervish and one of the greatest mystics of Persia. He is said to have been killed by a Mongol soldier during the invasion by Jenghiz Khan. Of his extant political

## Atterbom

works the most famous are "The Book of Council," a series of didactic poems on ethics; "The Parliament of Birds" (1184-1187). His principal work in prose is "Biographies of the Saints."

**Attar, or Otto, of Roses** (oil of roses), an essential oil obtained from the petals of three species of roses, viz.: *rosa centifolia*, *moschata* and *damascena*. The rose gardens at Ghazipur, in India, have long been famed for the production of this precious liquid. These gardens are large fields, planted with rows of small rose bushes. The blossoms, which unfold in the morning, are all gathered before noon, and their petals are at once transferred to clay stills, and distilled with twice their weight of water. The rose water which comes over is placed in shallow vessels covered with moist muslin to exclude dust, and exposed all night to the cool air. In the morning the thin film of oil which has collected on the top is carefully swept off with a feather and transferred to a small vial. This process is repeated morning after morning, till nearly the whole of the oil is separated from the water. Heber says that about 20,000 roses are required to yield a rupee weight (170 grains) of attar. Attar is also imported from Smyrna and Constantinople; but it rarely, if ever, arrives in this country pure. It is commonly adulterated with spermaceti and a volatile oil, which appears to be derived from one or more species of *andropogon*, and which is called oil of ginger-grass, or oil of geranium. Pure attar of rose, carefully distilled, is at first colorless, but speedily becomes yellowish. It congeals below 80°; melts at 84°. At 57°, 1,000 alcohol dissolve 7½ oil, and at 72°, 33 oil. Sp. gr. 872. Formula, C<sub>23</sub>H<sub>23</sub>O<sub>3</sub>. Many attempts have been made to discover some chemical reaction which would reveal the falsification of attar with geranium oil, but hitherto mostly in vain.

**Atterbom, Peter Daniel Amadeus** (ät'-ter-bom), a Swedish poet, born in the parish at Asbo, East Gothland, Jan. 19, 1790. He was early influenced by German literature, and, having visited Germany and Italy in 1817-1819, he formed ties of friendship with Schelling and Thorwaldsen; he became instructor to Crown Prince Oscar, in 1820, and professor at the university in Upsala in 1828. Although unquestionably the foremost among the lyric poets of the romantic school in Sweden, it must be acknowledged that his rare talent was much impaired by his groping in Schelling's and Hegel's philosophy. His most celebrated work is "The Isle of Blessedness" (1823), a romantic drama in the manner of Tieck; but he also wrote "The Flowers," a cycle of lyrics; "The Blue Bird," a play; and "Swedish Seers and Poets," a volume of criticism. He died in Upsala, July 21, 1855.



**Atterbury, Francis**, an English prelate, born March 6, 1662, and educated at Westminster and Oxford. In 1687, he took his degree of M. A., and appeared as a controversialist in a defense of the character of Luther, entitled "Considerations on the Spirit of Martin Luther," etc. He also assisted his pupil, Charles Boyle, in his famous controversy with Bentley on the "Epistles of Phalaris." Having taken orders, in 1691, he settled in London, became chaplain to William and Mary, preacher of Bridewell, and lecturer of St. Bride's. Controversy was congenial to him, and, in 1706, he commenced one with Dr. Wake, which lasted four years, on the rights, privileges and powers of convocations. For this service he received the thanks of the lower house of convocation and the degree of Doctor of Divinity from Oxford. Soon after the accession of Queen Anne he was made Dean of Carlisle, aided in the defense of the famous Sacheverell, and wrote "A Representation of the Present State of Religion." In 1712, he was made Dean of Christ Church, and, in 1713, Bishop of Rochester and Dean of Westminster. After the death of the Queen, in 1714, he distinguished himself by his opposition to George I.; and, having entered into a correspondence with the Pretender's party, was apprehended in August, 1722, and committed to the Tower. Being banished from the kingdom, he settled in Paris, where he chiefly occupied himself in study and in correspondence with men of letters. But even here, in 1725, he was actively engaged in fomenting discontent in the Scottish Highlands. He died Feb. 15, 1732, and his body was privately interred in Westminster Abbey.

**Attic**, pertaining to Attica or to Athens. Pure; elegant; classical; poignant; characterized by keenness of intellect, delicacy of wit, purity of elegance, soundness of judgment and most expressive brevity; as, the Attic Muse. Attic dialect is that dialect of the Greek language which was spoken in Attica. It was the most refined and polished of all the dialects of ancient Greece; and in it wrote Solon, the lawgiver; Thucydides and Xenophon, the historians; Aristophanes, the comic poet; Plato and Aristotle, the philosophers, and Demosthenes, the orator. When, after the Macedonian conquest, Greek became the language of literature and diplomacy in most parts of the civilized world, the Attic came to be that dialect of the Greek tongue which was generally adopted.

In architecture, a low order, commonly used over a principal order, never with columns, but usually with antæ or small pilasters. It is employed to decorate the façade of a story of little height, terminating the upper part of a building; and it doubtless derives its name from its resemblance in proportional height and concealed

roof to some of the buildings of Greece. In all the best examples, and especially in the remains of antiquity at Rome, the attic is decorated with a molded base and cornice; often with pilasters and figures, as in the Arch of Constantine. In modern architecture, the proportions of the attic order have never been subject to fixed rules, and their good effect is entirely dependent on the taste and feeling of the architect. Attic base: The base of a column consisting of an upper and lower torus, a scotia and fillets between them. Attic story: A term frequently applied to the upper story of a house, when the ceiling is square with the sides, to distinguish it from a garret.

**Attica**, a State of ancient Greece, the capital of which, Athens, was once the first city in the world. The territory was triangular in shape, with Cape Sunium (Colonna) as its apex and the ranges of Mounts Cithæron and Parnes as its base. On the N. these ranges separated it from Bœotia; on the W. it was bounded by Megaris and the Saronic Gulf; on the E. by the Ægean. Its most marked physical divisions consisted of the highlands, midland district, and coast district, with the two famous plains of Eleusis and of Athens. The Cephissus and Ilissus, though small, were its chief streams; its principal hills, Cithæron, Parnes, Hymettus, Pentelicus, and Laurium. Its soil has probably undergone considerable deterioration, but was fertile in fruits, and especially of the olive and fig. These are still cultivated as well as the vine and cereals, but Attica is better suited for pasture than tillage.

*History.*—According to tradition the earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came, B. C. 1550, with a colony from Egypt, taught them all the essentials of civilization, and founded Athens. One of Cecrops' descendants founded 11 other cities in the regions round, and there followed a period of mutual hostility. To Theseus is assigned the honor of uniting these cities in a confederacy, with Athens as the capital, thus forming the Attic State. After the death of Codrus, B. C. 1068, the monarchy was abolished, and the government vested in archons elected by the nobility, at first for life, in 752 B. C. for 10 years, and in 683 B. C. for one year only. The severe Constitution of Draco was succeeded in 594 by the milder code of Solon, the democratic elements of which, after the brief tyranny of the Pisistratids, were emphasized and developed by Clisthenes. He divided the people into 10 classes, and made the Senate consist of 500 persons, establishing as the government an oligarchy modified by popular control. Then came the splendid era of the Persian War, which elevated Athens to the summit of fame. Miltiades at Marathon



## Atticus

and Themistocles at Salamis conquered the Persians by land and by sea. The chief external danger being removed, the rights of the people were enlarged; the archons and other magistrates were chosen from all classes without distinction. The period from the Persian War to the time of Alexander (B. c. 500 to 336) was most remarkable for the development of the Athenian Constitution. Attica appears to have contained a territory of nearly 850 square miles, with some 500,000 inhabitants, 360,000 of whom were slaves, while the inhabitants of the city numbered 180,000. Cimon and Pericles (B. c. 444) raised Athens to its point of greatest splendor, though under the latter began the Peloponnesian War, which ended with the conquest of Athens by the Lacedæmonians. The succeeding tyranny of the Thirty, under the protection of a Spartan garrison, was overthrown by Thrasybulus, with a temporary partial restoration of the power of Athens; but the battle of Cheronæa (B. c. 338) made Attica, in common with the rest of Greece, a dependency of Macedon. The attempts at revolt after the death of Alexander were crushed, and in 260 B. c. Attica was still under the sway of Antigonus Gonatus, the Macedonian king. A period of freedom under the shelter of the Achæan League then ensued, but their support of Mithridates led in B. c. 146 to the subjugation of the Grecian States by Rome. After the division of the Roman empire Attica belonged to the empire of the East until, in A. D. 396, it was conquered by Alarie the Goth, and the country devastated.

The names of the different tribes of Attica and of their respective heroes, as found on monuments, were

| TRIBE:         | HERO:       |
|----------------|-------------|
| ERECHTHEIS,    | ERECHTHEUS. |
| ÆGEIS,         | ÆGEUS.      |
| PANDIONIS,     | PANDION.    |
| LEONTIS,       | LEOS.       |
| ACAMANTIS,     | ACAMAS.     |
| ÆNEIS,         | ÆNEUS.      |
| CECROPIS,      | CECROPS.    |
| HIPPOTHOONTIS, | HIPPOTHOON. |
| ÆANTIS,        | AJAX.       |
| ANTIOCHIS,     | ANTIOCHUS.  |

Attica, along with the ancient Bœotia, now forms a nome or province (Attike and Viotia) of the kingdom of Greece; area, 2,472 square miles; pop. (1896) 313,069.

**Atticus, Titus Pomponius** (at'ē-kus), a noble Roman, the contemporary of Cicero and Cæsar. He displayed such address and tact, that, during the war between Cæsar and Pompey, he managed to remain neutral; sent money to the son of Marius, while he secured the attachment of Sylla; and, when Cicero and Hortensius were rivals, was equally intimate with both. When young,

## Attila

he resided at Athens, where he so secured the affections of the citizens that, on the day of his departure from that city, all went into mourning.

He was an author and poet, and reached the age of 77, without sickness. When at last he became ill, he refused all nourishment, and, therefore, ended his life by voluntary starvation. Died 32 B. c. He was a disciple of Epicurus.



ATTICUS.

**Attila** (at'ē-la), the famous leader of the Huns, was the son of Mundzuk, and the successor, in conjunction with his brother Bleda, of his uncle Rhuas. The rule of the two leaders extended over a great part of Northern Asia and Europe, and they threatened the Eastern Empire, and twice compelled the weak Theodosius II. to purchase an inglorious peace. Attila caused his brother Bleda to be murdered (444), and in a short time extended his dominion over all the peoples of Germany and exacted tribute from the Eastern and Western emperors. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners, and he speedily formed a pretext for leading them against the Empire of the East. He laid waste all the countries from the Black to the Adriatic Sea, and in three encounters defeated the Emperor Theodosius, but could not take Constantinople. Thrace, Macedonia, and Greece all submitted to the invader, who destroyed 70 flourishing cities; and Theodosius was obliged to purchase a peace. Turning to the W., the "scourge of God," as the universal terror termed him, crossed with an immense army the Rhine, the Moselle, and the Seine, went to the Loire, and laid siege to Orleans. The inhabitants of this city repelled the first attack, and the united forces of the Romans under Aetius, and of the Visigoths under their King Theodoric, compelled Attila to raise the siege. He retreated to Champagne, and waited for the enemy in the plains of Chalons. In apparent opposition to the prophecies of the soothsayers the ranks of the Romans and Goths were broken; but when the victory of Attila seemed assured the Gothic prince, Thorismond, the son of Theodoric, poured down from the neighboring height upon the Huns, who were defeated with great slaughter. Rather irritated than discouraged, he



## Attleboro

sought in the following year a new opportunity to seize upon Italy, and demanded Honoria, the sister of Valentinian III., in marriage, with half the kingdom as a dowry. When this demand was refused he conquered and destroyed Aquileia, Padua, Vicenza, Verona, and Bergamo, laid waste the plains of Lombardy, and was marching on Rome when Pope Leo I. went with the Roman ambassadors to his camp and succeeded in obtaining a peace. Attila went back to Hungary, and died on the night of his marriage with Hilda or Ildico (453), either from the bursting of a blood vessel or by her hand. The description that Jornandes has left us of him is in keeping with his Kalmuck-Tartar origin. He had a large head, a flat nose, broad shoulders, and a short and ill-formed body; but his eyes were brilliant, his walk stately, and his voice strong and well toned.

**Attleboro**, a town in Bristol co., Mass., on the New York, New Haven and Hartford railroad; 32 miles S. W. of Boston. It was incorporated in 1694; contains nearly a dozen villages; and is principally engaged in the manufacture of jewelry, watches and clocks, silverware, hats, buttons, and cotton and woolen goods. It has a National bank, high school, public library, daily newspapers, and a property valuation of over \$6,000,000. Pop. (1890) 7,557; (1900) 11,335; (1910) 16,215.

**Attock**, a town and fort of the Punjab, on the left or E. bank of the Indus. Attock stands below the fort, a parallelogram of 800 yards by 400, established by the Emperor Akbar in 1581, to defend the passage of the river, but it is no longer a position of strength. The great railway bridge across the Indus here was opened in 1883. It has five arches 130 feet high, and renders continuous the railway connection between Calcutta and Peshawur (1,600 miles). The situation of Attock is important, whether in a commercial or in a military view. It is at the head of the steamboat navigation of the Indus, being 940 miles from its mouth; while, about 2 miles above it, the Cabul river, the only considerable affluent of the Indus from the W., is practicable for vessels of 40 or 50 tons for a distance of 50 miles. The valley, again, of this last mentioned stream, presenting, as it does, the best approach to the E. and S. from Central Asia, has been the route of nearly all but the maritime invaders of India from the days of Alexander the Great downward. Taxila, where the Macedonians crossed the Indus, has been identified with Attock.

**Attorney**, a person appointed to do something for and in the stead and name of another. An attorney may have general powers to act for another; or, his power may be special, and limited to a particular act or acts. A special attorney is appointed

## Attraction

by a deed called a power or letter of attorney, specifying the acts which he is authorized to do. An attorney at law is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. The rules and qualifications, whereby one is authorized to practice as an attorney in any court, are very different in different countries, and in the different courts of the same country. There are various statutes on this subject in the laws of the several States, and almost every court has certain rules, a compliance with which is necessary, in order to authorize any one to appear in court for, and represent any party to a suit, without special authority under seal. Women are now admitted as practicing attorneys.

**Attorney-General**, a governmental law officer. In the United States the Department of Justice is presided over by the Attorney-General, whose duty it is to furnish all legal advice needed by Federal authorities, and conduct all litigation in which the United States is concerned. He is also called upon to recommend persons to fill the places of judges of the United States Circuit and District Courts. There is an Attorney-General in each State whose duty it is to furnish legal advice to the Legislature; he represents the State in suits at law, and aids in prosecuting offenses against the State.

In England the highest legal functionary permanently retained, on a salary, to take the part of the crown in any suits affecting the royal (by which is really meant the public) interests. In precedence, he ranks above the Solicitor-General. When he files an information in the appropriate courts regarding damage to the King's lands, great political or other crimes, etc., it is sure to meet with immediate attention. He is not a member of the Cabinet, but goes out with the ministry from whom he received his appointment.

**Attraction**, in natural philosophy, a force in virtue of which the material particles of all bodies tend necessarily to approach each other. It operates at whatever distances the bodies may be from each other, whether the space between them be filled with other masses of matter or is vacant, and whether the bodies themselves are at rest or are in motion. When they are not closely in contact, the attraction between them is called that of gravitation or of gravity.

It is of various kinds: (1) The attraction of gravitation or of gravity is the operation of the above-mentioned attraction when the bodies acting and acted upon are not closely in contact. It is often called the law of gravity or gravitation, but the term law in this case means simply generalization. It states the universality of a fact, but does not really account for it. By this law or



generalization, the attraction between any two material particles is directly proportional to the product of their masses, and inversely proportional to the square of their distance asunder. (2) Molecular attraction differs from the former in acting only at infinitely small distances. It ceases to be appreciable when the distances between the molecules become appreciably large. It is divided into cohesion, affinity, and adhesion.

Capillary attraction, meaning the attraction excited by a hair-like tube on a liquid within it, is, properly speaking, a variety of adhesion.

In magnetism, the power excited by a magnet or loadstone of drawing and attaching iron to itself.

In electricity, the power possessed by an electrified body of drawing certain other bodies to itself. The repulsions or attractions between two electrified bodies are in the inverse ratio of the squares of their distance. The distance remaining the same, the force of attraction or repulsion between two electrified bodies is directly as the product of the quantities of electricity with which they are charged.

**Attribute**, in philosophy, a quality or property of a substance, as whiteness or hardness. A substance is known to us only as a congeries of attributes. In the fine arts an attribute is a symbol regularly accompanying and marking out some personage. Thus the caduceus, purse, winged hat, and sandals are attributes of Mercury, the trampled dragon of St. George.

**Attucks, Crispus**, a mulatto or half-breed Indian, born about 1720; was a leader of the crowd of people who, on March 5, 1770, provoked the British soldiers in Boston to open fire, which resulted in the death of Attucks and others and created the incident known as the Boston massacre. The British officer of the day and six of his men were tried for murder and acquitted by a jury.

**Atwater, Lyman Hotchkiss**, an American theologian, born in Hampden, Conn., Feb. 23, 1813; received both his collegiate and theological training at Yale; was pastor of the First Congregational Church in Fairfield, Conn., in 1835-1854; in the last year became Professor of Mental and Moral Philosophy at Princeton College, and, in 1869, Professor of Logic, Metaphysics, Political Science, Economics and Ethics there. He was the author of a "Manual of Elementary Logic" (1867). He died in Princeton, N. J., Feb. 17, 1883.

**Atwater, Wilber Olin**, an American chemist, born in Johnsburg, N. Y., May 3, 1844; was graduated at Wesleyan University in 1865; made a special study of chemistry in the Sheffield Scientific School of Yale and the Universities of Leipsic and Berlin; became Professor of Chemistry in

Wesleyan University in 1873; was director of the Connecticut Agricultural Experiment Station in 1875-1877, and of the Storrs (Conn.) Experiment Station in 1887-1902; founded in 1888 and was director till 1891, office of Experiment Stations, United States Department of Agriculture; became chief of the bureau of nutrition investigations; and published over 150 papers on chemistry and allied subjects. He died Sept. 22, 1907.

**Atwill, Edward Robert**, an American clergyman, born in Red Hook, N. Y., Feb. 18, 1840; was graduated at Columbia College in 1862, and at the General Theological Seminary in 1864; was rector of St. Paul's Church in Burlington, Vt., in 1867-1880, and of Trinity in Toledo, O., in 1882-1890; and was consecrated the first Protestant Episcopal bishop of West Missouri, Oct. 14, 1890.

**Atwood, George**, an English mathematician, born in 1745; best known by his invention, called after him, Atwood's Machine, for verifying the laws of falling bodies. It consists essentially of a freely moving pulley over which runs a fine cord with two equal weights suspended from the ends. A small additional weight is laid upon one of them, causing it to descend with uniform acceleration. Means are provided by which the added weight can be removed at any point of the descent, thus allowing the motion to continue from this point onward with uniform velocity. He died in 1807.

**Atwood, Isaac Morgan**, an American educator, born in Pembroke, N. Y., March 24, 1838; was ordained in the Universalist Church in 1861; held several pastorates; edited "The Christian Leader" 1867-1873; became an associate editor of the "Universalist Leader;" and was chosen president of the Canton (N. Y.) Theological Seminary in 1879. His chief works are, "Have We Outgrown Christianity?" (1870); "Latest Word of Universalism" (1878); "Manual of Revelation" (1888); "Walks about Zion" (1881).

**Atwood, Melville**, an Anglo-American geologist, born in Prescott Hall, England, July 31, 1812; studied lithology, microscopy, and geology early in life, and engaged in gold and diamond mining in Brazil. In 1843 he made a discovery that greatly enhanced the value of zinc ore. After coming to the United States, in 1852, he invented the blanket system of amalgamation. He also established the value of the famous Comstock silver lode, by an assay of minerals in that region. He died in Berkeley, Cal., April 25, 1898.

**Atys**, or **Attys** (at'is), in classical mythology, the shepherd lover of Cybèle, who, having broken the vow of chastity



## Aube

which he made her, castrated himself. In Asia Minor Atys seems to have been a deity, with somewhat of the same character as Adonis.

**Aube** (ōb), a N. E. French Department; area, 2,317 square miles; pop. (1906) 243,670. The surface is undulating, and watered by the Aube, etc. The N. and N. W. districts are bleak and infertile, the S. districts remarkably fertile. A large extent of ground is under forests and vineyards, and the soil is admirable for grain, pulse, and hemp. The chief manufactures are worsted and hosiery. Troyes is the capital. The river Aube, which gives name to the department, rises in Haute-Marne, flows N. W., and, after a course of 113 miles, joins the Seine.

**Auber, Daniel François Esprit** (ō-bā'), a French operatic composer, born Jan. 29, 1782, at Caen, in Normandy; was originally intended for a mercantile career, but devoted himself to music, studying under Cherubini. His first great success was his opera "La Bergère Châtelaine," produced in 1820. In 1822 he had associated himself with Scribe as librettist, and other operas now followed in quick succession. Chief among them were "Masaniello; or, La Muette de Portici" (1828); "Fra Diavolo"



DANIEL F. E. AUBER.

(1830); "Lestocq" (1834); "L'Ambassadrice" (1836); "Le Domino Noir" (1837); "Les Diamants de la Couronne" (1841); "Marco Spada" (1853); "La Fiancée du Roi de Garbe" (1864). Despite his success in "Masaniello" his peculiar field was comic opera, in which his charming melodies, bearing strongly the stamp of the French national character, his uniform grace and piquancy, won him a high place. He died in Paris, May 13, 1871.

**Auberlen, Karl August** (ou'ber-len), a German Protestant theologian, born at Fellbach, Württemberg, Nov. 19, 1824; edu-

## Aubry de Montdidier

cated at Tübingen, and was made professor at Basel in 1851. He was author of "The Divine Revelation: an Essay in Defense of the Truth." He died at Basel, May 2, 1864.

**Aubert, Joachim Marie Jean Jacques Alexandre Jules** (ō-bār'), a French general and military writer, born in 1804; prominent in several campaigns, and was made commander of the Legion of Honor in 1860. He is best known to the public as a journalist and historical writer. Among his works are "Gauls and Germans," "The Invasion" (1870); "History of the War of 1870-1871" (1873). He died in 1890.

**Aubertin, Charles** (ō-bār-tan'), a French scholar, born in St. Didier, Dec. 24, 1825; became rector of the Academy of Poitiers in 1874. His works include "Critical Study of the Alleged Relations of Seneca to St. Paul" (1857); "Public Spirit in the Eighteenth Century" (1873); "Origins of French Language and Literature in the Middle Ages" (1876-1878), etc.

**Aubigné, Theodore Agrippa d'.** See D'AUBIGNÉ.

**Aubin du Cormier** (ō-ban dü korm-yā'), St., a village of France, in Brittany, where, on July 28, 1488, a battle was fought between the Bretons and the French, in which the latter were victorious, and took possession of St. Aubin du Cormier. Among their prisoners were the Prince of Orange and the Duc d'Orleans. A body of 400 English archers, under Lord Woodville, were cruelly put to death after the battle.

**Aublet, Albert** (ōb-lā), a French painter, born in Paris; studied historical painting under Gerome; won a first-class medal in the Paris Exposition of 1889, and the decoration of the Legion of Honor in 1890. His first great painting was the "The Wash-room of the Reserves in the Cherbourg Barracks," exhibited in the Salon of 1879, and probably his most celebrated one is the "Meeting of Henri III. and the Duc de Guise," shown in the Salon of 1880.

**Aubrey, John**, an English antiquary, born in Wiltshire March 12 or Nov. 3, 1626; was educated at Oxford; collected materials for the "Monasticon Anglicanum," and afforded important assistance to Wood, the antiquary. He left large collections of manuscripts, which have been used by subsequent writers. His "Miscellanies" (London, 1696) contain much curious information, but display credulity and superstition. His "Natural History" and "Antiquities of the County of Surrey" were published in 1719. He died in June, 1697.

**Aubry de Montdidier** (ō-brē' de môn-dēd-yā'), a French soldier, supposed to have been murdered by his comrade, Richard de Macaire, in 1371. He is the hero of many dramas, founded on the details of the discovery of his murderer. His faithful dog



## Auburn

persisted in pursuing and harassing Macaire, and this coming to the ears of King Charles V., he ordered a fight to be tried between them. The dog was victorious, and he has ever since been famous in story as the "Dog of Montargis;" from the place of the fight.

**Auburn**, city and county-seat of Androscoggin co., Me.; on the Androscoggin river and the Maine Central railroad, 30 miles S. W. of Augusta. The river, which separates Auburn from the city of Lewiston, has a fall of 60 feet near the cities, giving them excellent power for manufacturing. Auburn is principally engaged in the manufacture of shoes, though it is doing considerable in the lines of cotton goods, furniture and tanned leather. It is lighted by electricity, and has 2 National banks, a high school, public library and an assessed property valuation of \$7,000,000. Pop. (1910) 15,064.

**Auburn**, city and county-seat of Cayuga co., N. Y.; on the outlet of Owasco Lake and the New York Central and Hudson River and the Lehigh Valley railroads; 174 miles W. of Albany. The city is an important industrial center, its principal manufactures being reapers, mowers, binders, threshing machines and other agricultural implements, carpets, cotton, woolen and iron goods, and shoes, for which the lakes provide excellent power. It is the seat of the Auburn Theological Seminary (Presb.), founded in 1821; a large State prison, widely known for its "silent" system of discipline; a State Insane Asylum and a State armory. There are also about 25 churches, an Academic High School, Academy of Music, 2 National banks, hospital, orphan asylum, several public libraries and daily and weekly newspapers. Among its public attractions is a statue of the late William H. Seward, who lived here. The city has a property valuation of over \$15,000,000. Pop. (1900) 30,345; (1910) 34,668.

**Auburn Theological Seminary**, a Presbyterian institution in Auburn, N. Y.; opened in 1819; offers free tuition to college graduates; has grounds and buildings valued at over \$325,000; aggregate endowment funds, \$800,000; average annual income, \$67,000; faculty, 12; students, about 70; volumes in the library, about 33,000; graduates since opening, over 1,700.

**Aubusson, Pierre d'**. See D'AUBUSSON.

**Auch** (ōsh), an ancient town of France; capital of the Department of Gers; on the Gers river; 43 miles S. of Agen. In the time of Cæsar's invasion it was the capital of the Ausci or Auscii. It contains an archbishop's palace, a Gothic cathedral, public library, royal college, museum of natural science and a town hall. It is also noted for its manufactures of cotton stuffs, leather, linen, etc. Pop. (1901) 13,939.

## Auckland

**Auchenia**, a genus of mammalia of the order *ruminantia* and the family *camelidæ*. It includes the llamas, which are the American representatives of the camels so well known in the Eastern world. They have no dorsal humps, and their toes are completely divided. There are about four species of auchenia: the *A. guanaco*, or guanaco; the *A. glama*, or llama; the *A. paco*, the paco or alpaca; and the *A. vicunia*, or vicuna.

**Auchmuty, Richard Tylden**, an American philanthropist, born in New York city in 1831; received a collegiate education; practiced architecture for many years with James Renwick; served in the Union army through the Civil War; declined several public offices after its close, and with his wife founded the New York Trade Schools, on a plan entirely original and which almost immediately became productive of large results, at a cost of \$250,000. The success of this institution was made permanent by J. Pierpont Morgan, who, in 1892, gave it an endowment of \$500,000. Auchmuty died in Lenox, Mass., July 18, 1893.

**Auchterarder**, a town in Perthshire, Scotland, with manufactures of tweeds, tartans, etc. The opposition to the presentee to the church of Auchterader (1839) originated the struggle which ended in the formation of the Free Church of Scotland.

**Auckland**, a town in New Zealand, in the North Island, founded in 1840, and situated on Waitemata harbor, one of the finest harbors of New Zealand, where the island is only 6 miles across, there being another harbor (Manukau) on the opposite side of the isthmus. At dead low water there is sufficient depth in the harbor for the largest steamers. The working ship channel has an average depth of 36 feet, and varies in width from 1 to 2 miles. The harbor has two good entrances, with lighthouse; and is defended by batteries. There are numerous wharves and jetties, and a couple of graving-docks, one of which — the Calliope dock, opened in 1887 — is one of the largest in the whole of the Southern Seas. Its site is picturesque, the streets are spacious and the public buildings — churches, educational establishments, including a university college — are numerous and handsome. It has a large and increasing trade, there being connection with the chief places on the island by rail, and regular communication with the other ports of the colony, Australia and Fiji, by steam. It was formerly the capital of the colony. Pop. (1906), including suburbs, 82,101. The provincial district of Auckland forms the northern part of North Island, with an area of 25,746 square miles; pop. (1906) 211,223. The surface is very diversified; volcanic phenomena are common, including geysers, hot lakes, etc.; rivers are



## Auckland

numerous; wool, timber, kauri-gum, etc., are exported. Much gold has been obtained in the Thames Valley and elsewhere.

**Auckland, William Eden, Lord**, an English statesman, born April 3, 1744; educated at Eton and Oxford; called to the bar, 1768; Under-Secretary of State 1772, and in 1776 Lord of Trade. In 1778 he was nominated, in conjunction with Lord Howe and others, to act as a mediator between Great Britain and the insurgent American colonies. He was afterward Secretary of State for Ireland, Ambassador Extraordinary to France, Ambassador Extraordinary to the Netherlands. He was raised to the peerage in 1788, and died May 28, 1814.

**Auckland Islands**, a group lying in the Pacific Ocean to the S. of New Zealand. The largest of these islands is about 30 miles long by 15 broad, and is covered with dense vegetation. They are almost entirely uninhabited, belong to the British and are a station for whaling ships.

**Auction**, the public disposal of goods to the highest bidder. None but those who have taken out an auction license are at present allowed to conduct such sales. To ascertain who the highest bidder is, two leading processes may be adopted. The goods may be put up at a low figure, and then competitors for them bidding against each other will raise this to a higher price. This is what is generally done. In what is called a "Dutch auction," however, the process is reversed. The goods are put up at a price much above their value, and gradually lowered till a bid is given for them, and they are then forthwith knocked down to him from whom it proceeded.

**Aucuba**, a genus of plants belonging to the order *cornaceæ*, or cornels. The only known species is *A. japonica*, a well known evergreen, with leaves like those of the laurel in form and mottled with yellow.

**Aude** (ōd), a maritime Department in the S. of France; area, 2,438 square miles; mainly covered by hills belonging to the Pyrenees or the Cevennes, and traversed W. to E. by a valley drained by the Aude. The loftier districts are bleak and unproductive; the others tolerably fertile, yielding good crops of grain. The wines, especially white, bear comparison with any. Pop. (1906) 308,327.

**Audette, Louis Arthur**, a Canadian lawyer, born in Quebec, Dec. 14, 1856; was educated at Quebec Seminary and Laval University; called to the bar in 1880; was secretary to the Board of Arbitration appointed in 1893 to determine disputed matters of account between Canada and the Provinces of Ontario and Quebec; and also became Registrar of the Exchequer Court of

## Auditory

Canada. He published "The Practice of the Exchequer Court of Canada" (1895).

**Audiometer**, or **Audimeter**, an instrument devised by Prof. Hughes, the inventor of the microphone, and described by Dr. Richardson at a meeting of the Royal Society of London in 1879. Originally its object was to measure with precision the sense of hearing. Among its constituent parts are an induction coil, a microphone key and a telephone. The audiometer has been materially modified, and is now principally used for obtaining a balance of induction from two electric coils acting upon a third. A scale is provided to show the extent of the movement. A varying or interrupted current being passed through the two outer coils, the preponderating current will produce the most induction if the central coil is equidistant. It can always be moved to such a point that there will be no inductive effect, one counteracting the other. Thus its position measures the relative induction. A telephone is in circuit with the intermediate coil and is used to determine when its position is such that no current is induced in it.

**Audiphone**, an invention to assist the hearing of deaf persons in whom the auditory nerve is not entirely destroyed. The instrument, made of a thin sheet of ebonite rubber or hard vulcanite, is about the size of a palm leaf fan, with a handle and strings attached to bend it into a curving form, and a small clamp for fixing the string at the handles. The audiphone is pressed by the deaf person using it against his upper front teeth, with the convex side outward; when so placed it communicates the vibrations caused by musical sounds or articulate speech to the teeth and bones of the skull, thence to the organs of hearing. For different sounds it requires to be focussed to different degrees of convexity. A simple strip of fine glazed mill board has been recommended by some experimenters as cheaper and equally serviceable; and birch wood veneer has been used with success for the same purpose.

**Audit**, an examination into accounts or dealings with money or property, along with vouchers or other documents connected therewith, especially by proper officers, or persons appointed for the purpose. Also the occasion of receiving the rents from the tenants on an estate.

**Auditory**, pertaining to the organs of hearing. The auditory artery is a ramification of the internal carotid one, the several branches of which are distributed throughout the brain. The auditory canal, or external meatus of the ear, is considered to belong to the external portion of that organ. It extends inward from the concha for rather more than an



## Audouard

inch. Part of it is cartilaginous and part osseous. The auditory nerve, called also the acoustic nerve, enters the ear by the internal auditory canal, and divides into two leading branches, which again subdivide to an amazing extent. It is remarkably soft in texture. The auditory and the facial nerves together constitute the seventh pair of nerves in Willis' arrangement.

**Audouard, Olympe** (ō-dö-är'), a French writer (1830-1890); married to a notary in Marseilles, but soon after divorced; she traveled in Egypt, Turkey and Russia; and having conducted various journals in Paris since 1860, made a successful lecture tour through the United States in 1868-1869. After her return she became interested in spiritism. She was an ardent advocate of woman's rights. Among her novels and books of travel may be mentioned: "How Men Love" (1861); "The Mysteries of the Seraglio and of the Turkish Harems" (1863); "The Mysteries of Egypt Unveiled" (1865); "War to Man" (1866); "Across America" (1869-1871); "Parisian Silhouettes" (1883).

**Audran, Gerard** (ōd-ran'), a French engraver, born at Lyons in 1640, and, after three years at Rome, where he acquired a high reputation by his engraving of Pope Clement IX., was recalled to France by Colbert, and appointed engraver to Louis XIV. Here he engraved the works of Lebrun, illustrating the battles of Alexander, and many paintings by Raphael, Titian, Domenichino, Poussin and others. He died at Paris in 1703. His nephews, **BENOIT** (1661-1721) and **JEAN** (1667-1756), were also engravers.

**Audsley, George Ashdown**, a Scottish-American architect, born in Elgin, Scotland, Sept. 6, 1838; established himself in the United States in 1892, and subsequently became prominent both as an architect and author. In collaboration with his brother, **WILLIAM J. A. AUDSLEY**, he was author of several works—on illuminating, decorating, Christian symbolism, etc., and, individually, published "Keramic Art of Japan;" "Ornamental Art of Japan;" "The Art of Chromolithography;" "The Practical Decorator," etc.

**Audubon, John James**, an American naturalist of French extraction, born near New Orleans, May 4, 1780; was educated in France, and studied painting under David. In 1798 he settled in Pennsylvania, but, having a great love for ornithology, he set out in 1810 with his wife and child, descended the Ohio, and for many years roamed the forests in every direction, drawing the birds which he shot. In 1826 he went to England, exhibited his drawings in Liverpool, Manchester and Edinburgh, and finally pub-

## Auerbach

lished them in an unrivaled work of double-folio size, with 435 colored plates of birds the size of life ("The Birds of America," 4 vols., 1827-

1839), with an accompanying text ("Ornithological Biography," 5 vols., 8 vo., partly written by Prof. Macgillivray). On his final return to the United States he labored with Dr. Bachman on an illustrated work entitled "The Quadru-



JOHN J. AUDUBON.

peds of America" (1843-1850, 3 vols.). He died in New York city, June 27, 1851.

**Auenbrugger von Auenbrug, Leopold** (ou'en-brög-er fon ou'en-brög), an Austrian physician, born at Gratz in 1722, practiced at the Spanish hospital in Vienna, where he died in 1809. As early as 1754 he had discovered the method of investigating internal diseases which afterward made him famous; but not until after seven years of experiments and verification did he publish his treatise, entitled "Inventum novum ex percussione thoracis humani interni pectoris morbos detegendi" (Vienna, 1761).

**Auer, Adelheid von** (ou'er), pseudonym of **CHARLOTTE VON COSEL**, German novelist, born in Berlin, Jan. 6, 1818; author of a great many stories of real life, among them "Footprints in Sand" (1868); "A Sister of Charity" (1870); "In the World's Labyrinth" (1878); "Castles in the Air" (1882); all written in the tone and spirit of a moderate conservative.

**Auerbach, Berthold** (ou'er-bäch), a German novelist, born at Nordstetten, Württemberg, Feb. 28, 1812; began to write while a student in Heidelberg, and under the pseudonym "THEOBALD CHAUBER" produced a "Biography of Frederiek the Great" (1834-1836). A series of novels from the history of Judaism, under the collective title "The Ghetto," of which "Spinoza" (1837) and "Poet and Merchant" (1839) were printed in separate editions, was followed by a translation of Spinoza, with a critical biography (1841); and by "The Educated Citizen: a Book for the Thinking Human Mind" (1842), intended to bring philosophical problems within the comprehension of the uninitiated. His next work, "Black Forest Village Stories" (1843), was received with universal favor, translated into nearly all European languages, and established his fame. To this class of tales



## Auersperg

belong also "The Professor's Lady" (1847); "Little Barefoot" (1856); "Joseph in the Snow" (1860); "Edelweiss" (1861); "After Thirty Years," new village stories (1876). His first effort in the field of the novel, "New Life" (1851), met with little favor; but "On the Heights" (1865) constituted the crowning success of his literary career. It was followed by "The Villa on the Rhine" (1868); "Waldfried, a Family History" (1874); and "The Head Forester" (1879). He died at Cannes, France, Feb. 8, 1882.

**Auersperg** (ou'ers-bärg), **Anton Alexander, Graf von**, a German poet, born at Laibach, April 11, 1806. Descended from an ancient Swabian family which, in the 11th century, had settled and acquired large estates in Carniola, he took a prominent position in the Diet of that Province (1861-1867). In 1861 he was chosen a life member of the Upper House of the Austrian Reichsrath. He was always distinguished by his liberalism and his ultra-German sympathies; but he best known under the *nom de plume* of ANASTASIUS GRUN, as one of the German epic and lyrical poets, among whom he holds a high rank, excelling most in humorous subjects and political satires. He died at Gratz, Sept. 12, 1876. His collected works fill 7 volumes (1877).

**Auerstadt** (ou'er-stadt), a village in the Prussian Province of Saxony, 10 miles W. of Naumburg. It is famous for the great battle which took place there Oct. 14, 1806, between the French under Davoust, and the Prussian army under Duke Charles of Brunswick, which ended in a great victory for the former. The Prussians, who numbered fully 48,000, left nearly half of their men dead or wounded on the ground, while the French (30,000) escaped with a loss of only 7,000. Napoleon, who had, on the same day, defeated the main army of Frederick William III. at Jena, made Davoust Duke of Auerstadt.

**Augeas** (â-jē'as), a fabulous king of Elis, in Greece, whose stable contained 3,000 oxen, and had not been cleaned for 30 years. Hercules undertook to clear away the filth in one day in return for a 10th part of the cattle, and executed the task by turning the river Alpheus through it. Augeas, having broken the bargain, was deposed and slain by Hercules.

**Augereau** (ōzh-rō'), **Pierre François Charles, Duke of Castiglione**, a celebrated French general, born at Paris in 1757. He joined the army as a private soldier, proceeded to Spain, and soon rose to the rank of adjutant-general. He then took high command under Napoleon I. in Italy, and in 1796, at the head of his own brigade, stormed the bridge of Lodi. To him Napoleon owed the brilliant victories of Castig-

## Augier

lione and Arcole. Augereau having been sent by Napoleon to Paris, became military commander of the capital, and led the *coup d'état*, or Revolution of Fructidor, by which the enemies of the Directory were seized and overthrown. Appointed to the command of the army on the German frontier, he became so wildly democratic that the Directory displaced him and sent him to Perpignan. He refused to assist Napoleon in the revolution which preceded the consulate and the empire. In 1805, being created a Marshal of France, Augereau commanded at the reduction of the Vorarlberg; was at the battle of Jena in 1806, and accompanied Napoleon to Berlin. He commanded the French at Eylau in 1807, and, in 1809 and 1810, commanded in Catalonia, where he committed great excesses. Augereau was at the great battles of Leipsic, Oct. 16, 17, and 18, 1813, and in 1814, commanded at Lyons, to repel the march of the Austrians from that direction on the capital. Yielding to superior numbers, he retired to the S. and, displaying little attachment to Napoleon, acknowledged the Bourbons, retained his honors, and became a peer. During the "100 days" of 1815, he remained in privacy, but on the return of Louis XVIII., he again sought public life; and, as the last act of an eventful life, voted for the condemnation of his brother-soldier, Marshal Ney, to an ignominious death. For this the French people have never forgiven him. He died in June, 1816.

**Augier, Guillaume Victor Emile** (ōzh-yā'), a French dramatic poet, born at Valence, Sept. 20, 1820. "La Ciguë," his first piece, in two acts, after being rejected at the Théâtre Française in 1844, was accepted by the managers of the Odeon Théâtre, and there brought out. It had a run of three months, and established the popularity of the author. The latter subsequently produced other light pieces. These, however, were thrown in the shade by "Gabrielle," a five-act comedy, which has been pronounced by competent critics to be Augier's most finished and best constructed work, whether as regards plot, poetry or the delineation of character. He was nominated a member of the Académie Française, and then officer of the Legion of Honor. At the solicitation of Mlle. Rachel, Augier wrote "Diane," a piece in five acts, but which failed to elicit the applause bestowed upon "Gabrielle." In 1868, his "Fils de Giboyer" had a success equal to the latter. The style of Augier is at once classic and easy, dignified and yet pictorial, never heavy, and always interesting. He may be said to have founded a new school in French dramatic literature, and his works, partly by their originality, and partly by intrinsic merit of a kind possessed in common with other dramatic productions,



have acquired very great popularity. He died Oct. 25, 1889.

**Augite**, the name applied by Werner to volcanic schist, and by Dana to certain kinds of aluminous pyroxene. It is nearly allied to hornblende and is frequent in volcanic rocks.

**Augsburg** (ougs-pörg), a city of South Germany, capital of Suabia, in the kingdom of Bavaria; situated on a plain, 35 miles N. W. of Munich. It was founded by the Emperor Augustus, 12 B. C. The streets are narrow but picturesque, the buildings retaining many mediaeval characteristics. Among the most notable are the cathedral, arsenal, town hall and Abbey of St. Ulric. Napoleon III. received his early education in a gymnasium of this city. It is a center of the book trade. Augsburg has been prominent since the Middle Ages for its commercial and financial operations and was long the home of merchant princes such as the Fuggers. It was the scene of the great Augsburg Diet. It was a free city till 1806, when Napoleon ceded it to Bavaria. Pop. (1905) 94,923.

**Augsburg, Confession of**, name given to the celebrated declaration of faith, compiled by Melanchthon, revised by Luther and other reformers, and read before the Diet of Augsburg, June 25, 1530. It consisted of 28 articles, seven of which refuted Roman Catholic errors, and the remaining 21 set forth the Lutheran creed. Soon after its promulgation, the last hope of reforming the Roman Catholic Church was abandoned, and complete severance followed. An answer by the Roman Catholics was read Aug. 3, 1530; when the Diet declared that it had been refuted. Melanchthon then drew up another confession. The first is called the unaltered, and the second, the altered form.

**Augsburg, Diet of**, the most celebrated of the numerous diets held at Augsburg. Pope Clement VII. refusing to call a general council for the settlement of all religious disputes, the Emperor Charles V. summoned one to meet at Augsburg, June 20, 1530. On the 25th the famous "Confession" was read; later an answer was made by the Catholics, whereupon the Protestants were ordered to conform in all points to the Church of Rome, Charles V. giving them till April 15, 1531, to reunite with the Mother Church. On Nov. 22, the emperor announced his intention to execute the edict of Worms, made severe enactments against the Protestants, and reconstituted the Imperial Chamber. The Protestants put in a counter declaration, and the Diet closed.

**Augsburg, League of**, a league concluded at Augsburg, July 9, 1686, for the

maintenance of the treaties of Münster and Nimeguen, and the truce of Ratisbon, and to resist the encroachments of France. The contracting parties were the Emperor Leopold I., the Kings of Spain and Sweden, the Electors of Saxony and Bavaria, and the circles of Suabia, Franconia, Upper Saxony and Bavaria.

**Augsburg Seminary**, an educational institution in Minneapolis, Minn., under the auspices of the Lutheran Church; organized in 1869; has grounds and buildings valued at \$125,000; average annual income, \$15,000; professors, 10; students, about 150; graduates, over 530.

**Augur, Christopher Colon**, an American military officer; born in New York, July 10, 1821; was graduated at the United States Military Academy in 1843; became Major of the 13th United States Infantry in 1861; Colonel of the 12th Infantry in 1866; Brigadier-General, United States army, March 4, 1869; Major-General in the volunteer service in 1862; mustered out of that service in 1866; and was retired in the regular army, July 16, 1885. He commanded a division in the battle of Cedar Mountain, being severely wounded. He died in Washington, D. C., Jan. 16, 1898.

**Augurs**, a college of diviners in ancient Rome, who predicted future events and read the will of the gods from the occurrence of certain signs, connected with thunder and lightning; the flight and cries of birds; the feeding of the sacred chickens; the action of certain quadrupeds or serpents; accidents, such as spilling the salt, etc. The answers of the augurs and the signs were called auguries; bird-predictions were auspices. Nothing was undertaken without the augurs, and by the words *alio die* ("meet on another day"), they could dissolve the assembly of the people and annul decrees passed at the meeting.

**August**, the eighth month of our year, named by the Roman Emperor Augustus, after himself, being associated with several of his victories and other fortunate events. Before this it was called Sextilis or the sixth month (counting from March). July had been named for Julius Cæsar and the Senate to please Augustus decreed that August should have equal length, taking a day from February.

**Augusta**, or **Agosta**, a fortified city of Sicily, about 12 miles N. of Syracuse, near the site of ancient Megara Hyblæa. In 1693 and 1848 earthquakes nearly destroyed the city. Near it was fought in 1676 the great naval battle between the French and the Dutch in which Admiral De Ruyter was fatally wounded. Pop. 13,867.



## Augusta

**Augusta**, city, and county-seat of Richmond co., Ga.; on the Savannah river, and the Augusta Southern, the Central of Georgia, the Georgia, the Charleston and Western Carolina, the South Carolina and Georgia, and the Southern railroads; 120 miles N. W. of Savannah. The site is about 700 feet above the sea level, and the city has an even temperature and a dry, invigorating atmosphere, making it a popular resort for pulmonary invalids. The city is laid out with broad streets which intersect at right angles, and many of them are beautifully shaded with trees. The city hall is in a park which also contains a granite monument in memory of the Georgia signers of the Declaration of Independence, and an imposing monument to the Confederate dead of the State has been erected on Broad street, the principal thoroughfare of the city. The city has several parks, and a United States arsenal, and in the suburbs are Summerville, a noted health resort, the principal cemetery, and attractive fair grounds. Augusta has a large trade in cotton, lumber, fruit and vegetables, but its main importance is in its manufacturing enterprises. According to the United States census of 1900 there were 388 manufacturing establishments reported, employing \$9,016,619 capital and 7,402 persons; paying \$2,093,915 for wages and \$6,244,286 for materials; and having a combined output valued at \$10,069,750. The principal industrial plants are cotton mills, of which there were 14 in operation in 1900, three of which had a capital of more than \$1,000,000 each, and all having over 200,000 spindles in operation. During 1899 it was estimated that at least \$8,000,000 in new capital was invested in cotton manufacturing in Georgia, by far the greater part in Atlanta and Augusta. The city is the seat of the Medical College of Georgia, and has an orphan asylum, two public hospitals, the Louise King Home, a juvenile reformatory, 2 National and several State banks, and about a dozen daily and weekly periodicals. The annual trade of the city exceeds \$80,000,000; the assessed property valuations exceed \$18,500,000, and the bonded debt in 1900 was \$1,752,300. Pop. (1890) 33,300; (1900) 39,441; (1910) 41,040.

**Augusta**, city, capital of the State of Maine, and county-seat of Kennebec co.; on the Kennebec river, and the Maine Central railroad; 63 miles N. E. of Portland. The city is built on both sides of the river on a series of terraces, the principal part being on the W. bank. It was first permanently settled by traders from Massachusetts in 1754; was incorporated under the name of Hallowell, in 1771; was reduced by the setting off of Hallowell in 1797; became the capital of the State in 1831; and received a city charter in 1849. In the State

## Augusta Victoria

House is the State library, a notable collection of portraits of American statesmen, and, in the rotunda, an impressive array of the Civil War battle flags of the Maine Volunteers. In the principal park is a Soldiers and Sailors' monument. On the E. side of the river are the State Asylum for the Insane, and United States arsenal. Four miles from Augusta is a National Soldiers' Home. The principal manufactures, which are promoted by an abundant water power, are cotton goods, paper, wood pulp, and lumber. The city is lighted by electricity, and has electric street railways, 3 National banks, high school, Lithgow Public Library, a large number of weekly periodicals, and an assessed property valuation of about \$7,000,000. Pop. (1890) 10,527; (1900) 11,683; (1910) 13,211.

**Augusta**, a title first given to his wife Livia, after the death of Augustus, according to the will of the emperor. It was afterward conferred by Claudius on Agrippina (A. D. 51), and by Nero on his wife Poppæa, as well as her daughter (A. D. 64). Eventually it became a common title of the mother, wife, sister, or daughter of an emperor.

**Augustana College**, a co-educational institution in Rock Island, Ill., organized in 1860 under the auspices of the Lutheran Church; reported in 1899: Professors, 27; students, 575; volumes in the library, 15,000; ground and buildings valued at \$210,000; productive funds, \$225,000; income, \$53,500; graduates, 881; president, O. Olsson, D. D.

**Augustan Age, The**, in England, the reign of Queen Anne (1702-1714), also called the Silver Age, the Golden Age being the reign of Elizabeth. By far the foremost name is that of Sir Isaac Newton, and of commanders, John Churchill (Duke of Marlborough). The poets were Congreve, Garth, Gay, Parnell, Philips, Pope, Prior, Rowe, and Swift. The other authors were Addison, Barnes, George Bull, Anthony Collins, Jeremy Collier, Roger Cotes, Defoe, Dodwell, Flamsteed, George Hickes, Dr. John Jeffery, John Norris, Ray, South, Steele, etc. Wren, Archibald Pitcairn, and Sir Cloudesley Shovel also lived in this reign. Except Pope and Gay, the poets have no high standing, and of the miscellaneous class, Addison and Defoe are the best known.

**Augusta Victoria**, Duchess of Schleswig-Holstein-Sonderburg-Augustenburg, born Oct. 22, 1858; daughter of the late Duke Friedrich; married Prince Friedrich Wilhelm, afterward Wilhelm II., Feb. 27, 1881; became Empress of Germany and Queen of Prussia on the accession of her husband to the thrones in June, 1888. In 1900 she had borne the Emperor-King seven children, the Crown Prince, Friedrich Wilhelm, being born May 6, 1882.



**Augustine** (â'gus-tên). **Aurelius Augustinus, St.**, a renowned father of the Christian Church, was born at Tagaste, in Africa, in 354, his mother, Monica, being a Christian, his father, Patricius, a pagan. His parents sent him to Carthage to complete his education, but he disappointed their expectations by his neglect of serious study and his devotion to pleasure. A lost book of Cicero's, called "Hortensius," led him to the study of philosophy; but, dissatisfied with this, he went over to the Manichæans. He was one of their disciples for nine years, but left them, went to Rome, and thence to Milan, where he announced himself as a teacher of rhetoric. St. Ambrose, the bishop of this city, converted him to the faith of his boyhood, and the reading of Paul's epistles wrought an entire change in his life and character. He retired into solitude, and prepared himself for baptism, which he received in his 33d year from the hands of Ambrose. Returning to Africa, he sold his estate and gave the proceeds to the poor, retaining only enough to support him. At the desire of the people of Hippo Augustine became the assistant of the bishop of that town, preached with extraordinary success, and in 395 succeeded to the see. He entered into a warm controversy with Pelagius concerning the doctrines of free-will, grace, and predestination, and wrote treatises concerning them, but of his various works his "Confessions" is most secure of immortality. He died Aug. 28. 430, while Hippo was besieged by the Vandals. He was a man of great enthusiasm, self-devotion, zeal for truth, and powerful intellect, and, though there have been fathers of the Church more learned, none have wielded a more powerful influence. His writings are partly autobiographical (as the "Confessions"), partly polemical, homiletic, or exegetical. The greatest is the "City of God" ("De Civitate Dei"), a vindication of Christianity.

**Augustine, or Austin, St.**, the Apostle of the English, flourished at the close of the 6th century, was sent with 40 monks by Pope Gregory I. to introduce Christianity into Saxon England, and was kindly received by Ethelbert, King of Kent, whom he converted, baptizing 10,000 of his subjects in one day. In acknowledgment of his tact and success Augustine received the archiepiscopal pall from the Pope, with instructions to establish 12 sees in his province, but he could not persuade the British bishops in Wales to unite with the new English Church. He died in 604 or 605.

**Augustins, or Augustines**, members of several monastic fraternities who follow rules framed by the great St. Augustine, or deduced from his writings, of which the chief are the Canons Regular of St. Augustine, or Austin Canons, and the Beg-

ging Hermits or Austin Friars. The Austin Canons were introduced into Great Britain about 1100, and had about 170 houses in England, and about 25 in Scotland. They took the vows of chastity and poverty, and their habit was a long, black cassock with a white rochet over it, having over that a black cloak and hood. The Austin Friars, originally hermits, were a much more austere body, went barefooted, and formed one of the four orders of mendicants. An order of nuns had also the name of Augustines. Their garments, at first black, were latterly violet.

**Augustulus, Romulus**, the last of the Western Roman emperors; reigned for one year (475-476), when he was overthrown by Odoacer and banished.

**Augustus, Caius Julius Cæsar Octavianus**, originally called CAIUS OCTAVIUS, the celebrated Roman emperor, was the son of Caius Octavius and Atia, a daughter of Julia, the sister of Julius Cæsar. The Octavian family originated at Velitræ, in the country of the Volscians. The branch to which Octavius belonged was rich and distinguished. His father had risen to the rank of senator, and had gone to Macedonia, after being chosen prætor, where he was distinguished as a civil and military officer. Octavius was born during the consulate of Cicero (63 B. C.). He lost his father when young, but was very carefully brought up at Rome by his mother and L. Marcius Philippus, the second husband of Atia. His talents gained him the regard of his great-uncle, Julius Cæsar, who declared himself willing to adopt him for his son, in case he himself should remain without children. Octavius was at Apollonia, in Epirus, where he was studying eloquence under the renowned orator Apollodorus, when he received the news of the tragical death of his uncle, and of his having adopted him as his son. Notwithstanding the anxiety of his friends, he went over to Italy, in order, if circumstances should favor him, to satisfy the hopes which he had entertained from being adopted by Julius Cæsar. When he landed at Brundisium, deputies from the veterans collected there came to him. Conducted in triumph to the city, and saluted as the heir and avenger of Cæsar, he made his adoption publicly known, and took the name of his uncle, adding to it that of Octavianus.

He placed himself, then only 19 years old, at the head of the veterans, possessed himself of all the public money in Brundisium, and advanced through Campania to Rome. Here there were two parties, that of the republicans, who had killed Cæsar, and that of Antony and Lepidus, who, under the pretence of avenging him, strove to establish their own authority. The latter party became victorious, and the



consul, Antony, exercised almost unlimited power. Octavianus addressed himself first to Cicero, who had retired to his villa at Cumæ, being desirous to gain over this great orator, always beloved by the people, and whom Antony hated and feared. From thence he went to Rome, where the greater part of the magistrates, soldiers, and citizens came to meet him, Antony alone paying no attention to his return. After Octavianus had caused his adoption to be confirmed in the most solemn manner, he went to Antony, who had taken possession of Cæsar's papers and property, and demanded of him the inheritance left him, in order to pay the legacies mentioned in his uncle's will. Antony at first haughtily refused to acknowledge his claims, but afterward changed his demeanor when he found the influence of Octavianus continually increasing, and his own proportionably diminishing. There could be no real union, however, between two equally ambitious rivals. In their hearts they cherished reciprocal hatred and jealousy; and their enmity was so little a secret that Octavianus was accused of having wished to get Antony murdered. How the latter went to Cisalpine Gaul, besieged Mutina, and was declared an enemy to his country while absent from Rome; how Octavianus, who had obtained the most powerful party in the Senate, accompanied the consul sent against Antony, and, after the death of the consul, took the chief command; how he afterwards, when Antony, together with Lepidus, entered Italy at the head of a powerful army, united with him; how a triumvirate was formed by the three generals; and how, after dreadful scenes of blood in Rome and the rest of Italy, they defeated the republican army under Brutus and Cassius, at Philippi in Macedonia (42 B. C.);—all this is contained in the article on Antony.

After his return to Rome he satisfied the demands of his soldiers by dividing among them confiscated lands. This division caused great disturbances. In the midst of the stormy scenes which convulsed Italy, he was obliged to contend with Fulvia, whose daughter, Clodia, he had rejected, and with Lucius, the brother-in-law of Antony. After several battles, Lucius threw himself into the city of Perusia, where he was soon after obliged to surrender. The city was given up to be plundered, and 300 senators were condemned to death, as a propitiatory sacrifice to the manes of the deified Cæsar (40 B. C.). After the return of Antony, an end was put to the proscriptions. Octavianus allowed such of the proscribed persons as had escaped death by flight, and whom he no longer feared, to return. There were still some disturbances in Gaul, and the naval war with Sextus Pompeius continued for several years. About this time Octavianus married the famous Livia, the

wife of Claudius Nero, whom he compelled to resign her, after he himself had divorced his third wife, Scribonia. By a skillful course of conduct he brought about the defeat of Pompeius and reduced Lepidus to a nullity, thus leaving Antony alone as his rival. The empire was now divided between him and Antony; but while the former, in the East, gave himself up to a life of luxury, the young Octavianus pursued his plan of making himself sole master of the world. He especially strove to obtain the love of the people. He showed mildness and magnanimity, without the appearance of striving after the highest power, and declared himself ready to lay down his power when Antony should return from the war against the Parthians. He appeared rather to permit than to wish himself to be appointed perpetual tribune—an office which gave him supreme power. The more he advanced in the affections of the people, the more openly did he declare himself against Antony.

By making public a will, wherein his rival appointed his sons by Cleopatra his heirs, he stirred up the ill-will of the Romans against him. Availing himself of this feeling, Octavianus declared war against the Queen of Egypt, and led a considerable force, both by sea and land, to the Ambracian gulf. Here his admiral Vipsanius Agrippa gained the naval victory of *ACTIUM* (*q. v.*), which made Octavianus master of the world, 31 B. C. He pursued his rival to Egypt, and ended the war, after rejecting the proposal of Antony to decide their differences by a personal combat. Cleopatra and Antony killed themselves. Octavianus caused them to be splendidly buried. A son of Antony and Fulvia was sacrificed to ensure his safety. Cæsarion, a son of Cæsar and Cleopatra, shared the same fate. All the other relations of Antony remained uninjured, and Octavianus, on the whole, used his power with moderation. He spent two years in the East, in order to arrange the affairs of Egypt, Greece, Syria, Asia Minor, and the islands. On his return to Rome he celebrated a triumph for three days in succession, and (29 B. C.) closed the temple of Janus—for the third time since the foundation of Rome. Freed from his rivals and enemies, and master of the world, he is said to have been undecided as to how he should exercise his power, or whether he should even retain it. He first set about correcting the abuses which had prevailed during the civil war, established a general peace, ejected unworthy members from the Senate, restored ruined temples, and built new ones.

At the end of his seventh consulship, he entered the Senate house, and declared his resolution to lay down his power. The Senate, astonished at his moderation, besought him to retain it. He yielded to their press-



ing entreaties, and continued to govern through them. He now obtained the surname of Augustus, which marked the dignity of his person and rank, and united, by degrees, in himself, the offices of imperator, or commander-in-chief by sea and land, with power to make war and peace; of proconsul over all the provinces; of perpetual tribune of the people, which rendered his person inviolable, and gave him the power of interrupting public proceedings; and, in fine, of censor, and pontifex maximus, or controller of all religious matters. The laws themselves were subject to him, and the observance of them depended upon his will. To these dignities we must add the title of "father of his country." Great as was the power given to him, he exercised it with wise moderation. It was the spirit of his policy to retain old names and forms, but he steadfastly refused to assume the title of dictator, which latterly had become especially odious. Augustus conducted many wars in Africa, Asia, and particularly in Gaul and Spain, where he triumphed over the Cantabrians after a severe struggle. His arms subjected Aquitania, Pannonia, Dalmatia, and Illyria, and held the Dacians, Numidians, and Ethiopians in check. He concluded a treaty with the Parthians, by which they gave up Armenia, and restored the eagles taken from Crassus and Antony. At the foot of the Alps he erected monuments of his triumphs over the mountaineers, the proud remains of which are yet to be seen at Susa and Aosta.

After he had established peace throughout the empire, he again closed the temple of Janus. But this peace was interrupted, 9 A. D., by the defeat of Varus, who lost three legions in an engagement with the Germans, under Arminius, and killed himself in despair. The information of this misfortune greatly agitated Augustus. He let his beard and hair grow, and often cried out in the deepest grief, "O Varus, restore me my legions!" Meanwhile the Germans were held in check by Tiberius. During the peace, Augustus had issued many useful decrees, and abolished abuses in the government. He gave a new form to the Senate, employed himself in improving the manners of the people, particularly by promoting marriage, enacted laws for the suppression of luxury, introduced discipline into the armies, and order into the games of the circus. He adorned Rome in such a manner that it was truly said, "He found it of brick, and left it of marble." He also made journeys, as Velleius says, everywhere, to increase the blessings of peace; he went to Sicily and Greece, Asia Minor, Syria, Gaul, etc.; in several places he founded cities and colonies. The people erected altars to him, and, by a decree of the Senate, the month Sextilis was called

August. Two conspiracies, which threatened his life, miscarried. Cæpio, Murena, and Egnatius were punished with death; Cinna was more fortunate, receiving pardon from the emperor. This magnanimity increased the love of the Romans, and diminished the number of the disaffected; so that the master of Rome would have had nothing to wish for, if his family had been as obedient as the world. The debauchery of his daughter Julia gave him great pain, and he showed himself more severe against those who destroyed the honor of his family, than against those who threatened his life. History says that, in his old age, he was ruled by Livia, the only person, perhaps, whom he truly loved. He had no sons, and lost by death his sister's son, Marcellus, and his daughter's sons, Caius and Lucius, whom he had appointed his successors. Also, Drusus, his son-in-law, whom he loved, died early; and Tiberius, the brother of the latter, whom he hated, on account of his bad qualities, alone survived.

These numerous calamities, together with his continually increasing infirmities, gave him a strong desire of repose. He undertook a journey to Campania, from whose purer air he hoped for relief; but disease fixed upon him, and he died, in Nola (Aug. 19, 14 A. D.), in the 79th year of his age, and 45th of his reign. When he felt his death approaching he is said to have called for a mirror, arranged his hair, and demanded of the by-standers, "Have I played my part well?" and, an answer being returned in the affirmative, "Then," added he, using the form of the players, "farewell, and applaud" (*valet, et plaudite*). If this last passage in the life of Augustus is true, it is certainly indicative of his character, his policy, and even of his fortune. He conquered Brutus by means of Antony, and Antony by means of Agrippa. He several times changed his party, but never his purposes, and knew how to cause power to be offered, and pressed upon him, while it was, in fact, the object of all his exertions. It cannot be denied that he used his power with wisdom, and became the benefactor of his country, which he had previously plunged into the horrors of civil war. His taste and active mind led him to favor and protect the learned; and he even exercised the art of the poet himself; so that he was not unworthy of giving his name to an age distinguished for intellectual creations. His death plunged the empire into the greatest grief. He was numbered among the gods, and temples and altars were erected to him. Nevertheless, the most various opinions of his secret motives have been held, both in ancient and modern times, some maintaining that he was selfish and treacherous in the acts by which he



## Augustus I.

gained the supreme power, but honest and faithful in his government, others regarding him as a cool and calculating hypocrite throughout his career. Whatever may have been the judgments of his contemporaries regarding his personal character, the Romans in later times looked back to the age of Augustus as the most prosperous and the most distinguished in their annals.

**Augustus I.**, Elector of Saxony, born in Freiberg, July 31, 1526; was the son of Duke Henry the Pious, and brother of Maurice, whom he succeeded in 1553. Anna of Denmark, whom he married in 1548, exercised a strong influence over him and won him from Calvinistic opinions to the creed of Lutheranism, of which he became a zealous partisan, even persecuting his former associates. He was active in the conflict of his time, aided in establishing the Religious Peace of Augsburg in 1555, and was instrumental in securing a "formula of concord" in 1580, whereby he gained the support of eighty-six Lutheran imperial estates, but only widened the breach with the Calvinists. Soon after his death, the "formula of concord" was repealed. The Elector greatly increased the importance of Saxony, introduced many useful improvements and reforms, and adorned Dresden, the capital. He died Feb. 12, 1586.

**Augustus II., Frederick**, Elector of Saxony and King of Poland, second son of John George III., Elector of Saxony; born in Dresden, in 1670. To his residence in France he owed that taste for luxury and the fine arts which made the Saxon court inferior in splendor to none but that of Louis XIV. In 1695 he became elector and in 1696 was candidate for the vacant Polish throne. The French ambassador and the nobles supported the Prince of Conti, but Augustus by acceptance of the Catholic faith, by bribery and intimidation secured the election, June 27, 1697. Early in his reign, a treaty was made between Denmark, Poland, and Russia against Charles XII. of Sweden, for the conquest of Livonia. But Charles, after having defeated the Danes and the Russians, turned toward Poland.

Thus commenced the celebrated Northern War, which lasted 20 years, in which Augustus, with his faithful Saxons, had to withstand the opposition of the Poles, as well as the valor of the Swede. Charles declared him a usurper, and thus separated the cause of the republic from that of the king, who obtained but little assistance from the Poles. The Swedes advanced to Clissow, between Warsaw and Cracow. Augustus had 24,000 men, Charles only half the number; but the Poles gave way in the beginning of the engagement, and Charles gained a complete victory, July 20, 1702. On May 1, 1703, the Saxon army was defeated again at Pultusk. The diet assem-

## Augustus II.

bled at Warsaw declared Augustus, Feb. 14, 1704, incapable of wearing the crown of Poland, and Stanislaus Leszczyński voivode of Posen, was chosen king, July 12, 1704. Charles, victorious on every side, advanced into Saxony, and Augustus found himself obliged to negotiate a secret peace, at Altranstadt, Sept. 24, 1706. Meanwhile, the Russians, ignorant of these transactions, obliged Augustus to attack the Swedish general Mardefeld. He gained a signal victory at Kalisch, and entered Warsaw in triumph, at the time that the proposals of Charles were brought to him. However much he might desire to take advantage of his good fortune, it was too late. Saxony lay at the mercy of the Swedes. He signed the treaty, and, Dec. 18, 1706, visited Charles in his camp at Altranstadt. He soon after received an unexpected visit from Charles in Dresden. Count Fleming, his first minister, advised him to make himself master of the person of his dreaded enemy, but he rejected the unjust proposal.

He now devoted himself to the domestic affairs of Saxony. His love of splendor involved him in many expenses, by which the finances of his kingdom were disordered. In 1708 he served under an assumed name in a campaign against the French, in the Netherlands. In 1709, after the defeat of Charles at Pultawa, the Poles recalled Augustus, who united himself anew with Peter. These two monarchs, in alliance with Denmark, sent troops into Pomerania. Notwithstanding the exhausted state of Sweden, the Swedish general Steinbock gained a splendid victory over the allies at Gadebusch, Dec. 20, 1712, which compelled them to raise the siege of Wismar and Stralsund. Charles XII., having afterward returned from his residence in Turkey, and made known his determination to prosecute the war with vigor, an alliance, at the head of which was Augustus, was formed against him; but his death put an end to the war, and Augustus concluded a peace with Sweden. A confederation was now formed in Poland against the Saxon troops, by the party of Stanislaus, in the belief that Augustus was aiming at absolute power. The Saxons were attacked and obliged to surrender. At length, through the mediation of Peter, an arrangement was concluded at Warsaw, 1717, between Augustus and the Polish leaders. The Saxon troops were removed from the kingdom, and Augustus agreed not to maintain more than 17,000 soldiers in Poland, who were to be under the Polish authorities. The last years of his reign were characterized by boundless luxury and corruption of manners. He was not disliked by his subjects, and filled with dignity his station among the European powers. In his character generous ideas were united with despotic feelings, a taste for pleasure with the cares



of ambition, and the restlessness of a warlike spirit with the effeminacy of a luxurious life. Death surprised him in the midst of his pleasures and projects. On his journey to Warsaw to attend the diet, a small wound in his knee becoming inflamed, he died, Feb. 1, 1733, and was buried in Craeow. His wife, Christine Eberhardine, left him one son. By his mistresses he had many children. The Countess of Königsmark bore him the celebrated Maurice of Saxony.

**Augustus III., Frederick**, Elector of Saxony and King of Poland, son of Augustus II.; born in Dresden, in 1696; succeeded his father as elector in 1733. Toward the end of this year Louis XV. endeavored to replace Stanislaus Lesczinsky, whose daughter he had married, on the throne of Poland; but France was too far distant to send troops enough to Poland to support him. A part of the Polish nobility separated from the diet, and, supported by a Russian army, chose Augustus king; and in 1736 he was first generally recognized as such by the congress assembled at Warsaw to conclude a peace. Although without the great and amiable qualities of his father, in other respects he closely followed his example, distinguishing himself by the splendor of his feasts and the extravagance of his court. Hunting was his passion. The cares of government he gave up to his favorite and prime minister, Count Brühl, who was artful enough to persuade a monarch, weak, but proud and jealous of his dignity, that he alone exercised the supreme power. His system of politics consisted in entire dependence upon Russia. He preferred Dresden to Warsaw, and through his long absence from Poland the government sank into entire inactivity. Never were the annual diets more turbulent, and never were they so inefficient from the unbending obstinacy of the members, who continually opposed each other, under the most trivial pretexts. Augustus was satisfied if he could remain in his beloved Saxony, and thus the great kingdom of Poland was almost entirely without a government for 30 years.

In the midst of this confusion the Poles appeared to be satisfied and happy; but when Frederick II. had conquered Silesia, Augustus, disturbed by the rapidly increasing power of Prussia, united himself with the Queen of Hungary, by the treaties of December, 1742, May 13, 1744, and by that of Leipsic, May 18, 1745. He pledged himself, by means of the money which England and Holland were to pay him, to furnish her with 30,000 auxiliary troops, which he sent into Silesia, where they were united with the Austrian army, but were entirely defeated at Hohenfriedberg, June 4, 1745. Frederick now attacked Saxony itself, and

Prince Leopold of Dessau defeated the Saxon army once more, Dec. 15, 1745, at Kesselsdorf, under the walls of Dresden. Augustus deserted his capital, and preserved his pictures and porcelain, but lost the archives of the State, which fell into the hands of the victors. By the peace of Dresden, Dec. 25, 1745, he was reinstated in the possession of Saxony, in the next year. In 1756 he saw himself involved anew in a war against Prussia. When Frederick declined his proposal of neutrality he left Dresden, Sept. 10, and entered the camp at Pirna, where 17,000 Saxon troops were assembled. Frederick surrounded the Saxons, who were obliged to surrender, Oct. 14. Augustus fled to Königstein, and afterward to Poland. His authority in this country had always been inconsiderable, and after the loss of Saxony, became still more insignificant. The accession of Catharine to the Russian throne was a source of disquietude, for she sought to deprive the Saxon princes, who were allies of France, of the Polish thrones. The peace of Hubertsberg was hardly concluded when Augustus returned from Warsaw to Dresden, where he was seized, Oct. 5, 1763, with a fit of the gout, which put an end to his life. He had, like his father, before his accession to the Polish throne (1712), embraced the Roman Catholic religion. His son, Frederick Christian, succeeded him as Elector of Saxony, and Stanislaus Poniatowsky as King of Poland.

**Auk**, the name given to several sea birds, especially the great and the little auk. The great auk is the *alca impennis* of Linnæus. It is from two to two and a half feet high, with short wings almost useless for flight. In the water, however, it makes way with astonishing rapidity. It is essentially a northern bird. It seems to be rapidly verging to extinction. Its bones left behind show that it was formerly abundant on the shores of Iceland, Greenland, and Denmark. The little auk of Pennant and others, called also the common rotche, and the little white and black diver is the *mergulus melanoleucos* of Yarrell's "British Birds," the *M. alle* of Carpenter and Dallas, and the *alca alle* of Linnæus. It has the breast, the belly, a dot above the eyes, and a stripe on the wing, white; the rest of the plumage black. Its length is 9 inches, and the extent of its wings 16. Its dimensions are thus about those of a large pigeon. It nestles in holes or crevices on the bare rocks, laying one bluish-green egg. It is abundant in the Arctic seas. It is found also in Great Britain.

**Aulic**, an epithet given to a council (the Reichshofrath) in the old German Empire, one of the two supreme courts of the German Empire, the other being the court of the imperial chamber (Reichskammer-



## Aulis

gericht). It had not only concurrent jurisdiction with the latter court, but in many cases exclusive jurisdiction, in all feudal processes, and in criminal affairs, over the immediate feudatories of the emperor and in affairs which concerned the Imperial Government. The title is now applied in Germany in a general sense to the chief council of any department, political, administrative, judicial or military.

**Aulis**, in ancient Greece, a seaport in Bœotia, on the strait called Euripus, between Bœotia and Eubœa.

**Aullagas** (oul-yä'gas), a salt lake of Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desaguadero, and has only one perceptible, insignificant outlet, so that what becomes of its superfluous water is still a matter of uncertainty.

**Aumale** (ō-mäl'), a small French town, in the Department of Seine-Inférieure, 35 miles N. E. of Rouen, which has given titles to several notables in French history.

**Aungerville, Richard** (ân'ger-vil), known as RICHARD DE BURY (from his birthplace, Bury St. Edmund's), an English statesman, bibliographer and correspondent of Petrarch, born in 1281. He entered the order of Benedictine monks, and became tutor to the Prince of Wales, afterward Edward III. Promoted to several offices of dignity, he ultimately became Bishop of Durham, and Lord Chancellor of England. During his frequent embassies to the Continent he made the acquaintance of many of the eminent men of the day. He was a diligent collector of books, and formed a library at Oxford. Author of "Philobiblon," "Epistolæ Familiarium," including letters to Petrarch, etc. He died in 1345.

**Aurbacher, Ludwig** (our'bä-cher), a German author (1784-1847), well remembered by his "Volksbüchlein" (1827-1829); a collection of popular tales, ranking among the best productions of this kind in German literature.

**Aurelian, Lucius Domitius Aurelianus**, an Emperor of Rome, distinguished for his military abilities and stern severity of character; was the son of a peasant of Illyricum. He was born about 212 A. D., and rose to the highest rank in the army, and even to the consulate; which good fortune was increased by a wealthy marriage. Claudius II., on his death-bed, in 270, recommended Aurelian to the choice of the troops of Illyricum, who readily acceded to his wishes. He delivered Italy from the barbarians, reduced Tetricus, who had been unwillingly made to assume the purple in Gaul, and conquered the famous Zenobia, Queen of Palmyra. Aurelian followed up his victories by the reformation of abuses, and the

## Aurelius Antoninus

restoration throughout the empire of order and regularity, but tarnished his good intentions by the general severity of his measures, and the sacrifice of the senatorian order to his slightest suspicions. He had planned a great expedition against Persia, and was waiting in Thrace for an opportunity to cross the straits, when he lost his life, A. D. 275, by assassination, the result of a conspiracy excited by a secretary whom he intended to call to account for peculation. Aurelian was a wise, able, and active prince, and very useful in the declining state of the empire.

**Aurelius Antoninus, Marcus**, often called simply MARCUS AURELIUS, Roman Emperor and philosopher, son-in-law, adopted son, and successor of Antoninus Pius, born A. D. 121, succeeded to the throne 161; died 180. His name originally was Marcus Annius Verus. He voluntarily shared the government with Lucius Verus, whom Antoninus Pius had also adopted. Brought up and instructed by Plutarch's nephew, Sextus, the orator Herodes Atticus, and L. Volusius Meeianus, the jurist, he had become acquainted with learned men, and formed a particular love for the Stoic philosophy. A war with Parthia broke out in the year of his accession, and did not terminate till 166. A confederacy of the northern tribes now threatened Italy, while a frightful pestilence, brought from the East with the army, raged in Rome itself. Both emperors set out in person against the rebellious tribes. In 169 Verus died, and the sole command of the war devolved on Marcus Aurelius, who prosecuted it with the utmost rigor, and nearly exterminated the Marcomanni. His victory over the Quadi (174) is connected with a famous legend. Dion Cassius tells us that the 12th legion of the Roman army was shut up in a defile, and reduced to great straits for want of water, when a body of Christians enrolled in the legion prayed for relief. Not only was rain sent, which enabled the Romans to quench their thirst, but a fierce storm of hail beat upon the enemy, accompanied by thunder and lightning, which so terrified them that a complete victory was obtained, and the legion was ever after called "The Thundering Legion." After this victory, the Marcomanni, the Quadi, as well as the rest of the barbarians, sued for peace. The sedition of the Syrian governor, Avidius Cassius, with whom Faustina, the Empress, was in treasonable communication, called off the Emperor from his conquests, but before he reached Asia the rebel was assassinated. Aurelius returned to Rome, after visiting Egypt and Greece, but soon new incursions of the Marcomanni compelled him once more to take the field. He defeated the enemy several times, but was taken sick at Sirmium, and died at Vindobona (Vienna), in 180.



His only extant work is the "Meditations," written in Greek, and which has been translated into most modern languages. This may be regarded as a manual of practical morality, in which wisdom, gentleness, and benevolence are combined in the most fascinating manner. Many believe it to have been intended for the instruction of his son Commodus. Aurelius was one of the best emperors Rome ever saw, although his philosophy and the magnanimity of his character did not restrain him from the persecution of the Christians, whose religious doctrines he was led to believe were subversive of good government.

**Aurengzebe.** See AURUNGZEBE.

**Aureola**, or **Aureole**, in paintings, an illumination surrounding a holy person, as Christ, a saint, or a martyr, intended to represent a luminous cloud or haze emanating from him. It is generally of an oval shape, or may be nearly or quite circular, and is of similar character with the nimbus surrounding the heads of sacred personages.

**Aureus**, the first gold coin which was coined at Rome, 207 B. C. Its value varied at different times, from about \$3 to \$6.

**Aurichalcite**, a mineral placed by Dana under the fourth section of his hydrous carbonates. It occurs in acicular crystals, forming drusy incrustations; also columnar, plumose, granular, or laminated. Its luster is pearly; its color, pale-green, or sometimes azure. The hardness is 2. The composition: Oxide of copper, 16.03 to 32.5; oxide of zinc, 32.02 to 56.82; carbonic acid, 14.08 to 24.69; water, 9.93 to 10.80; lime, 0 to 8.62. It is found in England at Roughen Gill, in Cumberland; at Leadhills, in Lanarkshire; in Spain, Asia, and the United States. Buratite, by some called limeaurichalcite, occurs in France and in Austro-Hungary.

**Auricles of the Heart**, those two of the four cavities of the heart which are much smaller than the others, and each of which, moreover, has falling down upon its external face a flattened appendage, like the ear of a dog, from which the name of the whole structure is derived. The right auricle has a communication with the right ventricle, and the left auricle with the left ventricle. The two auricles are irregular, cuboidal, muscular bags, separated from each other by a thin, fleshy partition. The main portion of each consists of what is called the *sinus venosus*, into which the veins pour their blood.

**Auricula**, a well known and beautiful garden flower, the *primula auricula*. It is a native of the Alpine districts of Italy, Switzerland, and Germany, and occurs also in Astrakhan. In its wild state its colors are generally yellow and red, more rarely

purple, and occasionally variegated or mealy. A still greater variety of colors has been introduced by cultivation. In zoology, a genus of pulmoniferous mollusks, the typical one of the family *auriculidæ*. They are found chiefly in the brackish swamps of tropical islands. Tate, in 1875, enumerated 94 recent and 28 fossil species, the latter apparently Neocomian in age. There are several sub-genera.

**Aurifaber**, the Latinized name of JOHANN GOLDSCHMIDT, one of Luther's companions, born in 1519, became pastor at Erfurt in 1566; died there in 1579. He collected the unpublished manuscripts of Luther, and edited the "Epistolæ" and the "Table-Talk."

**Auriga** (â-rē'ga), in astronomy, the Wagoner, a constellation of the northern hemisphere, containing 68 stars, including Capella of the first magnitude.

**Aurillac** (ô-rē-yak), a town of France, capital of the Department of Cantal; on the Dourdonne river; 272 miles S. of Paris. It is noted for its ancient buildings, among which are the Church of Notre Dame, constructed in the 13th century, and the castle of St. Stephen. Most of the town is of modern construction. It has manufactures of jewelry, copper, kettles, paper, woolen stuffs and carpets. Pop. (1891) 15,824.

**Auringer, Obadiah Cyrus**, an American poet, born at Glens Falls, N. Y., June 4, 1849. He served for some years in the United States navy. In 1875 he became a farmer in his native place. Among his works are "Voices of a Shell," "Seythe and Sword" (1887); "Episode of Jane McCrea," and "The Book of the Hills."

**Aurochs**, the English and very nearly the German name of the *aurochs fossile* of Cuvier, the *bos irus* of some other writers, now called *bison priscus*. It belongs to the order *ruminantia* and the family *bovidæ*. It is a species of ox, with a shaggy coat and mane, found by the Romans in the forests of Germany and Belgium, and still existing in small numbers in Lithuania, being preserved by strict protective laws. In prehistoric times it must have existed in England, for its remains have been found in newer Pliocene strata at Woolwich, at Ilford, and in the valley of the Thames. It is not to be confounded with the urus of Cæsar. The genus is almost extinct.

**Aurora**, the dawning light before sunrise; daybreak; the morning. In mythology, the daughter of Hyperion and Thia, and sister of Sol and Luna. She was one of the ancient goddesses of the race of the Titans, but retained her rank among the later race of gods. To the Titan Astræus, son of Crius, she bore the winds, Zephyrus, Boreas, and Notus, the morning star, and the constella-



## Aurora

tions. She rises from the ocean, drawn by the celestial horses Lampus and Phæton, and with rosy fingers raises the veil of night, shedding light upon the world, until she flies from the splendor of day. Among the mortals whose beauty captivated the goddess poets mention Orion, Tithonus and Cephalus.

**Aurora**, a city in Kane co., Ill., on the Fox river, and the Chicago and Northwestern, the Burlington Route, and other railroads; 38 miles W. of Chicago. It contains several locomotive, car, and railroad repair shops; large cotton and woolen mills; watch and carriage factories; smelting and silver plating works; stove and machine works; and other industries. It is the farming and manufacturing center for Kane and adjoining counties. There are 12 churches, State hospital, Jennings Seminary, electric light and street railway plants, Holly system of water works, 5 National banks, daily and weekly newspapers, and assessed property valuations of about \$5,000,000. Pop. (1900) 24,147; (1910) 29,807.

**Aurora Borealis**, a luminous meteoric phenomenon appearing in the N. most frequently in high latitudes, the corresponding phenomenon in the southern hemisphere

## Aurora Borealis

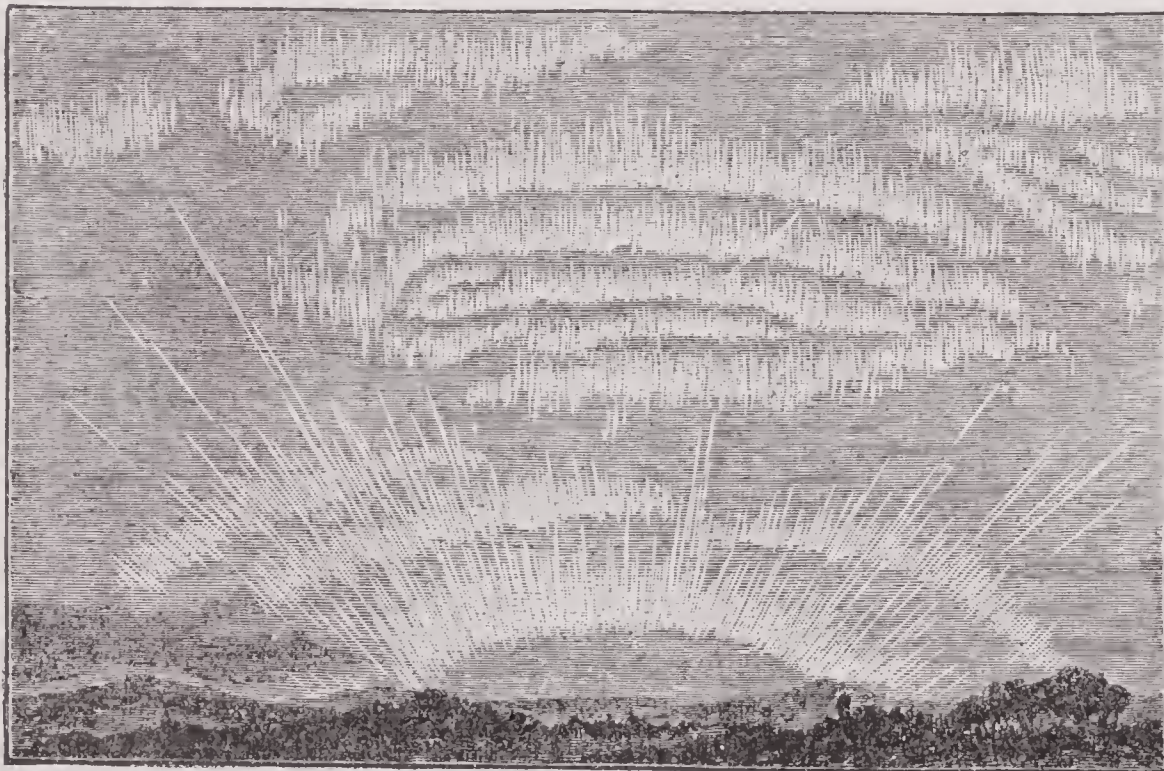
the zenith from a dusky line of cloud or haze a few degrees above the horizon, and stretching from the N. toward the W. and E., so as to form an arc with its ends on the horizon, and its different parts and rays



AURORA DRIVING HER CHARIOT.

are constantly in motion. Sometimes it appears in detached places; at other times it almost covers the whole sky. It assumes many shapes and a variety of colors, from a pale red or yellow to a deep red or blood color; and in the northern latitudes serves to illuminate the earth and cheer the gloom of the long winter nights. The appearance of the aurora borealis so exactly resembles the effects of artificial electricity that there is every reason to believe that their causes are identical. When electricity passes through rarified air it exhibits a diffused luminous stream which has all the characteristic appearances of the aurora, and hence

it is highly probable that this natural phenomenon is occasioned by the passage of electricity through the upper regions of the atmosphere. The influence of the aurora upon the magnetic needle is now considered as an ascertained fact, and the connection between it and magnetism is further evident from the fact that the beams or coruscations issuing from a point in the horizon W. of N. are frequently observed to run in



AURORA BOREALIS.

being called aurora australis, and both being also called polar light, streamers, etc. The northern aurora has been far the most observed and studied. It usually manifests itself by streams of light ascending toward

the magnetic meridian. What are known as magnetic storms are invariably connected with exhibitions of the aurora, and with spontaneous galvanic currents in the ordinary telegraph wires; and this connection is



found to be so certain that, upon remarking the display of one of the three classes of phenomena, we can at once assert that the other two are also observable. The aurora borealis is frequently accompanied by sound, which is variously described as resembling the rustling of pieces of silk against each other, or the sound of wind against the flame of a candle. The aurora of the southern hemisphere is quite a similar phenomenon to that of the northern.

**Aurungzebe** (au-rung-zēb'), known as the Great Mogul, or Emperor of Hindustan, born Oct. 22, 1618. He was the son of Shah Jehan, and properly named Moham-mad, but received from his grandfather that of Aurungzebe (Ornament of the Throne), by which he is known to history. After deposing and imprisoning his father, and putting his brothers to death, Aurungzebe, in 1658, was crowned sole monarch of the great Mogul Empire. His long reign was more remarkable for its internal policy than for its outward events. In some respects it may be compared to the reign of Louis XIV. of France. Both reigns were of unusual duration, and of unquestionable brilliancy. Aurungzebe carried on many wars, conquered Golconda and Beejapur, and subjugated the Mahrattas. The Mussulmans of India still regard him as the greatest of their sovereigns. Aurungzebe died at Ahmednuggur, in the Deccan, Feb. 21, 1707, master of 21 provinces, and of a revenue of about \$200,000,000.

**Ausable Chasm**, a picturesque and popular American summer resort, in New York State; 12 miles from Plattsburg, and 1 mile from Keeseville. It is an isolated formation, wholly independent of, and disconnected from, any other similar panorama. At the beginning of the chasm, the river is hemmed into a channel not more than 10 feet wide by walls of rock from 100 to 200 feet high. Lower down the walls gradually spread apart till in some places there is a distance between them of 50 feet, and then extend with sharp turns and occasional enlargements for nearly 2 miles. Lateral fissures, narrow and deep, project from the main ravine at nearly right angles, and through one of these a staircase of over 200 feet reaches to the abyss. The walls are formed of laminæ of sandstone, laid in precise and regular order, and their crevices are filled with a thick growth of hardy pines and cedars. The trip through the chasm may be made in a small boat or on foot. For the accommodation of tourists, stone walks with substantial iron railings and firm bridges have been constructed.

**Auscultation**, the art of discovering diseases within the body by means of the sense of hearing. Being carried out most efficiently by means of an instrument called a stethoscope, it is often called mediate auscultation. It is used to study the natural

sounds produced within the body, especially the action of the lungs and heart, both in health and disease. Its operation can be facilitated by percussion of the surface.

**Ausonius, Decimus Magnus**, son of a physician of Bordeaux, was born in the beginning of the 4th century. He devoted himself to the cultivation of letters. In A. D. 369, his reputation caused him to be selected by the Emperor Valentinian as tutor to his son Gratian. In A. D. 377, he was appointed prætorian prefect of Italy, and of the Gauls in the following year, and made consul by Gratian in 379. His poetical talents were highly esteemed during his life (as indeed he is among the best writers of that late era); and the Emperor Theodosius wished to obtain the same return of flattery from him which Augustus received from Horace and Vergil. But his style is vicious and full of conceits, and his subjects generally too trifling to retain any interest.

**Auspices**, among the Romans, omens, especially those drawn from the flight or other movements of birds, or, less properly, from the occurrence of lightning or thunder in particular parts of the sky. These were supposed to be indications of the will of heaven, and to reveal futurity. At first only the augurs took the auspices, but after a time civil officers, discharging important functions, had the right of doing so. Two kinds of auspices, however, arose—a greater and a lesser; the former reserved to dictators, consuls, censors, prætors, or the commander-in-chief in war; the latter permitted to less exalted functionaries. In the struggle which the plebeians carried on against the patricians for permission to share in political power, the chief argument used by the opponents of change was, the impossibility that a plebeian could take the auspices; but when, in B. C. 307, the flinging open of the augural college to all classes permitted him to try the experiment, it was found that he did the work as effectively (not to say as ineffectively) as any patrician whatever. The glory of a successful enterprise was universally assigned to the person who took the auspices, and not to the leader of the enterprise itself; hence, the phrase arose, to carry on a war "under the auspices" of the Emperor or some other high authority.

**Austen, Jane**, an English novelist, born at Steventon, Hampshire, of which parish her father was the rector, Dec. 16, 1775. She was the youngest of seven children, among whom she had but one sister, and of her brothers two ultimately rose to the rank of Admiral in the navy. Her father gave her a better education than was common for girls toward the close of the 18th century. Jane learned French and Italian, and had a good acquaintance with English literature, her favorite authors being Richardson, Johnson, Cowper, Crabbe, and, later,



## Austerlitz

Scott. She grew up tall and remarkably graceful in person, with bright hazel eyes, fine features, rich color, and beautiful brown curly hair. Her disposition was very sweet and charming, and she was an especial favorite with children, whom she used to delight with her long, improvised stories. In 1801 she went with her family to Bath, and after her father's death in 1805, removed to Southampton, and finally, in 1809, to Chawton, near Winchester. She had written stories from her childhood, but it was here that she first gave anything to the world. Four stories were published anonymously during her lifetime: "Sense and Sensibility" (1811); "Pride and Prejudice" (1813); "Mansfield Park" (1814), and "Emma" (1816). The first two were written before the gifted authoress was more than two-and-twenty years old. Early in 1816, her health began to give way. In May, 1817, she went for medical advice to Winchester, and there she died, July 18, 1817. She was buried there in the Cathedral. "Northanger Abbey" and "Persuasion" were published in 1818, when the authorship of the whole six was first acknowledged. Jane Austen's novels are the earliest example of the so-called domestic novel in England. No one was ever better acquainted with the limits of her own powers than this marvelous girl, and consequently all her work stands on the same high level of excellence. The finest critics, with singular unanimity, have praised the delicacy of her touch, and her faultless work has called forth the most unqualified admiration from Southey, Coleridge, Sydney Smith, and Lord Macaulay. Her world is the gentry in the England of her time, and she portrays its every-day life with marvelous truthfulness of insight.

**Austerlitz**, a small town of Moravia, on the Littawa, 13 miles S. E. of Brünn. In the vicinity, on Dec. 2, 1805, was fought the famous battle that bears its name, between the French army of 80,000 men, commanded by Napoleon, and the combined Russian and Austrian armies, numbering 84,000, under their respective Emperors; in which the former achieved a signal victory. According to Alison, the allies lost 30,000 in killed, wounded, and prisoners, and the French 12,000. The battle was followed by an armistice, the terms of which were dictated by Napoleon; and immediately after, on Dec. 26, by the Treaty of Presburg, which disastrously affected Austria. The battle of Austerlitz is sometimes called "The Battle of the Three Emperors."

**Austin**, a city of Texas, county-seat of Travis co. and capital of the State; situated on the Colorado river about 225 miles N. W. of Galveston, and on the Houston and Texas Central, the Missouri, Kansas, and Texas, the International and Great Northern, and

## Austin

the Austin and Northwestern railroads. The capitol building is one of the largest of the State capitol, and cost the State three million acres of western lands paid to the builders and fifty thousand acres appropriated for preliminary expenses. Its corridors and chambers are adorned with fine statuary and historical paintings, and on the grounds are found some of the finest monumental sculptures in the South, among them the Confederate monument and the Terry Ranger monument, the latter of which was unveiled June 26, 1907. Among important institutions are the University of Texas, St. Edward's College, Tillottson's Institute, and the Sam Houston College (colored). State asylums for the insane and State schools for the blind and for the deaf and dumb are also located here. Austin has an extensive trade in cotton, grain, wool, hides, and live stock, and a large wholesale trade in groceries, dry goods, and provisions. Plain lumber, flour, and leather are the chief manufactured products. The great dam built in 1893 for water supply and power was swept away by floods in 1900, but in 1907 negotiations were pending for rebuilding it. Taxable values in 1907 reached about \$12,000,000, which amount represents about two-fifths of the real value, no other city in the State having so large a proportion of non-taxable property; the bonded indebtedness on Aug. 1, 1907, was \$1,529,500. The city has municipal ownership of water and electric light. The settlement formerly known as Waterloo was incorporated under its present name and made the capital of the Republic of Texas in 1839, and eventually became the capital of the State. Austin is a beautifully located and well-built city. It has splendid educational advantages in both common schools and schools for advanced education. The first free school in the State was established here in 1871. Pop. (1900) 22,258; (1910) 29,860. F. M. MADDOX.

**Austin, Alfred**, an English poet, critic, and journalist, born at Headingley, near Leeds, May 30, 1835. He graduated from the University of London in 1853, was called to the bar in 1857, and was editor of the "National Review," 1883-1893. He was appointed poet laureate of England in 1896. He is the author of political books, novels, and many volumes of verse. The latter include "The Season: a Satire" (1862); "The Human Tragedy" (1862); "The Golden Age: a Satire" (1871); "The Tower of Babel," a drama (1874); "Savonarola," a tragedy (1881); and "Veronica's Garden," in prose and verse (1895). Some of his happiest effects are attained in "Prince Lucifer" and "The Garden that I Love," although opinion is very much divided on the subject of his merits as a poet, particularly in such works as "Fortunatus, the Pessimist" (1891). Among his later prose



## Austin

works are "Haunts of Ancient Peace" (1902); "A Lesson in Harmony" (1904); "The Door of Humility" (1906).

**Austin, Jane Goodwin**, an American novelist, born in Worcester, Mass., Feb. 25, 1831; was educated and thenceforth lived in Boston. Her reputation rests on excellent stories describing the Pilgrim Fathers and the early colonists of Massachusetts, including "Fairy Dreams" (1860); "Moonfolk" (1874); "Mrs. Beauchamp Brown" (1880); "A Nameless Nobleman" (1881); "The Desmond Hundred" (1882); "Nantucket Scraps" (1882); "Standish of Standish" (1889); "Betty Alden" (1891); and "David Alden's Daughter" (1892). She died in Boston, March 30, 1894.

**Austin, John**, an English writer on jurisprudence, born in Creeling Mill, Suffolk, March 3, 1790. From 1826 to 1835 he filled the chair of Jurisprudence at London University. He served on several royal commissions, one of which took him to Malta; lived for some years on the Continent, and finally settled at Weybridge in Surrey. His fame rests on his great works, "The Province of Jurisprudence Determined," published in 1832; and his "Lectures on Jurisprudence," published by his widow between 1861 and 1863. He died in Weybridge, Surrey, in December, 1859. His wife, SARAH, one of the Taylors of Norwich, born in 1793, produced translations of German works, and other books bearing on Germany or its literature; also "Considerations on National Education," etc. She died in Weybridge, Surrey, Aug. 8, 1867. Her daughter, LADY DUFF GORDON, translated the "Amber Witch," and other German works.

**Austin, Stephen Fuller**, an American pioneer, born in Austinville, Va., Nov. 31, 1793; a son of Moses Austin, the real founder of the State of Texas, who, about 1820, obtained permission from the Mexican Government to establish an American colony in Texas, but died before his plans were accomplished. Stephen took up the work unfinished by his father, and located a thrifty colony on the site of the present city of Austin, in 1821. Subsequently he was a commissioner to urge the admission of Texas into the Mexican Union; was imprisoned there for several months; and, in 1835, was a commissioner to the United States Government to secure the recognition of Texas as an independent State. He died in Columbia, Tex., Dec. 25, 1836.

**Australasia**, a division of the globe usually regarded as comprehending the islands of Australia, Tasmania, New Zealand, New Caledonia, the New Hebrides, the Solomon Islands, New Ireland, New Britain, the Admiralty Islands, New Guinea, and the Arru Islands, besides numerous other islands and island groups; area, 3,259,199 square miles,

## Australia

pop. (1891) 4,285,297. It forms one of three portions into which some geographers have divided Oceania, the other two being Malaysia and Polynesia.

**Australia** (older name, New Holland), the largest island in the world, a sea-girt continent, lying between the Indian and Pacific Oceans, S. E. of Asia; between lat. 10° 39' and 39° 11' S.; long. 113° 5' and 153° 16' E.; greatest length, from W. to E., 2,400 miles; greatest breadth from N. to S., 1,700 to 1,900 miles. It is separated from New Guinea on the N. by Torres Strait, from Tasmania on the S. by Bass Strait. It is divided into two unequal parts by the Tropic of Capricorn, and is occupied by what are known as the original states of the Commonwealth of Australia, since the federation which was proclaimed Jan. 1, 1901.

**Area and Population.**—The area and the population (exclusive of aborigines) of the different States composing the Commonwealth of Australia in 1910 were as follows:

| Original States.       | Area. Sq. M. | Pop.      |
|------------------------|--------------|-----------|
| New South Wales.....   | 310,367      | 1,621,677 |
| Victoria .....         | 87,884       | 1,303,357 |
| Queensland .....       | 668,497      | 572,654   |
| South Australia.....   | 903,690      | 416,047   |
| Western Australia..... | 975,920      | 273,534   |
| Tasmania .....         | 26,215       | 186,860   |
| Total .....            | 2,972,573    | 4,374,129 |

Sydney, the capital of New South Wales, Melbourne, the capital of Victoria, Adelaide, the capital of South Australia, and Brisbane, the capital of Queensland, are the chief towns.

**Topography.**—Although there are numerous spacious harbors on the coasts, there are few remarkable indentations; the principal being the Gulf of Carpentaria, on the N., the Great Australian Bight, and Spencer Gulf, on the S. The chief projections are Cape York Peninsula and Arnhem Land in the N. Parallel to the N. E. coast runs the Great Barrier Reef for 1,000 miles. In great part the E. coast is bold and rocky, and is fringed with many small islands. Part of the S. coast is low and sandy, and part presents cliffs of several hundred feet high. The N. and W. coasts are generally low, with some elevations at intervals.

**Geology.**—The interior, so far as explored, is largely composed of rocky tracts and barren plains with little or no water. The whole continent forms an immense plateau, highest in the E., low in the center, and with a narrow tract of land usually intervening between the elevated area and the sea. The base of the table land is granite, which forms the surface rock in a great part of the S. W., and is common in the higher grounds along the E. side. Secondary (cretaceous) and tertiary rocks are



largely developed in the interior. Silurian rocks occupy a large area in South Australia, on both sides of Spencer Gulf. The mountainous region in the S. E. and E. is mainly composed of volcanic, silurian, carbonaceous, and carboniferous rocks yielding good coal. No active volcano is known to exist, but in the S. E. there are some craters only recently extinct. The highest and most extensive mountain system is a belt about 150 miles wide, skirting the whole eastern and southeastern border of the continent, and often called, in whole, or in part, the Great Dividing Range, from forming the great water shed of Australia. A part of it, called the Australian Alps, in the S. E. contains the highest summits in Australia, Mt. Kosciusko (7,175 feet), Mt. Clark (7,256), and Mt. Townshend (7,353). West of the Dividing Range are extensive plains or downs admirably adapted for pastoral purposes. The deserts and scrubs, which occupy large areas of the interior, are a characteristic feature of Australia. The former are destitute of vegetation, or are clothed only with a coarse, spiny grass that affords no sustenance to cattle or horses; the latter are composed of a dense growth of shrubs and low trees, often impenetrable till the traveler has cleared a track with his axe.

*Water Courses.*—The rivers of Australia are nearly all subject to great irregularities in volume, many of them at one time showing a channel in which there is merely a series of pools, while at another they inundate the whole adjacent country. The chief is the Murray, which, with its affluents, the Murrumbidgee, Lachlan and Darling, drains a great part of the interior W. of the Dividing Range, and falls into the sea on the S. coast (after entering Lake Alexandrina). Its greatest tributary is the Darling, which may even be regarded as the main stream. On the E. coast are the Hunter, Clarence, Brisbane, Fitzroy and Burdekin; on the W. the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the N. the Fitzroy, Victoria, Flinders, and Mitchell. The Australian rivers are of little service in facilitating internal communication. Many of them lose themselves in swamps or sandy wastes of the interior. A considerable river of the interior is Cooper's Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the S. side of the continent having no outlet, and, accordingly, salt. The principal of these are Lakes Eyre, Torrens, and Gairdner, all of which vary in size and saltiness according to the season. Another large salt lake of little depth, Lake Amadeus, lies a little W. of the center of Australia. Various others of less magnitude are scattered over the interior.

*Climate.*—The climate of Australia is generally hot and dry, but very healthy. In

the tropical portions there are heavy rains, and in most of the coast districts there is a sufficiency of moisture, but in the interior the heat and drought are extreme. Considerable portions now devoted to pasturage are liable, at times, to suffer from drought. At Melbourne the mean temperature is about 56°, at Sydney about 63°. The S. E. settled districts are at times subject to excessively hot winds from the interior, which cause great discomfort, and are often followed by a violent cold wind from the S. ("southerly bursters"). In the mountainous and more temperate parts snow storms are common in June, July and August.

*Mineralogy.*—Australia is a region containing a vast quantity of mineral wealth. Foremost come its rich and extensive deposits of gold, which, since the precious metal was first discovered, in 1851, have produced a total of more than \$1,350,000,000. The greatest quantity has been obtained in Victoria, but New South Wales and Queensland have also yielded a considerable amount. Probably there are rich stores of gold as yet undiscovered. Australia also possesses silver, copper, tin, lead, zinc, antimony, mercury, plumbago, etc., in abundance, besides coal (now worked to a considerable extent in New South Wales) and iron. Various precious stones are found, as the garnet, ruby, topaz, sapphire, and even the diamond. Of building stone there are granite, limestone, marble, and sandstone.

*Plant Life.*—The Australian flora presents peculiarities which mark it off by itself in a very decided manner. Many of its most striking features have an unmistakable relation to the general dryness of the climate. The trees and bushes have, for the most part, a scanty foliage, presenting little surface for evaporation, or thick leathery leaves well fitted to retain moisture. The most widely spread types of Australian vegetation are the various kinds of gum tree (*eucalyptus*), the shea-oak (*casuarina*), the acacia or wattle, the grass tree (*xanthorrhœa*), many varieties of *proteaceæ*, and a great number of ferns and tree ferns. Of the gum tree there are found upward of 150 species, many of which are of great value. Individual specimens of the peppermint (*E. amygdalina*) have been found to measure from 480 to 500 feet in height. As timber trees the most valuable members of this genus are the *E. rostrata* (or red gum), *E. leucoxydon*, and *E. marginata*, the timber of which is hard, dense, and almost indestructible. A number of the gum trees have deciduous bark. The wattle or acacia includes about 300 species, some of them of considerable economic value, yielding good timber or bark for tanning. The most beautiful and most useful is that known as the golden wattle (*A. dealbata*), which, in spring is adorned with



rich masses of fragrant yellow blossom. Palms — of which there are 24 species, all except the cocoa-palm peculiar to Australia — are confined to the N. and E. coasts. In the "scrubs" already mentioned hosts of densely intertwined bushes occupy extensive areas. The mallee scrub is formed by a species of dwarf eucalyptus, the mulga scrub by a species of thorny acacia. A plant which covers large areas in the arid regions is the spinifex or porcupine grass, a hard, coarse and excessively spiny plant, which renders traveling difficult, wounds the feet of horses, and is utterly uneatable by any animal. Other large tracts are occupied by herbs or bushes of a more valuable kind, from their affording fodder. Foremost among those stands the salt-bush (*atriplex nummularia*, order *chenopodiaceæ*). Beautiful flowering plants are numerous. Australia also possesses great numbers of turf-forming grasses, such as the kangaroo grass (*anthistiria australis*), which survives even a tolerably protracted drought. The native fruit trees are few and unimportant, and the same may be said of the plants yielding roots used as food; but exotic fruits and vegetables may now be had in the different colonies in great abundance and of excellent quality. The vine, the olive, and mulberry thrive well, and quantities of wine are now produced. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugarcane.

**Animal Life.**—The Australian fauna is almost unique in its character. Its great feature is the nearly total absence of all the forms of mammalia which abound in the rest of the world, their place being supplied by a great variety of marsupials — these animals being nowhere else found, except in the opossums of America. There are about 110 kinds of marsupials (of which the kangaroo, wombat, bandicoot, and phalangers or opossums, are the best-known varieties), over 20 kinds of bats, a wild dog (the dingo), and a number of rats and mice. Two extraordinary animals, the platypus, or water mole of the colonist (*ornithorhynchus*), and the porcupine ant-eater (*echidna*) constitute the lowest order of mammals (*monotremata*), and are confined to Australia. Their young are produced from eggs. Australia now possesses a large stock of the domestic animals of England, which thrive there remarkably well. The breed of horses is excellent. Horned cattle and sheep are largely bred, the first attaining a great size, while the sheep improve in fleece and their flesh in flavor.

The birds of Australia are numerous and in great variety, all the more important orders and families of class *Aves* being represented. Eagles, some very large,

measuring about nine feet from wing to wing; falcons, and various species of hawks and owls, are numerous; and so also are parrots and cockatoos, many of them of the most beautiful plumage. Pigeons of various species, and the most delicate and varied hues, frequent sundry parts of the island. The largest Australian bird is the emu, which, though excelled in size by the ostrich, attains a height sometimes of more than seven feet, five and six being the average. It is widely diffused, but is rapidly disappearing from the more settled districts. The lyre bird with its magnificent lyre-shaped tail, the interesting bower birds, and the mound-building talegalla and megapodius, are natives of this land of peculiar natural productions. The gigantic jabiru stork may be seen on the borders of the rivers, lakes, or swamps, which also abound in the duck tribe. Other aquatic birds are the pelican, Australian goose, and that *rara avis* of the Latin writers, the black swan. The game birds — pigeons, ducks, quails, geese, etc. — are numerous. The number of species is about 650. There are many reptiles, the largest being the alligator, found in some of the northern rivers. There are upward of 60 different species of snakes, some of which are very venomous. Lizards, frogs, and insects are also numerous in various parts. The seas, rivers and lagoons abound in fish of numerous varieties, and other aquatic animals, many of them peculiar. Whales and seals frequent the coasts. On the N. coasts are extensive fisheries of trepang, much visited by native traders from the Indian Archipelago. Some animals of European origin, such as the rabbit and the sparrow, have developed into real pests in several of the colonies in recent years.

**Peoples.**—The natives belong to the Australian negro stock, and are sometimes considered the lowest as regards intelligence in the whole human family, though this is doubtful. They are believed to number about 31,000, exclusive of those in the unexplored parts. They are of a dark-brown or black color, with jet-black curly, but not woolly, hair, of medium size, but inferior muscular development. In the settled parts of the continent they are inoffensive, and rapidly dying out. They have no fixed habitations; in the summer they live almost entirely in the open air, and in the more inclement weather they shelter themselves with bark erections of the rudest construction. They have no cultivation and no domestic animals. Their food consists of such animals as they can kill, and no kind of living creature seems to be rejected, snakes, lizards, frogs, and even insects being eaten, often half raw. They are ignorant of the potter's art. In their natural condition they wear little or no clothing. They speak a number of different languages or dialects.



The women are regarded merely as slaves, and are frightfully maltreated. They have no religion; they practice polygamy, and are said to sometimes resort to cannibalism, but only in exceptional circumstances. They are occasionally employed by the settlers in light kinds of work, and as horse-breakers; but they dislike continuous occupation, and soon give it up. The weapons of all the tribes are generally similar, consisting of spears, shields, boomerangs, wooden axes, clubs, and stone hatchets. Of these the boomerang is the most singular, being an invention confined to the Australians.

*Government.*—In addition to the central federated government (see AUSTRALIAN FEDERATION), each of the colonies has a governor, administration, and a Legislature of its own. The governors are appointed by the Queen, and all acts passed by the Colonial Legislatures must receive the royal assent. Each Legislature consists of two houses, a Legislative Council and a Legislative Assembly, the lower house being elected by manhood suffrage. The aggregate annual revenue of the colonies is about \$100,000,000, the annual expenditure several millions more. The public debt is over \$500,000,000. The colonies have a considerable defensive force of militia and volunteers, also a number of gun-boats, torpedo-boats, etc., besides which there is always a squadron of British men-of-war on the Australian station. There is no established Church in any of the colonies. The denomination which numbers most adherents is the English or Anglican Church, next to which come the Roman Catholics, Presbyterians and Methodists. Education is well provided for, instruction in the primary schools being, in some cases, free and compulsory, and the higher education being more and more attended to. There are flourishing universities in Melbourne, Sydney and Adelaide. Newspapers are exceedingly numerous, and periodicals of all kinds are abundant. There is, as yet, no native literature of any distinctive type, but names of Australian writers of ability, both in prose and poetry, are beginning to be known beyond their own country.

*Industrial Pursuits.*—Pastoral and agricultural pursuits and mining are the chief occupations of the people, though manufactures and handicrafts also employ large numbers. For sheep rearing and the growth of wool the Australian colonies are unrivaled, and, while the production of gold has considerably decreased, that of wool is constantly on the increase. The great bulk of the wool exported goes to Great Britain, which, in recent years, has received over 300,000,000 pounds from the Australian colonies annually. The commerce is rapidly extending, and becoming, every year, more important to England, whence the colonists

derive their chief supplies of manufactured goods in return for wool, gold, and other produce. Next to wool come gold, tin, copper, wheat, preserved meat, and tallow, hides and skins, cotton, tobacco, sugar and wine as the most important items of export. The chief imports consist of textile fabrics, haberdashery, and clothing, machinery and metal goods. The aggregate imports, in 1897, were \$327,997,650 in value, the exports \$361,052,630. There are upward of 12,000 miles of railway in actual use, or in course of construction, and about 35,000 miles of telegraph. The longest telegraph line is that running northward across the continent from Adelaide. The two chief routes for mails between Great Britain and the Australian colonies are by way of the Suez canal, and by San Francisco across the American continent. The coinage is the same as in the mother country. Banks and banking offices are numerous, including post-office or other savings banks for the reception of small sums.

*History.*—It is doubtful when Australia was first discovered by Europeans. Between 1531 and 1542 the Portuguese published the existence of a land which they called Great Java, and which corresponded to Australia, and probably the first discovery of the country was made by them early in the 16th century. The first authenticated discovery is said to have been made in 1601, by a Portuguese named Manoel Godinho de Eredia. In 1606, Torres, a Spaniard, passed through the strait that now bears his name, between New Guinea and Australia. Between this period and 1628, a large portion of the coast line of Australia had been surveyed by various Dutch navigators. In 1664 the continent was named New Holland by the Dutch government. In 1688 Dampier coasted along part of Australia, and about 1700 explored a part of the W. and N. W. coasts. In 1770 Cook carefully surveyed the E. coast, named a number of localities, and took possession of the country for Great Britain. He was followed by Bligh in 1789, who carried on a series of observations on the N. E. coast, adding largely to the knowledge already obtained of this new world. Colonists had now arrived on the soil, and a penal settlement was formed (1788) at Port Jackson. In this way was laid the foundation of the future colony of New South Wales. The Moreton Bay district (Queensland) was settled in 1825; in 1835 the Port Philip district. In 1851 the latter district was erected into a separate colony under the name of Victoria. Previous to this time the colonies both of Western Australia and of South Australia had been founded—the former in 1829, the latter in 1836. The latest of the colonies is Queensland, which only took an independent existence in 1859. The discovery of gold in abundance took place in 1851, and caused



an immense excitement and great influx of immigrants. The population was then only about 350,000, and was slowly increasing; but the discovery of the precious metal started the country on that career of prosperity which has since been almost uninterrupted. Convicts were long sent to Australia from the mother country, but transportation to New South Wales practically ceased in 1840, and the last convict vessel to West Australia arrived in 1868. Altogether about 70,000 convicts were landed in Australia (besides almost as many in Tasmania).

*Exploration.*—For 25 years after the establishment of a colony on the shores of Port Jackson, settlement was confined to the narrow strip of country shut in on the N. W. and S. by the Blue mountains, beyond which no one had penetrated, though many attempts to do so had been made. Along the sea the colony extended from Jervis bay to Port Stephens, a distance of 165 miles. In 1813 the mountain barrier was successfully crossed by Messrs. Blaxland, Lawson, and Wentworth, and the plains beyond were at once occupied. In 1815 a practicable road was made across the mountains, and exploration was thereafter pushed on with the greatest vigor. In 1817 Oxley discovered and traced the Lachlan for some hundred miles, and later he discovered the Macquarie and other streams. In 1819 the Murrumbidgee was discovered. In 1824 Messrs. Hovell and Hume crossed the district now forming the colony of Victoria and reached the head of Port Phillip. Allan Cunningham, the botanist, made extensive explorations in 1823 and subsequent years, and the celebrated Captain Sturt commenced his arduous and wonderful undertakings about the same time, nor should the names of Hume and George Macleay be forgotten. Major Mitchell continued the work, joining skill and science to much energy and good fortune. Meanwhile the survey of the coast begun by Flinders was ably continued by Capt. Parker King and others. The N. W. coasts were next examined by explorers, but with little result. From Sydney the center of exploration was moved to Adelaide, and from that city several famous expeditions set out. It was from Adelaide that Eyre started on most of his journeys, and from there also that Captain Sturt began his survey of the lower Murray and Darling in 1844. Much exploration was done in Queensland about this time by Dr. Leichhardt under the auspices of the government of New South Wales. Leichhardt lost his life in 1848 in an attempt to cross the continent to the W. coast. Very extensive discoveries were made by Messrs. A. C. and F. T. Gregory in the fifties, and in 1862 John M'Douall Stuart, after several gallant attempts, crossed the continent from Adelaide to the N. coast and returned to the

point of starting. In 1860–1861 a well-equipped expedition left Melbourne to cross the continent; it was under the command of R. O'Hara Burke and W. J. Wills, astronomical and meteorological observer. The disastrous end of the expedition is well known. Several relief expeditions were fitted out to find traces of the Burke and Wills party, and it fell to A. W. Hewitt to discover the sole survivor, King, who had been preserved from starvation by the kindly aid of the natives. Australia has never wanted for explorers, and from 1860 onward, a year has scarcely passed that an expedition of some kind has not been at work. The catalogue of the names of the explorers is a long one. To the names already mentioned may be added Sir John Forrest, Major Warburton, Landsborough, J. M'Kinlay, Alexander Forrest, E. Giles, Hodgkinson, the Jardine brothers, Lewis, Lindsay, etc.

**Australia, South**, one of the original States in the Commonwealth of Australia; occupies the middle of Australia, and stretches from sea to sea. At first as the colony of South Australia it extended between lon. 132° and 141° E., and from the Southern Ocean to lat. 26° N., and it then had an area of about 300,000 square miles. In 1861 a district lying to the W. of the colony was added to it, so that its W. boundary was shifted to the meridian of 129°. In 1863 it received in addition the country between its N. boundary and the opposite coast (this portion being now known as the Northern Territory), so that South Australia now possesses a territory extending across Australia, and occupying an area estimated at 903,690 square miles. On the E. it is bounded by Victoria, New South Wales and Queensland; on the W. by Western Australia. Its greatest length from N. to S. is 1,850 miles, and its width 650 miles. The S. coast, for the first 120 miles E. of where it begins at Port Eucla, has the shore backed by steep limestone ranges from 400 to 600 feet in height, but as a whole the coast is low and desolate-looking. In a straight line from Port Eucla on the W. to Cape Northumberland, near the boundary of Victoria, the distance is 850 miles, but the coast-line between these points extends to nearly twice that distance, owing to the depth to which Spencer Gulf and the Gulf of St. Vincent penetrate. Opposite the Gulf of St. Vincent is Kangaroo Island, the largest island on the Australian coast, excepting Tasmania. The coast of the Northern Territory is thickly strewn with islands, three of which are of large size. There are also some excellent ports, one of these, Port Darwin, where the overland telegraph and the cable from Batavia and the East meet, being among the finest harbors in Australia. On the E. side of the Gulf of St. Vincent lie the most populous portions of



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the State, and here is situated Adelaide, the rising State capital.

The interior formation of South Australia is very different from that of the more E. States. The mountains here run from the sea to the interior, ending somewhat abruptly among the lakes. The principal chain, the Mount Lofty range, begins at Cape Jervis, and follows the shore of the Gulf of St. Vincent past Adelaide, meeting at the head of the gulf, the ridges forming the backbone of Yorke Peninsula. The range still running N. is called Flinders range, and ends in a wide mass of mountain 3,000 feet high, separating the lakes Torrens, Eyre, Frome, and Blanche. All these so-called lakes are huge expanses of salt water, swamp, and mud. On the W. of Spencer Gulf is Eyre Peninsula, through the heart of which runs the Gawler range, which attains an elevation of 2,000 feet, and ends on the shores of another series of lakes of the same character as Lake Torrens. The principal summits of the Mount Lofty range are Razor-back, in lat.  $33^{\circ} 20'$ , and immediately N. of it Mount Bryan, close to which is the celebrated Burra-Burra copper mine. The highest peaks of the Flinders range are Mount Remarkable, 3,179 feet, Brown 3,174 feet, and Arden 3,000 feet. None of the peaks in the Gawler range attain more than a moderate elevation. On the left bank of the Murray, and near its mouth, a range of moderately elevated heights proceeds S. S. E., skirting the coast to its extremity near Cape Northumberland. Throughout these ranges the existence of volcanic agency at a former period is everywhere apparent. The Warburton range and the Stuart ranges lie beyond and to the N. and W. of the lakes; further N. on the Tropic of Capricorn, are the MacDonnell ranges, rising to a height of 4,000 feet, from which the extreme W. affluents of the Lake Eyre river system take their rise. The other portions of the territory to the N. and W. are almost level, and consist of either waterless plains or plains of sandstone boulders, with desert grass and spinifex.

Among the mountains E. of Gulf of St. Vincent primitive limestone, often in the form of a beautiful white marble, is very abundant. There are indications of a large variety of minerals throughout the State, but copper is the only one that has been met with in large quantities, the total production to the end of 1899 being valued at £23,000,000. Gold has been found in various places, but the quantity won has been small. In the Northern Territory gold has also been found over a considerable tract of country, and good progress has been made in mining, while other minerals are known to exist. Almost the only stream within the State proper, which deserves the name of river, is the Murray, which enters

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the colony on the E. in lat.  $34^{\circ}$ , flows first circuitously W. and then S., into the extensive lagoon called Lake Alexandrina, communicating with the sea by a narrow opening. During the rainy season it is navigable by steamers through its whole course within the State, and for 1,500 miles in New South Wales. In the Northern Territory the Roper river is a fine large stream, navigable for sea-going vessels for 100 miles from its mouth in the Gulf of Carpentaria; the Victoria is also navigable. The climate of South Australia proper greatly resembles that of Sicily and Naples. During nine months of the year it is agreeable, the disagreeable portion of the year being the three summer months of December, January, and February, when the natural heat of the season is greatly increased by hot winds from the interior. What is called winter would be considered in England merely a wet autumn. There are no epidemic diseases. Scrofulous and tubercular diseases are rare, but diseases of the eyes are common in summer, being either occasioned by the impalpable dust floating in the atmosphere, or by exposure to the night air after the glare of the sun.

South Australia produces nearly all the fruits and vegetables that are cultivated in England as well as others, but it is chiefly distinguished as a wheat and grape-growing country. Besides supplying its own wants, it sends large quantities of wheat to the neighboring States and to England, where "Adelaide" wheat is held in high estimation. The area under wheat is about 1,750,000 acres. The quantity produced varies greatly with the season, but the average production is six bushels per acre. The area under vineyards is gradually extending, and now approaches 20,000 acres. Brandy is produced as well as wine. Hop-growing is attracting some attention, and the olive is also cultivated. The value of the exports of the State is £7,100,000, and of the imports £7,300,000, total £14,400,000. The chief exports are wool, wheat, flour, copper and copper ore, skins, etc. The value of the wool exported is generally about £1,000,000, and of wheat and flour from £800,000 to £1,500,000, according to the season. The trade of a large part of New South Wales passes through South Australia. The revenue and expenditure are each about £2,700,000. The length of railways is 1,890 miles. There is a complete system of telegraphs, besides the great line from Adelaide across the continent to Port Darwin, a distance of 2,000 miles. The public debt of the State is £24,309,035, and has been mostly incurred for reproductive public works. Pop. (1910) 416,047. See AUSTRALIA: AUSTRALIAN FEDERATION.

**Australia, Western**, one of the original States in the Commonwealth of Australia; embraces all that portion of Australia W. of



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lon. 129° E., bounded E. by South Australia, and N., W., and S. by the Indian Ocean; lying between the parallels of 13° 30' and 35° 8' S.; greatest length, 1,450 miles N. to S.; greatest breadth, 850 miles E. to W.; area, 975,920 square miles. The coast-line measures about 3,000 miles, and, except on the S., is indented by numerous bays, creeks, and estuaries. The coast is fringed by many islands, but none is of any importance. The principal inlets are Cambridge Gulf, Admiralty Gulf, York Sound, Collier bay, King Sound, Roebuck bay, Exmouth Gulf, Shark bay, Geographe bay, and King George Sound, the last the most important as having Albany on its shore, the port of call for the European mail steamers. The chief rivers are the Ord and Fitzroy on the N., De Grey, Ashburton, Fortescue, Gascoign, Murchison, Greenough, Swan, and Blackwood on the W. The Swan river is important, as Perth, the capital, is situated on its banks. Some of the rivers within the tropics are large and navigable, but few of the others run all the year, and fewer still are navigable even for boats to any great distance. The interior was till recent years not well known, but at present there is little territory which has not been explored.

The country is mostly an alternation of ridges and hollows, sandy, without grass, and clothed with bushes and scrubby timber, without the trace of a water-course. The really settled and occupied portion of the State forms only a mere fraction of its whole area. The population is mostly collected in the S. W. corner, where the first settlements were made, and around the recently discovered gold reefs. Scattered settlements stud the coast at various points. On the W. coast are extensive banks covered with the pearl oyster, which give employment to a fleet of boats. The Kimberley district in the N. is a region of great promise; it comprises 20,000,000 acres of well-watered land intersected by the Fitzroy river and other large streams, and is said to be admirably adapted for pastoral purposes, besides having a large area suitable for the cultivation of sugar, coffee, and rice. The greater part of the seaboard, except along the Australian bight, is separated from the interior by a low range of hills running parallel to it, and covered with forests. The fertile land exists in patches, and some of it is of a very rich character. The principal crops are wheat, barley, hay, and potatoes; the vine is also successfully cultivated, and excellent wine is made in the colony. The area under cultivation comprises about 140,000 acres, of which wheat occupies 42,000 acres, hay 84,000 acres, vines 2,750 acres. The live stock in 1899 numbered 2,210,000 sheep, 245,000 cattle, 62,000 horses, besides a large number of camels, pigs, goats, and poultry. An available area of 1,000 square

## Australian Alps

miles is covered with jarrah forests. The jarrah is a species of eucalyptus (*E. marginata*), its timber is in great request for railway sleepers, for building purposes, and especially for marine constructions, having the valuable property of resisting the attacks of the white ant on land and the ship worm at sea. Considerable areas in the S. W. are covered with karri (*E. diversicolor*). There are also numerous forests of sandalwood trees, the timber of which is exported in large quantities, chiefly to China for incense purposes. Flowers and fruits from all quarters of the globe grow luxuriantly. Among the fruits successfully cultivated are apples, pears, oranges, peaches, plums, apricots, figs, almonds, bananas, olives, etc. English vegetables may be profitably cultivated at almost all seasons. Bees thrive and produce abundant stores of honey.

The mineral resources of the State are not yet fully known. Gold has been discovered in large quantities, and Western Australia is now the chief gold-producing State of Australia, the Coolgardie gold fields being among the most productive. In 1899 the gold exported had the value of £6,246,731. Lead and copper exist abundantly, and several mines are in operation. Iron ore might be raised in almost inexhaustible quantities, and tin also exists. The gold discoveries have formed an epoch in the history of the State, and trade and population have recently increased very rapidly. The imports, which in 1887 were valued at £830,000, amounted in 1899 to £4,474,000, the exports in the latter year being £6,985,000. Besides gold the exports include wool, jarrah and karri timber, sandal wood, pearls, pearl shells, tin ore, skins, etc. The revenue has grown enormously. In 1881 it was £206,205; in 1891, £497,670; and in 1898, £2,754,747. The public debt is £9,203,738, equal to £53, 16s. 8d. per inhabitant. There are about 1,400 miles of railway open. The principal towns are Perth, the capital, and Fremantle, which is the chief port. The first part of the State settled was the S. W. corner, long known as the Swan River Settlement, established in 1829. From 1850 to 1868 it was a place for the transportation of convicts. In 1890 the State received a system of responsible government similar to that prevailing in the other colonies. Pop. (1910) 273,534. See AUSTRALIA: AUSTRALIAN FEDERATION.

**Australian Alps**, a range of mountains in the S. E. of Australia, formerly part of the Great Dividing Range, stretching from the neighborhood of Melbourne, about 37° 40' S., 145° 30' E., to the S. E. of New South Wales, about 35° S., 149° E., over a length of about 400 miles, with a width of about 100 to 150 miles. The highest peaks are in New South Wales, and the highest of all, according to Lendenfeld, is the peak called



## Australian Federation

by him Mt. Townshend (7,353 feet), belonging to a group which he calls the Kosciusko group, the latter name having been previously applied to another peak (called Mueller's Peak by Lendenfeld), a few miles to the N. which was long believed to be the highest. The peaks next in height belong to the Bogong group in Victoria, and the W. of the Mitta Mitta, the highest of which is Mt. Bogong (6,508 feet). They do not reach the snow line, though snow lies in the higher valleys all the summer. Geologically, the Australian Alps are composed mainly of very ancient metamorphic rocks, and have been worn down in the course of ages to tablelands, which slope down rather steeply on all sides, and are crowned by the higher peaks. Volcanic rocks cover the tableland to the S. of Mt. Bogong.

**Australian Federation**, a political union of all the Australian colonies, the agitation for which began in 1852. The first convention for this purpose was held at Hobart in January, 1886. The colonies represented were Victoria, Queensland, Tasmania, Western Australia, and Fiji. This effort was abortive, but another conference took place in 1891, at Sydney, N. S. W., which was attended by delegates from each of the colonies. A plan of Federal government was proposed, which resembled in many of its features that of the United States. A draft bill to constitute the Commonwealth of Australia was adopted by the convention, and it was agreed to submit it to the approval of the individual Legislatures of the several colonies. This bill met with success in the lower branch of but one colonial Legislature — that of Victoria. In January, 1895, there was a conference of premiers of five colonies at Hobart, and the Legislative Assembly of New South Wales passed a Federal enabling act in November of that year, and notice of motion was given in other Legislatures to bring in a similar bill. The first practical step was taken in 1898. A convention of representatives of New South Wales, Victoria, Tasmania, South Australia, and Western Australia succeeded in drafting a constitution, which was submitted to the popular vote of each of those colonies in June. The constitution provided for a Governor-General, appointed by the Crown; a Federal Parliament, composed of the Crown, represented by the Governor-General, a Senate, and a House of Representatives. The powers of the Parliament were set forth in 39 articles, and covered trade with other countries, taxation, coinage, weights and measures, foreign corporations, pensions, arbitration, etc. Free trade between the States was recognized. By the terms of the plebiscite, an affirmative vote of substantially one-third of the electors of New South Wales, and of one-fifth of the electors of each of the other colonies, was

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required to adopt this constitution. The returns of the election in June were fatal to the scheme. While the majorities in the four lesser colonies were overwhelmingly in favor of the constitution, the requisite affirmative vote in New South Wales was not obtained.

On Feb. 2, 1899, a unanimous agreement was reached by the colonial premiers in conference at Melbourne, regarding the unsettled questions referred to them by the colonial Legislatures, thus insuring the success of the federation project. In 1900, a bill making Federation effective was introduced into Parliament, at London, and passed, the only amendment offered having reference to the royal prerogative. Later in that year the Earl of Hopetoun was appointed by the Queen first Governor-General. He resigned in May, 1902.

**Austrasia** (the East Kingdom), the name given, under the Merovingians, to the Eastern possessions of the Franks, embracing Lorraine, Belgium, and the right bank of the Rhine. These districts, thickly inhabited by Franks, and forming the connection with the German mother country, were of great importance at the time of the rise of the Frankish power. Austrasia was allotted to Thierry I. on the death of his father, Clovis I., A. D. 511. Siegbert I. transferred the capital from Rheims to Metz, in 561. It was united to Neustria by Clotaire II. in 513, and separated from it by Dagobert I. in 622. Charles Martel annexed it to his dominions in 737. Carloman received Austrasia on the death of Charles Martel in 741, and Charlemagne annexed it to his empire in 772. From this time the division of the Frankish kingdom into Austrasia and Neustria lost its political importance.

**Austria**, or **Austria-Hungary**, an extensive monarchy in Central Europe, inhabited by several distinct nationalities, and consisting of two semi-independent countries, each with its own parliament and government, but with one common sovereign, army, and system of diplomacy, and also with a common parliament.

*History of the Country till the year 982.*—After the Romans had vanquished the Noricans, 33 A. D., and gained possession of the Danube, the country N. of the Danube, extending to the borders of Bohemia and Moravia, belonged to the kingdom of the Marcomanni and Quadi; a part of Lower Austria and Styria, with Vienna (Vindobona), a municipal city of the Roman empire, belonged to Upper Pannonia; the rest of the country, with Carinthia and a part of Carniola, formed a portion of Noricum. Gorz belonged to the Roman province of Illyricum, and Tyrol to Rætia. These limits became confused by the irruptions of the barbarians. The Boii, Vandals, Heruli, Rugii, Goths, Huns, Lombards, and Avars,



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in the course of the 5th and 6th centuries, successively occupied the country. But after the year 568, when the Lombards had established their power in Upper Italy, the river Ens formed the boundary line between the German tribe of Bajuvarii, the proprietors of the territory above the Ens, and the Avars, who had removed from the East to the banks of that stream. In 611 the Wendi, a Slavonic tribe, appeared on the Murr, Drave, and Save. In 788 the duchy of Bavaria was dissolved, and the Avars passed over the Ens and invaded the counties of the Franks in the Bavarian territory. In 791 Charlemagne forced them to retire to the Raab, and united the territory extending from the Ens to the junction of the Raab with the Danube (the territory below the Ens) with Germany, under the name of Avaria, or the Eastern Mark (*Marchia Orientalis*), or Austria; and in the 10th century (in a document of Otho III., 996) it was called *Ostirrichi*, equivalent to the modern *Oesterreich*. Many colonists, particularly from Bavaria, were sent by Charlemagne into the new province, and a margrave was appointed to administer the government. The Archbishop of Salzburg was at the head of ecclesiastical affairs. After its separation from Verdun, in 843, Avaria formed the E. boundary of the German empire. On the invasion of Germany by the Hungarians, in 900, Avaria fell into their hands, and was held by them till 955, when the Emperor Otho I., in consequence of the victory of Augsburg, reunited a great part of this province to the empire. By the power and address of its margraves the whole country was joined again with Germany, and in 1043, under the Emperor Henry III. and the Margrave Albert I. (the Victorious), its limits were extended to the Leitha.

*Austria under the House of Bamberg till 1282.*—From 982 to 1156 the margraviate of Austria was hereditary in the family of the counts of Badenburg (Bamberg); the succession, however, was not regulated by primogeniture, but by the will of the emperor. In ancient documents mention is made of the estates of Austria in the year 1096. After Henry the Proud (Duke of Bavaria and Saxony) was put under the ban of the empire, Leopold V., Margrave of Austria, received the duchy of Bavaria in 1138 from the Emperor Conrad. But when the Margrave Henry, son of Leopold, under the title of *Ja-so-mir-Gott* (Yes-so-me-God), had again ceded it, in 1156, to Henry the Lion, the boundaries of Austria were extended so as to include the territory above the Ens, and the whole was created a duchy with certain privileges. Under this duke the court resided at Vienna. Duke Leopold VI., the son of Henry, received the duchy of Styria in 1192 as a fief from the Emperor Henry VI., it having been added to the em-

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pire by Otho I., in 955, by his victory over the Hungarians. It was this prince who imprisoned Richard Cœur de Lion, King of England. Duke Leopold VII., the youngest son of the former, erected a palace within the city of Vienna, which was long occupied by the Austrian monarchs, under the name of the old castle. Leopold VII., called the Glorious, established the hospital of the Holy Cross, made Vienna, which had adopted a municipal constitution in 1198, a staple town, and granted 30,000 marks of silver for the promotion of trade and commerce. In 1229 he purchased a part of Carniola from the ecclesiastical principality of Freisingen for 1,650 marks, and left the country in a flourishing condition to the youngest of his three sons, Frederick II., surnamed the Warrior. In 1236 this prince was put under the ban of the empire, on account of his joining the alliance of the cities of Lombardy against the Emperor Frederick II.; and Otho, Duke of Bavaria, seized upon his territory above the Ens as far as Lintz. The rest of the country was granted, as a fief by the emperor, to a margrave, and Vienna became an imperial city.

During the emperor's campaign in Italy Duke Frederick recovered the principal part of his lands, and his rights were confirmed by the emperor at Verona, 1245. The rights of Vienna as an imperial city were abolished, and Frederick was to be called king, as sovereign of Austria and Styria; but all his expectations of empire were disappointed by his death in the battle of the Leitha against Bela IV., King of Hungary, July 15, 1246, in the 35th year of his age. Thus the male line of the house of Bamberg became extinct. The period from 1246 to 1282 is styled the Austrian interregnum. The Emperor Frederick II. declared Austria and Styria a vacant fief, the hereditary property of the German emperors, and sent a governor to Vienna, the privileges of which, as an imperial city, were once more renewed. But the female relations of the deceased Duke Frederick, his sister Margaret (widow of the Emperor Henry VI.), and his niece Gertrude, by the persuasion of Pope Innocent IV., in 1248, laid claim to the inheritance of their brother. The Margrave Hermann, with the aid of the Pope and a strong party, made himself master of Vienna, and of several Austrian cities. In Styria he was opposed by the governor Meinhard, Count of Görz. But Hermann died in 1250, and his son Frederick, who was afterward beheaded in 1268, at Naples, with Conradin of Suabia, was then only a year old. The whole country was distracted by various parties, and the Emperor Conrad IV. was prevented, by disputes with his neighbors, from turning his attention to Austria.

In 1251 the States of Austria and Styria determined to appoint one of the sons of



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the second sister of Frederick the Warrior, Constantia (widow of the Margrave Henry the Illustrious), to the office of duke. Their deputies were on the way to Misnia when they were persuaded by King Wenceslaus, on their entrance into Prague, to declare his son Ottocar Duke of Austria and Styria, who made every effort to support his appointment by arms, money, and especially by his marriage with the Empress-widow Margaret. Ottocar wrested Styria from Bela, King of Hungary, by his victory of July, 1260, in the Marchfeld; and in 1262 forced the Emperor Richard to invest him with both duchies. Soon after, by the will of his uncle Ulrich, the last Duke of Carinthia and Friuli (who died 1269), Ottocar became master of Carinthia, a part of Carniola connected with it, the kingdom of Istria, and a part of Friuli. But his arrogance soon caused his fall. In 1272 he refused to acknowledge Count Rudolph of Hapsburg emperor, and was obliged to defend himself against Rudolph. After an unsuccessful war he was forced to cede all his Austrian possessions in November, 1276. In 1277 he attempted to recover these territories, but, in the battle of the Marchfeld, Aug. 26, 1278, he was slain, and his son Wenceslaus was obliged to renounce all claim to them, in order to preserve his hereditary estates. The Emperor Rudolph remained three years in Vienna, and then appointed his eldest son governor. But having succeeded in gaining the consent of the electors of Saxony and Brandenburg, of the three ecclesiastical electors, and of the count-palatine of the Rhine, he granted the duchies of Austria and Styria, with the province of Carinthia, to his two sons, Albert and Rodolph, Dec. 27, 1280.

*Austria under the House of Hapsburg.*—I. From 1282 to 1526. Albert and Rodolph transferred Carinthia to Meinhard, Count of Tyrol, father-in-law to Albert. In 1283 they concluded a treaty, by which Albert was made sole possessor of Austria, Styria, and Carniola. Vienna, having again renounced its privileges as an imperial city, was made the residence of the court, and the successors of Rodolph, from this time, assumed Austria as the family title. The introduction of the Hapsburg dynasty was the foundation of the future greatness of Austria. The despotic Albert was assailed by Hungary and Bavaria and in 1298 he won the Roman crown in an engagement with Adolphus of Nassau. After this he undertook the conquest of Switzerland; but was assassinated, May 1, 1308, at Rheinfelden, by his nephew, John of Suabia, from whom he had basely withheld his hereditary estates. The inheritance of John now fell to the five sons of the murdered Albert—Frederick, surnamed the Fair, Leopold, Henry, Albert, and Otho. They were forced to purchase of the Emperor Henry VII. the

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investiture of their paternal estates (consisting, in 1308, of 26,572 square miles) for 20,000 marks of silver. Under their father, in 1301, the margraviate of Suabia was added to the territories of Austria, and the contest with Bavaria ended in Austria obtaining Neuburg. On the contrary, the attempt of Duke Leopold, in 1315, to recover the forest towns of Switzerland, which had been lost under Albert, was frustrated by the valor of the troops of the Swiss confederacy in the battle of Morgarten. In 1314 his brother Frederick, chosen Emperor of Germany by the electors, was conquered by his rival, the Emperor Louis (of Bavaria), in 1322, at Mühldorf, and was his prisoner for two years and a half in the castle of Trausnitz.

The dispute with the house of Luxemburg, in Bohemia, and with Pope John XXII., induced the emperor, in 1325, to liberate his captive. Upon this the latter renounced all share in the government, and pledged himself to surrender all the imperial domains which were still in the possession of Austria. But Leopold considered the agreement derogatory to his dignity and continued the war against Louis. Frederick, therefore, again surrendered himself a prisoner in Munich. Moved by his faithful adherence to his word, Louis concluded a friendly compact with Frederick, and made preparations for their common government, Sept. 7, 1325. These preparations, however, were never carried into execution; for the agreement had been concluded without the consent of the electors. Leopold died in 1326, and Henry of Austria in 1327; Frederick also died without children, Jan. 13, 1330, after which his brothers, Albert II. and Otho, came to a reconciliation with the Emperor Louis. After the death of their uncle, Henry, Margrave of Tyrol and Duke of Carinthia (the father of Margaret Maultasch), they persuaded the emperor to grant them the investiture of Tyrol and Carinthia, in May, 1335; they ceded Tyrol, however, to John, King of Bohemia, by the treaty of Oct. 9, 1356, in behalf of his son John Henry, or rather of his wife, Margaret Maultasch. In 1344, after the death of Otho and his sons, Albert II., called the Wise, united all his Austrian territories, which, by his marriage with the daughter of the last Count of Pfirt, had been augmented by the estates of her father in 1324, and by the Kyburg estates in Burgundy in 1326. Of the four sons of Albert II. (Rodolph, Albert, Leopold, and Frederick), Rodolph II. (IV.) completed the Church of St. Stephen's, and died in Milan in 1365, without children, a short time after his youngest brother, Frederick.

In 1379 the two surviving brothers divided the kingdom, so that Albert III. (with the Queue) became master of Austria, and gave the other territories to his



brother, Leopold III. the Pious. Leopold had made repeated attempts to gain the Hapsburg possessions in Switzerland. He was killed July 9, 1386, on the field of Sempach, where he lost the battle, in consequence of the valor of Winkelried, and Albert administered the government of the estates of his brother's minor sons. Margaret Maultasch ceded Tyrol to him on the death of Meinhard, her only son, who was married to the sister of Albert. She retained nothing but a few castles and 6,000 marks of gold. Her claims to Bavaria also she renounced in consideration of receiving Scharding and three Tyrolese cities, Kitzbühel, Ballenberg, and Kuffstein, and 116,000 florins of gold. In 1365 Leopold III. had bought the claims of the Count of Feldkirch for 36,000 florins; for 55,000 florins Austria received Brisgau from the Count of Fürstenberg, with the cities of Neuberg, Old Brisach, Kentzingen, and Billingen. The remainder of Carniola and the Windisch Mark, after the death of the last Count of Görz, were purchased, together with the county of Pludentz, from the Count of Werdenberg, and the possessions of the Count of Hogenberg, for 66,000 florins; and the city of Trieste was acquired in 1380 by aiding in the war between Hungary and Venice. Moreover, the two governments of Upper and Lower Suabia were pledged for 40,000 florins by the King of Rome, Wenceslaus, to Duke Leopold. The Austrian and Styrian lines, founded by Albert III. and Leopold III., his brother, continued for 78 years. In 1395, when Albert III. died, his only son, Albert IV., was in Palestine. On his return he determined to take vengeance on Procopius, Margrave of Moravia, for his hostile conduct; but he was poisoned in 1404 at Znaym. His young son and successor, Albert V., was declared of age in 1410; and being the son-in-law of the Emperor Sigismund, he united the crowns of Hungary and Bohemia in 1437, and connected them with that of Germany in 1438. But in the following year the young prince died. His posthumous son, Ladislaus, was the last of the Austrian line of Albert, and its possessions devolved on the Styrian line, 1457.

From this time the house of Austria has furnished an unbroken succession of German emperors. Hungary and Bohemia were lost for a time by the death of Albert V., and, after the unhappy contests with the Swiss, under Frederick III., the remains of the Hapsburg estates in Switzerland. But several territories were gained; and, to increase the rising splendor of the family, the emperor conferred upon the country the rank of an archduchy. The dispute which broke out between Frederick and his brothers Albert and Sigismund, relating to the divisions of their paternal inheritance, ended with the death of Albert in December,

1464. In the course of the troubles which resulted from this quarrel the emperor was besieged in the citadel of Vienna by the citizens, who favored the cause of the murdered prince. Sigismund now succeeded to his portion of the estate of Ladislaus and Frederick became sole ruler of all Austria. His son Maximilian, by his marriage with Mary, the surviving daughter of Charles the Bold, united the Netherlands to the Austrian dominions. But it cost Maximilian much anxiety and toil to maintain his power in this new province, which he administered as the guardian of his son Philip. His confinement at Bruges in 1489 resulted in an agreement which was decidedly for his advantage; but he lost at the same time the duchy of Guelders. After the death of his father, which happened Aug. 19, 1493, he was made Emperor of Germany, and transferred to his son Philip the government of the Netherlands. Maximilian I. added to his paternal inheritance all Tyrol, and several other territories, particularly some belonging to Bavaria. He also acquired for his family new claims to Hungary and Bohemia. During his reign Vienna became the great metropolis of the arts and sciences in the German empire. The marriage of his son Philip to Joanna of Spain raised the house of Hapsburg to the throne of Spain and the Indies. But Philip died in 1506, 13 years before his father, and the death of Maximilian, which happened Jan. 12, 1519, was followed by the union of Spain and Austria; his grandson (the eldest son of Philip), Charles I., King of Spain (see CHARLES V.), was elected Emperor of Germany. In the treaty of Worms, April 28, 1521, and of Ghent, May 7, 1540, he ceded to his brother Ferdinand all his hereditary estates in Germany, and retained for himself the kingdom of the Netherlands. The house of Austria was now the proprietor of a tract of country in Europe comprising 360,230 square miles. The Emperor Charles V. immediately increased the number of provinces in the Netherlands to 17, and confirmed their union with the German States, which had been concluded by his grandfather, under the title of the circle of Burgundy. In 1526 Austria was recognized as a European monarchy.

II. From 1526 to 1740.—Ferdinand I., by his marriage with Anna, the sister of Louis II., King of Hungary, who was killed in 1526 in the battle of Mohacs, acquired the kingdoms of Hungary and Bohemia, with Moravia, Silesia, and Lusatia, the appendages of Bohemia. Bohemia rejoiced to hail Ferdinand its king. Notwithstanding the divided opinions of the nobles, and the rising fortune of his adversary, John von Zapolya (see HUNGARY), he was raised to the throne of Hungary, Nov. 26, 1526, by the Hungarian Diet, and was crowned Nov.



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5, 1527. But Zapolya resorted for assistance to the Sultan, Soliman II., who appeared in 1529 at the gates of Vienna. The capital was rescued from ruin solely by the prudent measures of the Count of Salm, general of the Austrian army, and the imperial forces compelled Soliman to retreat. In 1535 a treaty was made by which John von Zapolya was allowed to retain the royal title and half of Hungary, and his posterity were to be entitled to nothing but Transylvania. But after the death of John new disputes arose, in which Soliman was again involved, and Ferdinand maintained the possession of Lower Hungary only by paying the warlike Sultan the sum of 30,000 ducats annually. This took place in 1562. Ferdinand was equally unsuccessful in the duchy of Würtemberg. This province had been taken from the restless Duke Ulrich by the Suabian Confederacy, and sold to the Emperor Charles V.; and when his estates were divided it fell to Ferdinand.

Philip, Landgrave of Hesse, the friend of Duke Ulrich, took advantage of the opportunity offered him by the embarrassment of Ferdinand in the Hungarian war. With the aid of France he conquered Würtemberg; but France ceded it again to Ulrich in the treaty of Caden, in Bohemia, concluded June 29, 1534, on condition that the province should still be a fief of Austria, and after the extinction of the male line of the duke that it should revert to that country. The remaining half of Bregentz, the county of Thengen, and the city of Constance were insufficient wholly to compensate these losses; nevertheless, the territory of the German line of the house of Austria was estimated at 114,468 square miles. Ferdinand received also the imperial crown in 1556, when his brother Charles laid by the scepter for a cowl. He died July 25, 1564, with the fame of an able prince, leaving 3 sons and 10 daughters. According to the directions given in his will, the three brothers divided the patrimony, so that Maximilian II., the eldest son, who succeeded his father as emperor, obtained Austria, Hungary, and Bohemia; Ferdinand, the second son, received Tyrol and Hither Austria; and Charles, the third, became master of Styria, Carinthia, Carniola, and Görz. But in 1595, after the death of the Archduke Ferdinand, the husband of Philippine Welser, the fair maid of Augsburg, his sons Andrew (cardinal and bishop of Constance and Brixen, and governor of the Netherlands for Spain) and Charles (Margrave of Burgau) were declared incompetent to succeed their father, and his possessions reverted to his relations. In Hungary the Emperor Maximilian met with far better fortune than his father had done. The death of Soliman at Szigeth in 1566 was followed by a peace, and in 1572 Maximilian crowned his eldest son, Rodolph,

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King of Hungary; he was afterward crowned King of Bohemia, and was elected King of Rome. In his attempts to add the Polish crown to his Austrian dominions he was equally unsuccessful with his fourth son, Maximilian, who engaged in a similar enterprise after the decease of Stephen Bathori in 1587. Maximilian died Oct. 12, 1576, and Rodolph the eldest of his five sons, succeeded to the imperial throne. The most remarkable events by which his reign is distinguished are the war against Turkey and Transylvania, the persecutions of the Protestants, who were all driven from his dominions, and the circumstances which obliged him to cede Hungary in 1608, and Bohemia and his hereditary estates in Austria in 1611, to his brother Matthias.

From this time we may date the successful exertions of the Austrian sovereigns to put down the restless spirit of the nation, and to keep the people in a state of abject submission. Matthias, who succeeded Maximilian on the imperial throne, concluded a peace for 20 years with the Turks; but he was disturbed by the Bohemians, who took up arms in defense of their religious rights. Matthias died March 20, 1619, before the negotiations for a compromise were completed. The Bohemians refused to acknowledge his successor, Ferdinand II., and chose Frederick V., the head of the Protestant league, and elector of the palatinate, for their king. After the battle of Prague, 1620, Bohemia submitted to the authority of Ferdinand. He immediately applied himself to eradicate Protestantism out of Bohemia proper and Moravia. At the same time he deprived Bohemia of the right of choosing her king, and of her other privileges. He erected a Catholic court of reform, and thus led to the emigration of thousands of the inhabitants. The house of Hapsburg has presented an example, which stands alone in history, of the manner in which violence and tyranny can check the progress of civilization; and Bohemia, the land of Huss, the land where religious freedom has been defended with such heroic zeal, was long greatly inferior in cultivation to every other country of Western Europe. The Austrian States also favoring, in general, the Protestant religion, were compelled by Ferdinand to swear allegiance to him, and Lutheranism was strictly forbidden in all the Austrian dominions. The province of Hungary, which revolted under Bethlem Gabor, Prince of Transylvania, was, after a long struggle, subdued. This religious war dispeopled, impoverished, and paralyzed the energies of the most fertile provinces of the house of Austria. During the reign of Ferdinand III., the successor of Ferdinand II. (1637-1657), Austria was continually the theater of war.



In the midst of these troubles Ferdinand ceded Lusatia to Saxony at the peace of Prague, concluded in 1635; and when the war was ended he ceded Alsace to France, at the peace of Westphalia in 1648. The Emperor Leopold I., son and successor of Ferdinand III., was victorious through the talents of his minister Eugene, in two wars with Turkey; and Vienna was delivered by John Sobieski (see SOBIESKI) and the Germans from the attacks of Kara Mustapha in 1683. In 1687 he changed Hungary into an hereditary kingdom, and joined to it the territory of Transylvania, which had been governed by distinct princes. Moreover, by the peace of Carlovitz, concluded in 1699, he restored to Hungary the country lying between the Danube and the Theiss. It was now the chief aim of Leopold to secure to Charles, his second son, the inheritance of the Spanish monarchy, then in the hands of Charles II., King of Spain, who had no children to succeed him; but his own indecision, and the artful policy of France, induced Charles II. to appoint the grandson of Louis XIV. his successor. Thus began the war of the Spanish Succession in 1701. Leopold died May 5, 1705, before it was terminated. Emperor Joseph I., his successor and eldest son, continued the war, but died without children, April 17, 1711. His brother Charles, the destined King of Spain, immediately hastened from Barcelona to his hereditary States, to take upon him the administration of the government. He was elected emperor Dec. 24 of the same year; but was obliged to accede to the peace of Utrecht, concluded by his allies at Rastadt and Baden in 1714. By this treaty Austria received the Netherlands, Milan, Mantua, Naples, and Sardinia. In 1720 Sicily was given to Austria in exchange for Sardinia. The duchy of Mantua, occupied by Joseph in 1708, was now made an Austrian fief, because it had formed an alliance with France prejudicial to the interests of Germany.

This monarchy now embraced 191,621 square miles. Its annual income was between 13,000,000 and 14,000,000 florins, and its army consisted of 130,000 men; but its power was weakened by new wars with Spain and France. In the peace concluded at Vienna 1735 and 1738, Charles VI. was forced to cede Naples and Sicily to Don Carlos, the Infante of Spain, and to the King of Sardinia a part of Milan, for which he received only a part of Parma and Piacenza. In the next year, by the peace of Belgrade, he lost nearly all the fruits of Eugene's victories, even the province of Temeswar; for he was obliged to transfer to the Porte Belgrade, Servia, and all the possessions of Austria in Walachia and Bosnia. All this Charles VI. willingly acceded to, in order to secure the succession to his daughter, Maria Theresa, by the Pragmatic Sanc-

tion. This law of inheritance was passed 1713-1719, and acknowledged one after another by all the European powers.

*Austria under the House of Hapsburg-Lorraine.*—I. From 1740 to 1790. By the death of Charles VI., Oct. 20, 1740, the male line of the Austrian house of Hapsburg became extinct; and Maria Theresa having married Stephen, Duke of Lorraine, ascended the Austrian throne. On every side her claims were disputed, and rival claims set up. A violent war began in which she had no protector but England. Frederick II. of Prussia subdued Silesia; the Elector of Bavaria was crowned in Linz and Prague, and in 1742 chosen emperor under the name of Charles VII. Hungary alone supported the heroic and beautiful queen. But in the peace of Breslau, concluded June 4, 1742, she was obliged to cede to Prussia Silesia and Glatz, with the exception of Teschen, Jagerndorf, and Troppau. Frederick II., by assisting the party of Charles VII., soon renewed the war. But Charles died Jan. 20, 1745, and the husband of Theresa was crowned Emperor of Germany under the title of Francis I. A second treaty of peace, concluded Dec. 25, 1745, confirmed to Frederick the possession of Silesia. By the peace of Aix-la-Chapelle, Oct. 18, 1748, Austria was obliged to cede the duchies of Parma, Piacenza, and Guastalla to Philip, Infante of Spain, and several districts of Milan to Sardinia. The Austrian monarchy was now firmly established; and it was the first wish of Maria Theresa to recover Silesia. With this object in view she formed an alliance with France, Russia, Saxony, and Sweden. This was the origin of the Seven Years' War; but, by the peace of Hubertsberg, 1763, Prussia retained Silesia, and Austria had sacrificed her blood and treasure in vain.

The first paper money was now issued in Austria, called state obligations, and the Emperor Francis erected a bank to exchange them. After his death, Aug. 18, 1765, Joseph II., his eldest son, was appointed colleague with his mother in the government of his hereditary States, and elected Emperor of Germany. To prevent the extinction of the male line of her family Maria Theresa now established two collateral lines; the house of Tuscany, in her second son, Peter Leopold; and the house of Este, in the person of the Archduke Ferdinand. For these separations Maria Theresa indemnified the country by the confiscation of several cities, formerly pledged to Poland by Hungary, without paying the sum for which they stood pledged; by obtaining Galicia and Lodomeria in the first profligate division of the kingdom of Poland in 1772; and by the capture of Bukowina, which was ceded by the Porte in 1777. In the peace of Teschen, May 13,



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1779, Austria received Innviertel, and the vacant county of Hohenembs in Suabia, the county of Falkenstein, and the Suabian territories of Tettwang and Argen; and thus at the death of the empress, Nov. 28, 1780, Austria contained 234,684 square miles; it had lost 16,366 square miles, and gained 34,301. The population was estimated at 24,000,000; but the public debt also had increased to 160,000,000 florins. The administration of the empress was distinguished by substantial improvements in connection with government, agriculture, trade, and commerce, the education of the people, the promotion of the arts and sciences, and of religion. The foreign relations of the kingdom also, even those with the Roman court, were happily conducted by the talents of her minister, Kaunitz.

Her successor, Joseph II., was active and restless; impartial, but too often rash and violent. While a colleague with his mother in the government he diminished the expenses of the State, and introduced a new system in the payment of pensions and of officers. But after the death of his mother all his activity and talent as a sovereign was fully developed. As severe to the military as to the civil officers, he adhered, however, to liberal principles. The censorship of the press was reformed; the Protestants received full toleration, and the rights of citizens; the Jews were treated with kindness; 900 convents and religious establishments were abolished, and even the visit of Pius VI. made no alteration in Joseph's system of reformation. The system of education he subjected to revision and improvement; and he tried to foster manufactures by duties on foreign goods. But his zeal excited the opposition of the enemies of improvement. The Low Countries revolted, and his vexation probably led him to attempt the exchange of the Netherlands, under the title of the kingdom of Austrasia, for the palatinate of Bavaria under an elector. But the project was frustrated by the constancy and firmness of the next agnate, the Duke of Deux-Ponts, and by the German league concluded by Frederick II. Joseph was equally unsuccessful in the war of 1788 against the Porte. His exertions in the field destroyed his health; and grief at the rebellious disposition of his hereditary States accelerated his death, which happened Feb. 20, 1790.

II. From 1790 onward.—Joseph II. was succeeded by his eldest brother, Leopold II. By his moderation and firmness he quelled the turbulent spirit of the Netherlands, and restored tranquillity to Hungary. The treaty of Reichenbach with Prussia, July 27, 1790, and the treaty of Sistova, Aug. 4, 1791, led to a peace with the Porte. The unhappy fate of his sister and her husband, Louis XVI.

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of France, induced him to form an alliance with Prussia, but he died March 1, 1792, before the revolutionary war broke out. Soon after the accession of his son, Francis II., to the throne, and before July 14, 1792, when he was elected German emperor, France declared war against him as King of Hungary and Bohemia. In the first articles of peace, dated at Campo Formio, Oct. 17, 1797, Austria lost Lombardy and the Netherlands, and received, as a compensation, the largest part of the Venetian territory; two years previous, in 1795, in the third division of Poland, the Austrian dominions had been enlarged by the addition of West Galicia. In the beginning of the year 1799 the Emperor Francis, in alliance with Russia, renewed the war with France. But Napoleon extorted the peace of Lunéville, Feb. 9, 1801, and Francis acceded to it, without the consent of England. By the conditions of the treaty he was to cede the county of Falkenstein and the Frickthal. Ferdinand, Grand-Duke of Tuscany, at the same time renounced his claim to this province, and received, in return for it, Salzburg and Berchtesgaden, with a part of the territory of Passau, and was afterward made master of the largest part of Eichstädt, and honored with the title of elector. Austria obtained the Tyrolese archbishoprics Trent and Brixen, and, notwithstanding its cessions of territory to France, had gained, including its acquisitions in Poland, 9,580 square miles; this made the whole extent 253,770 square miles. The public debt had also increased to 1,220,000,000 florins.

The first Consul of France now caused himself to be proclaimed emperor; and Aug. 11, 1804, Francis declared himself hereditary Emperor of Austria, and united the Austrian States under the name of the empire of Austria. Immediately after this important act he took arms once more with his allies, Russia and Great Britain, against the government of France. The war of 1805 was terminated by the peace of Presburg (Dec. 26, 1805). By the conditions of the treaty Francis was obliged to cede to France the remaining provinces of Italy; to the King of Bavaria, Burgau, Eichstädt, a part of Passau, all Tyrol, Vorarlberg, Hohenembs, Rothenfels, Tettwang, Argen, and Lindau; to the King of Würtemberg the five towns lying on the Danube, the county of Hohenberg, the landgraviate of Nellenburg, Altdorf, and a part of Brisgau; and to the Grand-Duke of Baden the remainder of Brisgau, Ortenau, Constance, and the commandery of Meinau. He received, in return, Salzburg and Berchtesgaden; the Elector of Salzburg was compensated by the province of Würzburg; and the dignity of grand-master of the Teutonic order was made hereditary in the



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house of Austria. Thus ended a war which cost the Austrian monarchy, besides the territories just enumerated, 90,000,000 florins, which were carried away by the French from Vienna, and 800,000,000 for the other expenses of the war; of which Francis paid a large proportion from his private purse. After the formation of the Confederation of the Rhine (July 12, 1806) Francis was forced to resign his dignity as Emperor of Germany (Aug. 6, 1806), which had been in his family more than 500 years. The old German, or Holy Roman, empire thus came to an end, and Francis had now only the title of Francis I., Emperor of Austria. In 1809 he resolved on a new war with France, aided only by Great Britain, which did nothing more than furnish some pecuniary assistance, and made a useless attack on Walcheren. Austria fought courageously, but in vain. The peace of Vienna (Oct. 14, 1809) cost the monarchy 42,380 square miles of territory, 3,500,000 subjects, and more than 11,000,000 florins of revenue. The public debt was also increased to 1,200,000,000 florins, and all the paper money in circulation was estimated at 950,000,000.

Napoleon, after tearing from the Austrian monarchy its fairest provinces—the duchy of Salzburg, with Berchtesgaden, Innviertel, Western Hausruckviertel, Carniola, and Görz, Trieste, the circle of Villach, a large part of Croatia, Istria, a part of the Grisons, the Bohemian territories in Saxony, all West Galicia, the circle of Zamoski in East Galicia, Cracow, with half the salt works of Wieliczka, the circle of Tarnopol, and many other territories which were given to Russia—formed a personal connection with the ancient family of Hapsburg, by his marriage with Maria Louisa, daughter of the Emperor of Austria, and (March 14, 1812) concluded an alliance with the Emperor Francis against Russia. But the Emperor of France was repulsed on his invasion of this country; Prussia rose up against him; and after the Congress of Prague had separated without accomplishing anything, Francis (Aug. 12, 1813) declared war against France, and formed an alliance (Sept. 9, 1813) at Teplitz, with Great Britain, Russia, Prussia, and Sweden, against his son-in-law. In the battle of Leipsic, the Austrian troops took an honorable part. The firmness with which the emperor signed the act of proscription against his son-in-law, and fixed the fate of his daughter and her infant, excited general respect. He signed the same act against Napoleon a second time, when he returned from Elba. He also opposed Murat in Italy. Yet the Austrian cabinet endeavored to provide for young Napoleon in the settlement of the affairs of France.

By the Congress of Vienna, 1814-1815,

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Austria gained the portion of Italy which is usually known as Lombardy and Venetia, and recovered, together with Dalmatia, the hereditary territories which it had been obliged to cede. The former Grand-Duke of Würzburg, on the contrary, ceded his territory to Bavaria, and again took possession of Tuscany. The final act resulting from the congress was signed in 1820. In 1821 liberal movements in Italy were put down. The July revolution of 1830, in France, caused warlike preparations to be made; but after Great Britain had acknowledged the new government, Austria acknowledged it also. Insurrections which took place in Modena, Parma, and the Papal States, 1831-1832, were suppressed without much difficulty. In the London conference relative to the affairs of Belgium Austria took an active share; but in proportion as Great Britain and France became more closely united, Austria entered into more intimate relations with Russia and Prussia. In the Polish insurrection Austria ultimately gave indications of a strong leaning in favor of Russia.

The death of the Emperor Francis I. (March 2, 1835) and the accession of Ferdinand I. made little change in the Austrian system of government. Metternich still continued at the head of affairs and to foster the reactionary policy. In 1846 the failure of the Polish insurrection had led to the incorporation of Cracow with Austria, but discontent with the government very widely prevailed in the empire. In Italy, the declarations of Pio Nono in favor of reform, and the concessions into which most of the other governments of the Italian peninsula had been hurried, increased the difficulties of Austria. In Hungary the constitutional opposition became stronger and stronger, and latterly, under the guidance of Kossuth and other popular agitators, assumed the form of a great constitutional movement. In 1848 the expulsion of Louis Philippe shook all Europe to its foundations. Metternich found it impossible any longer to guide the ship of State, and the government found itself compelled to grant a free press, and allow the citizens freely to arm themselves. The popular movement made great progress in Hungary; and in Italy a formidable insurrection broke out, threatening the very existence of the Austrian power in the peninsula. In the very center of the empire, in Vienna itself, the insurrection made equal progress, and the royal family, no longer in safety, removed to Innsbruck.

The Austrian monarchy appeared now to be hanging by a thread. The Hungarian diet declared itself permanent, under the presidency of Kossuth. Various ministerial changes took place, and at last the emperor abdicated in favor of his nephew, Francis



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Joseph. More vigorous measures were now adopted, and Austria, strongly aided by the forces of Russia, succeeded in suppressing the Hungarian insurrection. Haynau, on the occasion, rendered himself notorious by his severity, and Hungary underwent the fate of a conquered country. The year 1855 is memorable in Austrian history for the conclusion of a concordat with the Pope which put the educational and ecclesiastical affairs of the empire entirely into the hands of the papal see. It established an ecclesiastical censorship of the press, and placed all schools, even private schools, under the surveillance of the bishops; it proclaimed the complete independence of the bishops in relation to the civil government, so that all decrees proceeding from Rome might be published without obtaining the royal *placet*, and it authorized the bishops to convoke the provincial councils and diocesan synods without the consent of the civil authority.

In 1859 the hostile intentions of France and Sardinia against the possessions of Austria in Italy became so evident that she declared war by sending an army across the Ticino, but after disastrous defeats at Magenta and Solferino she was compelled to cede Milan and the N. W. portion of Lombardy to the Sardinian king. In 1864 she joined with Prussia and the other German States in the spoliation of Denmark, but a dispute about the conquered provinces of Schleswig-Holstein involved her in a war with her allies (1866), while at the same time Italy renewed her attempts for the recovery of Venice. Austria had accordingly to show front both in the N. and in the S. The S. army under Archduke Albert fought successfully, defeating the Italians under Victor Emanuel at Custozza (June 24), and driving them back across the Minio, but the fortune of the N. army under General Benedek was very different. On July 3, Benedek was completely defeated by the Prussian forces at Königgrätz (Sadowa) in Bohemia, and the road to Vienna lay open to the victors. Francis Joseph now ceded Venetia to Napoleon III., and claimed his intervention to assist in procuring a peace, evidently wishing to make a separate treaty with Italy, so as to be at liberty to employ the S. army against Prussia.

This design did not succeed, however. Both Italy and Prussia were willing to accept the mediation of Napoleon, but Italy would not hear of a separate arrangement, and continued the war. July 20 Admiral Tegetthoff defeated the Italian fleet near the Dalmatian island Lissa; but, on the other hand, the Prussians continued to advance into Austria, and threatened Vienna. Francis Joseph accordingly saw himself obliged to conclude a peace with Prussia

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(Aug. 23), and a little later peace was concluded with Italy also (Oct. 3). The result of the war was the cession of Venetia through France to Italy, and the withdrawal of Austria from all interference in the affairs of Germany.

Since 1866 Austria has been occupied chiefly with the internal affairs of the empire. The first aim of the government was to restore the constitution of the State, which had been established in February, 1861, but which had been suspended since 1865 owing to the demand of Hungary for self-government. As Austrian statesmen were anxious for a settlement of the dispute, the Hungarian demands were finally agreed to, and the empire of Austria divided into two parts, the one made up of the Cisleithan or Slavonic-German provinces, the other of the Transleithan provinces, the latter forming together the kingdom of Hungary. These two divisions of the empire were to be entirely independent, except in matters of diplomacy and military and naval matters—to some extent also in matters of finance. This settlement was consummated by the coronation of the Emperor Francis Joseph I. as King of Hungary, which took place at Pesth-Ofen, on June 8, 1867.

During the session of the Reichsrath, that is, the diet of the Cisleithan provinces, held in the same year the important question of the concordat of 1855 came up for discussion. The Liberal majority in the diet were desirous of seeing it entirely repealed, but as they fully recognized the insuperable obstacles in the way of this step, they were content to proceed by separate enactments intended to weaken the power that had been gained to the papal see by the concordat. With this end in view three measures were brought forward, one for the reestablishment of civil marriage, one for the emancipation of the schools from the domination of the Church, and one for the placing of the different creeds on a footing of equality. Before May 25, 1868, all these measures had passed through both houses of the diet, and on that day they received the imperial sanction. These laws were declared by the Pope to be "abominable," as well as null and void. Further enactments having in view the weakening of the power of the papal see in the State were passed in 1874, and were condemned by the Pope in the severest terms.

The fact of the Austro-Hungarian dominions comprising so many different nationalities with different languages has always given the government a great deal of trouble, both in the management of internal affairs and in regard to external matters. In the recent revival of the Eastern question, for instance, the course of Austria was hampered by the sympathy shown by the Magyars for the Turks, while her Slav sub-



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jects were naturally more favorable to Russia.

Previous to the outbreak of hostilities between Russia and Turkey she joined with the other powers in remonstrance with Turkey, but as to the actual struggle remained neutral. At the close of the war in the middle of 1878 Austria took part in the Congress of Berlin, where the settlement of the Eastern question was arranged, and it was decided that the provinces of Bosnia and Herzegovina should in future be administered by Austria-Hungary instead of Turkey. In 1908 both of these provinces and the sanjak of Novi-Bazar were suddenly annexed to the empire, and war with Turkey was averted only by the intervention of the Great Powers.

**Area and Divisions.**—The Austrian empire extends from about lat.  $42^{\circ}$  to  $51^{\circ}$  N., or, exclusive of Dalmatia and the narrower part of Croatia, from about lat.  $44^{\circ} 30'$  to  $51^{\circ}$  N., and from lon.  $8^{\circ} 30'$  to  $26^{\circ} 30'$  E.; the total area in round numbers is 240,000 square miles. Its greatest length from E. to W. is about 860 miles; its greatest breadth from N. to S., with the exclusion above stated, is about 400 miles; bounded S. by Turkey, the Adriatic Sea, and the kingdom of Italy; W. by Switzerland, Bavaria, and Saxony; N. by Prussia and Russian Poland; and E. by Russia and Rumania. On the shores of the Adriatic, along the coasts of Dalmatia, Croatia, Istria, etc., lies its only sea frontage, which, compared to the size of the monarchy, is of insignificant extent.

Besides being divided into the two great divisions above mentioned, the Austro-Hungarian monarchy is further divided into a number of governments or provinces. The following table exhibits the name and area of these governments, with their population in 1890 and 1900:

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**Natural Features.**—Although presenting every variety of surface the prevailing character of the Austrian dominions is mountainous, there being few districts where mountains are not found; while the plains do not occupy more than a fifth part of the whole superficies. The loftiest ranges, and the most extensively ramified, are found in Tyrol, Styria, Illyria, and the S. parts of Austria proper. In some of these regions the scenery is bold and romantic, and has been considered equal to that of Switzerland. The most extensive tracts of low or flat land occur in Slavonia and the S. E. and central parts of Hungary; much of this level land is remarkably fertile, but it is met at various points by vast morasses and arid steppes. The principal valleys are found in Tyrol, Salzburg, Styria, and Illyria. Extensive plains stretch along the courses of the rivers, particularly the Danube, the Theiss, and the March. The principal rivers of Austria are the Danube, the Elbe, the Save, the Drave, the Waag, the March, the Inn, the Teiss or Theiss, and the Maros. The Danube, for upward of 800 miles, is navigable for pretty large vessels, throughout the whole Austrian territory; while all the others, most of them tributaries of the Danube, are navigable for vessels of smaller size. All of them abound in fish. The lakes are numerous and often picturesque, though those in the low lands, particularly in the plains of Hungary, are rather marshes than lakes.

Austria lies between the isotherms of  $60^{\circ}$  and  $50^{\circ}$ , and has a climate nearly as various as its surface. The N. regions, between the 49th and 51st degrees of N. latitude, have an average temperature resembling that of the N. of France. Between lat.  $46^{\circ}$  and  $49^{\circ}$  the heat is considerable; and between  $42^{\circ}$  and  $46^{\circ}$ , which comprises the whole of South Austria, it is still great-

| DIVISIONS.                       | Area in<br>sq. m. | Population,<br>Dec. 31, 1890. | Population,<br>Dec. 31, 1900. |
|----------------------------------|-------------------|-------------------------------|-------------------------------|
| <i>Austrian Provinces —</i>      |                   |                               |                               |
| Lower Austria.....               | 7,654             | 2,661,799                     | 3,100,493                     |
| Upper Austria .....              | 4,631             | 785,831                       | 810,246                       |
| Salzburg .....                   | 2,767             | 173,510                       | 192,763                       |
| Styria .....                     | 8,670             | 1,282,708                     | 1,356,494                     |
| Carinthia .....                  | 4,005             | 361,008                       | 367,337                       |
| Carniola .....                   | 3,856             | 498,958                       | 508,150                       |
| Coast land .....                 | 3,084             | 695,384                       | 756,546                       |
| Tyrol and Vorarlberg.....        | 11,324            | 928,769                       | 981,989                       |
| Bohemia .....                    | 20,060            | 5,843,094                     | 6,318,697                     |
| Moravia .....                    | 8,583             | 2,276,870                     | 2,437,706                     |
| Silesia .....                    | 1,987             | 605,649                       | 680,422                       |
| Galicia .....                    | 30,307            | 6,607,816                     | 7,315,816                     |
| Bukowina .....                   | 4,035             | 646,591                       | 730,195                       |
| Dalmatia .....                   | 4,940             | 527,426                       | 593,783                       |
|                                  | 115,903           | 23,895,413                    | 26,150,597                    |
| <i>Hungarian Provinces —</i>     |                   |                               |                               |
| Hungary and Transylvania.....    | 108,258           | 15,231,527                    | 16,656,904                    |
| Croatia and Slavonia.....        | 16,773            | 2,201,927                     | 2,397,249                     |
| Fiume .....                      | 8                 | 30,337                        | 38,139                        |
| Military out of the country..... |                   | 25,752,                       | 114,811                       |
|                                  | 125,039           | 17,489,543                    | 19,207,103                    |
| Total .....                      | 240,942           | 41,384,956                    | 45,357,700                    |



er; the winter lasting two or three months only, and being, in general, extremely mild. The principal products of the N. are wheat, barley, oats, and rye; in the center, vines and maize are added; and in the S., olives. The productive capabilities of the soil, however, are not rendered available to their full extent. The wines of Austria are inferior on the whole, with exception of a few choice kinds, including the well-known Tokay. A great portion of the worst wine is made into brandy. The average produce of wine is about 540,000 gallons, of which Hungary yields by far the largest proportion. The forests cover 69,000 square miles, or one-third of the productive soil of the empire, and yield timber of excellent quality, adapted for all purposes. Wild deer, wild swine, chamois, foxes, lynxes, and a species of small black bear, are found in many districts, the fox and lynx being particularly abundant. Herds of a native breed of horses, of small size, roam wild over the plains of Hungary. All the domestic animals of England are known throughout the empire.

A large portion of the countries now composing the Austrian empire was at one time submerged by the sea, particularly Hungary, where the general appearance of its vast plains, the nature of their soil, and, above all, the occurrence of fossil sea shells, leave no room to doubt the former dominion of the ocean. Throughout all Austria the Tertiary formation prevails, with a margin of the Secondary formation, stretching to a greater or lesser extent into the surrounding countries, and diversified by patches of igneous rocks of the Tertiary and Alluvial epochs. In mineral productions Austria is very rich, possessing, with the exception of platinum, all the metals. We may more particularly mention gold, silver, iron, copper, lead, zinc, quicksilver, coal, and salt. The total annual value of the mineral products of the Austrian empire is estimated at upward of £12,000,000; of which £2,300,000 represents coal; £2,000,000 lignite; £4,300,000 smelted ores; and £3,400,000, salt.

*Manufactures and Commerce.*—Manufactures are in the most flourishing condition in Bohemia, Moravia, Silesia, and Lower Austria; less so in the E. provinces, and insignificant in Dalmatia, Bukowina, and the Military Frontiers. The total money value of manufactured products amounts to at least £130,000,000, the value of agricultural products to more than £200,000,000. As regards the individual branches of manufacture, there are machines produced yearly to the value of £4,000,000 to £5,000,000, and the supply about equals the demand. In the manufacture of musical and scientific instruments Austria holds a high position; those of Vienna are especially celebrated. The manufacture of stoneware and

chinaware is very extensive, being valued at about £2,500,000 yearly, and giving rise to a brisk export trade. The glass manufacture is one of the oldest and most highly developed branches of industry in Austria. The manufactories, about 200 in number, are spread over the whole of the monarchy, but are most numerous in Bohemia, where glass and glasswares of every kind are produced. The yearly value of this class of manufactures is estimated at about £2,500,000, of which a very considerable quantity is exported. The manufacture of metal goods is carried on to a great extent, being valued at about £10,000,000; and some of the iron and steel goods, such as scythes and reaping hooks, have a world-wide reputation. The manufacture of gold and silver plate and jewelry is also important, and the articles of Vienna workmanship compete successfully with the French. The production of chemicals reaches the amount of £5,000,000, and about covers the home demand. As regards articles of food, the sugar from beets has an annual value of about £12,000,000; of beer the production is £4,000,000 in value, the number of breweries is over 2,000; spirits are distilled to the value of £3,500,000. The manufacture of tobacco is a State monopoly, and is carried on in 38, mostly large, establishments. Of textile industries, the silk manufacture, since the loss of the Lombardo-Venetian provinces, has become greatly limited. The manufactures of woolen, hemp, and flax are among the oldest and most important of the State. The first gives employment to about 400,000 persons, and turns out about £14,000,000 worth of goods yearly, of which a considerable proportion is annually exported. In the whole monarchy there are about 650,000 spindles and 65,000 looms employed in woolen weaving. The linen manufacture (including also hemp and jute) gives employment to a greater number of persons than any other branch of industry (many of them in their homes), and produces goods to a greater value. The chief seats of the manufacture are Bohemia, Moravia, and Silesia. The annual produce of the cotton manufacture is next in value to that of woollens. Although about 2,400,000 spindles are in activity, cotton yarn has to be imported. On the other hand, however, cotton cloths, which enjoy a very good reputation, are exported. Tanning is carried on to the greatest extent in Moravia, Lower Austria, and Bohemia, yet not sufficiently to supply the demand. The manufacture of leather goods, however, is very large, and in the production of gloves (in Vienna and Prague) Austria stands next to France. Altogether the manufacture of leather and leather goods employs about 200,000 persons and produces goods to about £10,000,000 yearly.



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In addition to the general import and export trade, Austria carries on—partly from its central position in the continent of Europe, and partly from its numerous navigable streams, excellent roads, and in later times its partially completed railway system—a very considerable amount of business in the transit of goods through her territory to other countries. In 1887 the total value of the imports into Austria-Hungary was, in round numbers, £53,900,000, while the value of the exports was £69,860,000; the respective figures for the year 1897 were £62,940,000 and £63,854,000. These values were exclusive of coin and bullion, the import of which into Austria-Hungary in 1897 amounted to £8,322,000, while the export for the same year was £4,304,000. The principal import is raw cotton, which was imported in 1897 to the value of £4,225,000; wool being imported to the value of £3,209,000; cotton and woolen yarn to the value of £2,433,000; silk and silk goods to the value of £2,725,000; coffee to the value of £2,192,000; tobacco leaf and manufactured to the value of £2,167,000; coal and coke to the value of £3,100,000. Among the other chief articles furs and hides were imported to the value of £1,842,000; leather was imported to the value of £1,783,000; machinery, locomotives, etc., to the value of £1,642,000; hardware and clocks to the value of nearly £1,000,000; books, newspapers, and maps to the value of £1,492,000; grain to the value of £3,400,000; cattle to the value of £1,300,000. Wood formed the chief article of export, the value of this product being in 1897 £7,000,000; next came sugar, value £5,120,000; cattle to the value of £3,800,000. Among other exports of importance were grain to the value of £3,475,000; leather and leather wares (including gloves), £2,242,000; hardware, £1,533,000; eggs, £3,660,000; coal and coke, £2,850,000; woolen manufactures, £1,542,000; glass and glassware, £1,867,000; paper and paperwares, £909,000; wool, £883,000; malt, £2,042,000; wooden goods, £1,600,000; hides, etc., £1,420,000; etc. Nearly one-half of the commerce of Austria is carried on with Germany, the next places being occupied by Great Britain, Italy, Russia, and the United States.

Including fishing vessels and small craft, Austria-Hungary, in the beginning of 1897, had 12,447 vessels of all sizes, with a tonnage of 270,250, and employing 34,431 men. Of these 227 of 212,069 tons were sea-going vessels, the coasting vessels being 1,739 in number with a tonnage of 35,515. The principal ports of the empire are Trieste, Pola, and Fiume. In 1898 there were 20,445 miles of railway open for traffic in the empire, of which 10,598 were in Austria, and 9,847 in Hungary.

*Money, Weights, and Measures.*—On Jan. 1, 1900, a new monetary system went into

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effect, the coinage being changed from a silver to a gold basis, and the standard coin and money of account being the crown (equal to 20.3 cents in United States gold). Practically the chief medium of exchange is banknotes, of various denominations. The Austrian centner, the weight by which all large quantities are rated, is 123½ pounds avoirdupois. The metze (pl., metzen), the largest dry measure=1.7 of a bushel, or somewhat less than the fourth part of an English imperial quarter, nine metzen making two quarters nearly. The cimer, the most generally used liquid measure, is equal to 14.94 English wine gallons. The Vienna foot is equal to 12.45 inches English. The joch of land is 1.43 English acre.

*Population.*—None of the European States, with the exception of Russia, exhibits such a diversity of race and language among their population as does the Austrian empire. The Slavs, who amount to above 19,000,000, or 45 per cent. of the total population, are the chief of the component nationalities of the monarchy in point of numbers, forming the great mass of the population of Bohemia, Moravia, Carniola, Galicia, Dalmatia, the kingdom of Croatia and Slavonia, and Northern Hungary, and half the population of Silesia and Bukowina. This preponderance, however, is only apparent, as none of the other races are split up into so many branches differing so greatly from each other in language, religion, civilization, manners, and customs. These branches are the North Slavic Czechs, Moravians, and Slovaks, the Ruthenians and Poles, and the South Slavic Slovenians, Croats, Serbs, and Bulgarians. The Germans, about 10,570,000 in number, are scattered over the whole monarchy, and form almost the sole population of the archduchy of Austria, Salzburg, the greatest portion of Styria and Carinthia, almost the whole of Tyrol and Vorarlberg, considerable portions of Bohemia and Moravia, the whole of the W. of Silesia, etc.; and they are also numerous in Hungary and Transylvania. The Magyars or Hungarians (7,440,000 in number, or about 16 per cent. of the total population) form the great bulk of the inhabitants of the kingdom of Hungary and of the E. portion of Transylvania. To the Italic or Western Romanic stock belong the inhabitants of South Tyrol and parts of the coast lands and Dalmatia, numbering about 700,000 in all. A considerable portion of the S. E. of the empire is occupied by members of the Rumanian (or Eastern Romanic) stock, who number altogether about 2,800,000, and form more than half the population of Transylvania, besides being spread over the S. E. parts of Hungary, Bukowina, and part of Croatia and Slavonia. The number of Jews is also very



considerable (above 1,000,000), especially in Galicia, Hungary, Bohemia, and Moravia. There are also several other races whose numbers are small, such as the Gypsies (95,000), who are most numerous in Hungary and Transylvania, and the Albanians in Dalmatia and neighboring regions. The population is thickest in Lower Austria, Bohemia, Silesia, and Moravia; thinnest in Salzburg. Generally speaking, it decreases in density from W. to E.

*Religion.*—The State religion of Austria is the Roman Catholic, and next in numbers is the Greek Church. Calvinism and Lutheranism are also professed by a large body of the people; the former mostly in Hungary and Transylvania, the latter in the German provinces and in Galicia. The civil power exercises supreme control in all ecclesiastical matters, the emperor being, in everything but the name, head of the Church; and as no sentence of excommunication, or other ecclesiastical edict, can be issued without the sanction of the crown, the Pope's direct authority in Austria is somewhat limited. In 1890 there were in the Austrian portion of the monarchy 18,784,063 Roman Catholics, 2,797,089 Greek Catholics united to the Roman Church, 540,715 non-united, 430,849 Protestants, and 1,135,118 Jews. In Hungary and Transylvania there were 8,823,105 Roman Catholics, 1,670,283 Greek united and 2,633,491 non-united, 3,427,896 Protestants, and 724,588 Jews.

*Education.*—The intellectual culture of the people is at very different stages of advancement among the different races. It is highest in the German provinces, and lowest in the E. In Upper and Lower Austria, Salzburg, Tyrol, Moravia, Silesia, and Bohemia, almost all the children of suitable age are in attendance on the public schools; while in Bukowina only about 34, and in Galicia about 59 per cent. of them are at the schools. The educational system has been entirely remodeled in recent times. The elementary schools, or those in which the common branches are taught, are designated national schools or schools for the people (*Volksschulen*), and there children have to attend from the end of their 6th to the end of their 14th (in some provinces only their 12th) year. A higher class of elementary schools are known as town schools (*Bürgerschulen*), in which a superior education may be obtained. For the training of instructors for the people's schools, there are 43 normal schools for male teachers and 26 for female. As secondary schools or institutions of a more advanced grade, there are the gymnasia and the "real-schools," as they are called. The gymnasia resemble the best sort of our grammar schools, being intended chiefly to prepare pupils for the universities, and great attention being paid in them to the

classical languages. In the real-schools a more practical end is kept in view, and modern languages and physical science form the groundwork of the educational course. A complete course in a gymnasium extends over four years, in a real-school either three or four. There are also schools of an intermediate stamp known as "real-gymnasia." The higher education is provided for by the universities, the polytechnic institutes, and the various institutions in which particular subjects are taught. There are 11 universities in the monarchy, viz., in Vienna, Prague (two—a German and a Bohemian), Pesth, Gratz, Cracow, Lemberg, Innsbruck, Klausenburg, Agram, and Czernewitz. Most of these have four faculties—Catholic theology, law and politics, medicine, and philosophy. There are also several technical high schools in which mathematics, physics, and natural science are the chief objects of study. Besides these there are theological institutions; schools for jurisprudence and philosophy; schools of commerce, industrial arts, agriculture, arboriculture, and mining; military schools, naval schools, art schools, conservatories of music, etc. The principal libraries are the royal library at Vienna, with 450,000 volumes, 24,000 manuscripts, and 7,000 incunabula; and the university libraries of Vienna and Prague.

*Constitution, Revenue, Army, and Navy.*—As already mentioned, the Austrian dominions now consist of a German, or Slavo-Germanic, or Cisleithan empire, and a Transleithan or Hungarian kingdom, each with its own parliament, ministers, and government. The same hereditary sovereign rules over both, and they have a common army and navy, and a sort of common parliament known as the Delegations. The Delegations consist of 120 members, one-half of whom are chosen by and represent the legislature of German Austria, and the other half that of Hungary, the upper house of each legislature returning 20 and the lower house 40 deputies. In all matters affecting the common affairs of the monarchy the Delegations have a decisive vote, and their resolutions do not require the confirmation of the representative assemblies in which they have their source. The Delegations meet alternately in Vienna and Budapest. Their ordinary mode of procedure is to sit and vote in two chambers, the 60 deputies of Cisleithan Austria forming the one, and the 60 of Hungary the other. But if no agreement can be arrived at in this manner, the two bodies must meet together and without further debate give their final vote, which is binding for the whole empire. The jurisdiction of the Delegations extends specially to all matters affecting foreign affairs, war, and finance. The constitution of German Austria was finally established in December, 1867. The prov-



inces have each a diet or legislature of their own for provincial affairs, these diets being 16 in number, one each for Bohemia, Dalmatia, Galicia, Upper Austria, Lower Austria, Salzburg, Styria, Carinthia, Carniola, Bukowina, Moravia, Silesia, Tyrol, Vorarlberg, Görz and Gradisca, and Istria, the municipal council of Trieste having similar functions. The provincial diets are composed of the archbishops and bishops, the rectors of the universities, the representatives of the great estates, of towns, of boards of commerce, of rural communes, etc. The laws passed in these diets have reference to provincial taxation, agricultural, educational, and other matters. The National Parliament or legislature of German Austria, called the *Reichsrath* (or council of the realm), consists of an upper house or house of lords (*Herrnhaus*), and a lower house or house of deputies (*Abgeordnetenhaus*). The former is composed of princes of the imperial family, of nobles whose families have a hereditary right to this dignity, of the archbishops, the bishops of princely rank, and of a certain number of life members nominated by the emperor. The lower houses consist of 353 members, elected by all citizens above 24 possessing a small property qualification. The rights belonging to the Reichsrath are—consent to all laws relating to military service; coöperation in the legislation on commercial matters, customs, railways, etc.; and examination of the estimates of the income and expenditure of the State, and other financial matters. The constitution of Hungary, including also Croatia, Slavonia, and Transylvania, dates from the foundation of the kingdom, or about 895 A. D. It rests upon a number of statutes published at long intervals, the principal of these being the *Bulla Aurea* or Golden Bull of Andrew II., granted in 1222, by which the government was defined as an aristocratic monarchy. The legislative power is vested in the king and the parliament (*Reichstag*) conjointly. The latter consists of an upper house or house of magnates, and of a lower house or house of representatives. The house of magnates consists of the archdukes of the imperial family who have attained their majority, 54 ecclesiastical dignitaries, 151 counts, and 36 barons as hereditary members, 84 life members nominated by the sovereign, or elected by the chamber, etc. The lower house (of 453 members) is composed of elected representatives. The Hungarian Reichstag corresponds to the Reichsrath of the Cisleithan provinces, and accordingly only deals with such matters as are common to the provinces belonging to the Hungarian crown. Transylvania is, so far as legislation and administration are concerned, entirely incorporated with Hungary. Croatia and Slavonia, however, have a Landtag or diet of their own, which, like

the provincial diets of the Cisleithan portion of the empire, consists of only one chamber, and which is competent to deal with all matters belonging to the interior administration of the provinces, with religion and education, and with the administration of justice. Fiume, which was formerly associated with Croatia and Slavonia, and subject to the Landtag of these provinces, has, since August, 1870, been put directly under the central Hungarian government.

There being three distinct parliaments in the empire, there are also three budgets, viz., that for the whole empire, that for Cisleithan, and that for Transleithan Austria. In the budget of the whole empire for 1902 the revenue and expenditure were each estimated at 365,181,966 crowns; in that for Cisleithan Austria the revenue was estimated at 1,685,966,357 crowns, and the expenditures at 1,685,117,944 crowns; and in that for Transleithan Austria the estimated revenue was 1,086,870,018 crowns, the estimated expenditure being a little less. A small portion of the imperial revenue of Austria is derived from customs and other sources, and the remainder is made up by the two divisions of the empire, 70 per cent. thereof being contributed by the Cisleithan and 30 per cent. by the Transleithan portion.

Military service is obligatory on all citizens capable of bearing arms who have attained the age of 20, and lasts up to the age of 42, either in the active army, in the landwehr, or the landsturm. The period of service in the active army is 12 years, of which three are passed in the line, seven in the reserve, and two in the landwehr. In 1900 the standing army numbered 361,693 men (including officers) on the peace footing, and 1,826,940 men and 45,238 officers on the war footing.

The Austrian navy comprises about 120 vessels of all kinds, including 8 battleships, 10 port defense ships (4 monitors on the Danube), and 33 cruisers. The other vessels are mostly torpedo craft. The crews number about 8,500 officers and men.

**Authorized Version of the Bible**, the version of the Bible into English, made at the suggestion of James I. by 47 learned divines. It took three years—viz., from 1607 to 1610—to execute, and was first published in 1611. It is the only one appointed to be read in churches, and till quite recently its title-page contained the words “printed by authority.” It has held its place so long more by its own great merits than by the artificial support of law; and while there are numerous minute defects, which have been corrected in the revised version of the New Testament, it remains, in all essential respects, the same Bible which for nearly three centuries has



been the most potent factor in the spiritual education of the English-speaking race, and through it, more or less, of all the other families of mankind.

**Authors, British Society of**, an association of authors formed in London in 1883, for social and business purposes; has a governing committee of 30 members; maintains an attractive club-room and publishes a periodical called "The Author." The late Lord Tennyson was its president till his death.

**Authors' Club**, an American organization founded in New York city in 1882, and incorporated in 1887. It is governed by an executive committee without a president. Any person who is the author of a published book proper to literature, or of creditable literary work equivalent to such a book, is eligible to membership. The club has apartments in Carnegie Hall, holds meetings semi-monthly, and gives Saturday receptions for ladies in the winter season. It has a library consisting of the publications of its members and another devoted to literary biography.

**Authors, French Society of**, an organization founded in Paris, in 1837, for the protection of authors in their rights, and open to any man of letters. It is governed by an elective committee of 24 members. This society has a pension fund which provides for aid in work, for sick, and for age. Besides publishing a journal, the "Chronique," the society has collected a large sum of money from pirating publishers.

**Authors' Guild, American**, an organization founded in New York city, in 1892, and incorporated, in 1895, has for its objects the promotion of a professional spirit among authors and a better understanding between authors and their publishers, and, in general, the protection of literary property and the advancement of the interests of American authors and literature. All persons engaged in literary pursuits are eligible to membership. The guild has a pension fund for members who may become needy.

**Autocracy**, a word signifying that form of government in which the sovereign unites in himself the legislative and the executive powers of the State, and thus rules uncontrolled. Such a sovereign is, therefore, called an autocrat. Nearly all Eastern governments are of this form. Among European rulers, the Emperor of Russia alone bears the title of Autocrat, the name indicating his freedom from constitutional restraint of every kind. Such is the theory or principle of an autocracy, but it should be remembered that even the most rigorous autocrat must in practice have regard to the feelings and opinions of those about him. There are real, though not formal, checks.

In autocratic States, palace or court revolutions are not infrequent. This has been a marked feature of Russian history, especially in the 18th century. These revolutions often result in the deposition and assassination of the sovereign. In point of fact, the peculiar feature of an autocracy is the absence of regular and constitutional limits; it is a strong form of personal rule.

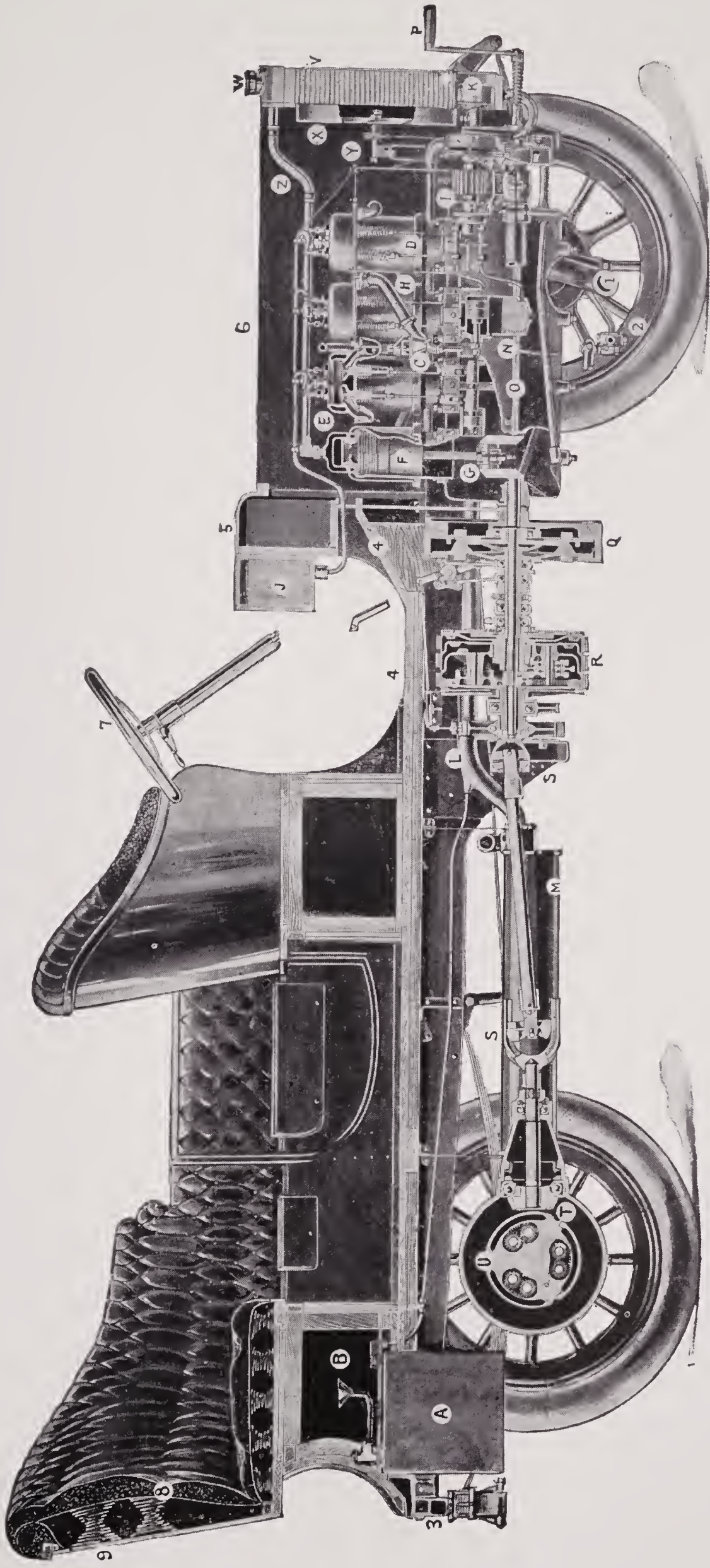
**Automatic Gun.** See MACHINE GUN.

**Automaton**, a self-moving machine performing actions like those of a living being. We find very early mention of them. In ancient times Dædalus is said to have made walking statues, and Archytas a flying dove. In modern times Friar Bacon had the reputation of having constructed a brazen head which spoke, and Regiomontanus an iron fly, which, after making the tour of the room, returned to its master. Albertus Magnus, in the 13th century, is said to have spent 30 years in constructing a human figure which advanced to the door when anyone knocked, opened it, and saluted the visitor. In the water-clock presented to Charlemagne by Haroun al Raschid, 12 doors in the dial opened respectively at the hour which they represented; they continued open till noon, when 12 knights issued out on horseback, paraded round the dial, and then returning shut themselves in again. Camus constructed an ingenious toy for Louis XIV., consisting of a carriage drawn by two horses, containing a little figure of a lady with a coachman and attendants. The coachman cracked his whip, the horses moved their legs naturally, and when the carriage arrived opposite the king's seat it stopped; the page stepped down and opened the door; the lady alighted and presented a petition to Louis. The flute-players, the tambour-player, and the wonderful duck of Vaucanson are celebrated for the astonishing ingenuity displayed in their construction. Of all automata among the most remarkable are the whist-playing and other figures of Mr. Maskelyne.

**Automobile**, a self-propelled, or motor-driven vehicle intended to run on highways, as distinguished from a locomotive intended to be run on a track.

The name automobile, rather incongruously derived from the Greek, *autos*, self, and the Latin, *mobilis*, movable, is of very recent origin. The motor-driven road-vehicle, however, dates from the early days of the nineteenth century, when it was for nearly two decades a formidable rival of the developing railroad. One of the earliest was that built by Richard Trevithick, who designed the earliest high-pressure steam engine to propel it. Other brilliant designers were the Englishmen, Goldsworthy, Gurney and Walter Hancock, who produced





A—20-Gallon Gasoline Tank. B—Filler. C—Carbureter. D—Copper Waterjacket. E—Cylinder Head Showing Valve Chamber. F—Piston. G—Connecting Rods. H—Gas Inlet Pipe. I—Camshaft Gear, Oil Governor and Water Pump. J—Coil. K—Cummulator. L—Exhaust Pipe and Pressure Feed to Gasoline Tank. M—Muffler. N—Oil Reservoir Governor. O—Governor Piston Shaft. P—Starting Crank. Q—Fly-Wheel and Clutch. R—Planetary Change-Speed Gear, 3 Speeds Forward and 1 Reverse, Operated by Hand Lever. S—Universal Joints. T—Bevel Gear. U—Differential Gear. V—Radiator or Water Cooler. W—Water Inlet. X—Vane Fan. Y—Fan Drive. Z—Water Circulating Pipe. 1—Steering Knuckle. 2—Steering Knuckle Socket. 3—Rear Platform Spring. 4—Footboard. 5—Dashboard Containing 5-Gallon Gasoline and Pressure Feed Oil Tank. 6—Hood or Bonnet. 7—Steering Wheel. 8—Upholstery. 9—Back of Body.







several improvements in boilers and engines, which were valuable contributions to the young science of steam engineering. These inventors built large passenger coaches, several of which had been in actual service for several years, when the growing popularity of the railroads, combined with the unjust discriminations of Parliament, operated to discourage their use on the highways. Thereafter, for nearly fifty years, nothing worthy of mention was accomplished in the way of developing motor vehicles.

The new impetus came with the improvement of the light, high-speed gasoline engine at the hands of Gottlieb Daimler of Cannstadt, Germany, in 1884. Daimler applied his improved engine to the propulsion of bicycles and four-wheeled carriages. His example was followed by the French engineers, Panhard and Levassor, the Peugeot brothers, and others now equally famous, by whom the modern gasoline automobile was first developed along the lines since followed throughout the world.

About the same time, Leon Serpollet, of Paris, invented his famous "flash boiler," an extremely compact and efficient type of steam generator, which was used by him on steam cycles and wagons, and also gave a powerful impulse to the development of steam carriages on both sides of the Atlantic. Flashers designed along the lines laid down by Serpollet have been used on several makes of high-powered steam wagons in England, also by such well-known American steam carriages as the White.

Probably no mechanical invention, not even the steam railway locomotive, has occasioned a greater activity in invention and begotten a greater or more inclusive group of allied industries than the automobile. Starting as an interesting mechanical novelty about twenty-five years since, it has rapidly become a necessity, and is now a recognized feature in commercial life, in the shape of trucks, delivery wagons and cabs, as well as for personal and pleasure use. The growing complexity of travel conditions in large cities must inevitably lead to its exclusive use for heavy draughting in the near future.

Three types of automobile are now recognized, their discrimination being based on the motor used: the steam, the gasoline and the electric. The last-named, driven by an electric motor energized by a storage battery, was originated in 1894 by Henry G. Morris and Pedro G. Salom, engineers of Philadelphia, and by Jeanteud and Bogard of Paris. Since that time it has been steadily developed both in efficiency and travel radius, thanks to battery improvements, and, with the virtual eclipse of the steam machine, has become the only serious rival of the gasoline automobile, particularly for heavy trucking service.

As a vehicle designed to operate under peculiar and very trying conditions, the automobile demands certain constructions and devices foreign alike to both railway cars and horse-drawn wagons. Having no track to limit and guide its travel, it requires efficient means: (a) for steering or changing its line of travel, and (b) for compensating the motions of its driven wheels on curves. The first of these requirements is found in the stud steering axles, by which the front, or steering, wheels are practically hinged to the axletree.

The horse-drawn wagon has the front axletree center-pivoted under the body on the so-called "fifth wheel." This arrangement, however, would be impracticable in an automobile, since, owing to the fact that the two wheels in turning do not describe concentric arcs, none but the longest and most gradual turns would be possible, the pivoted stud axles, on the other hand, being connected by and operated through a transverse drag-link, are so geared as to allow the outer wheel on a turn to assume a greater inclination from the normal than the inner. Consequently the two, pushed by the motor-driven rear wheels, describe arcs developed from a common center, without side slip or dragging. This is the only means by which a motor car may be turned without danger of breakage or upsetting.

The necessity of easy turning involves another conspicuous need—that the two rear-driven wheels shall rotate at different speeds. If the motive power be applied to only one rear wheel, this result is readily accomplished, except for the fact that the car could, then, turn in only one direction. The effect is practically achieved by the use of the differential or compensating gear. Briefly described, the typical form of this device consists of a sprocket or a bevel gear, according as the drive is by chain or by propeller shaft. Several spokes of this sprocket or gear serve as spindles for small bevel pinions, all of which mesh, at either side, with two bevel gears. These latter, in turn, are keyed to the inner ends of the center divided rear axle, the two road wheels being attached to the two outer ends. In operation the motor rotates the sprocket, and, as is evident, so long as the travel of the car is straight ahead, the bevel pinions, meshed with their gears, form a sort of clutch, holding the two parts of the divided axle rigidly to the sprocket, the whole rotating together, and thus transmitting equal power and motion to both road wheels. So soon, however, as a turn is made, and one road wheel must act as a pivot, the small bevel pinions begin rotating on their axes, allowing the pivot wheel to rotate as slowly as required, or to remain fixed, while at the same time transmitting nearly full speed to the other.



Because the travel on ordinary highways involves constant encountering of rough surface, stray obstacles, and the resistance of mud or sand, some method of neutralizing the shocks of travel is essential. This end is commonly achieved by the use of pneumatic tires, whose action has been described as a "swallowing-up" of unevennesses. The elasticity of the compressed air within the pneumatic tire permits of a constant redistribution of pressure within, so that the jolts resulting from contact with most obstacles are largely "absorbed," and the body of the ear is spared many a shock that might otherwise lead to disablement.

Highly resilient supports, like pneumatic tires, are essential with small or moderate-sized wheels and high speeds. With low speeds solid rubber tires are sufficient, even with small wheels. The effect of absorbing shocks may be achieved with wheels of large diameter, with rubber tires used only to promote traction. In fact, ease of travel increases as the square of the wheel's diameter. This is the secret of the success of the numerous high-wheel automobiles now on the market.

In the early days of automobiles the pneumatic tire was a constant occasion of trouble on account of ever-recurring liability to puncture. Continual improvement, however, in the quality and structure of tires has greatly reduced this, and at the present time puncture and rim-cutting are no more common than other forms of mishap. Great advances have also been made in the development of the several types of detachable rim, which obviate the difficult task of prying the shoe over the rim of the tire in order to reach and repair the inner tube.

The transmission of an automobile, or the device for imparting the motion of the engine to the road wheels, is of two general types: (a) by chain and sprocket from a countershaft carrying the differential to each of the drive wheels, which turn loose on a "dead," or non-rotating, rear axle; (b) by longitudinal "propeller shaft," carrying a bevel pinion, which meshes with a bevel gear on the differential of the center-divided rear axle. The latter type is constantly growing in favor, being preferred by many builders and users of motor cars as an efficient means of driving, which also does away with chain troubles. Some early gasoline cars had the motor shaft geared to a spur on the rear axle differential; others, particularly the early American types, used one chain engaging a sprocket on the rear axle differential.

The gasoline automobile has received so large a share of favor that it is now, fairly, the typical motor vehicle. Under the impetus given by the demand for the most efficient engine for motor car use, the gas engine has been developed to a degree of perfection that might otherwise have been long de-

layed. Not only has the weight per horsepower been reduced by nearly nine-tenths the average recognized twenty years ago, but ease and quietness of operation have been immensely increased.

The four-cycle engine is the prevailing type for automobiles. The most effective method of properly balancing a gasoline engine, which is the real occasion of smooth operation, is by increasing the number of the cylinders. Daimler and his early French collaborators used single-cylinder motors. An American, Charles E. Duryea, was the first to use multiple cylinders. In 1890 he built a two-cylinder horizontal engine to propel a motor buggy.

Later he used three-cylinder engines. The general trend within the last ten years has been steadily toward the use of four, and later, of six-cylinder engines, the reason being that, particularly with the latter, an approximately constant power-effort may be realized, thus avoiding the vibration and noise inevitable from the constant variations of pressure throughout the engine cycle, when only one or two cylinders are used. The use of multiple-cylinder engines explains the absence of the terrific vibration, so familiar in motors of ten years ago, in automobiles built at the present time.

The fuel exploded in the cylinder of an automobile engine is a mixture of vaporized gasoline and air, produced as required in an apparatus known as the carburetter or mixer. There have been several types of this instrument in use, the most familiar being (a) the surface carburetter, in which air is drawn under suction of the engine over a surface wet with the liquid spirit, and (b) the float or gravity carburetter, in which the spirit is atomized through a fine nozzle, being drawn by air-suction from a chamber, whose entrance is normally closed by a float bearing against the feed port. Both types are still in use, having been brought to high perfection by constant experiment. The proportions of air and gas in the fuel mixture may be precisely determined by adjusting the supply of air drawn through the mixing chamber by the inspiration stroke of the engine piston. The power effect and the rapidity of the ignition depend upon the proportions of air and gas in the mixture. Excess of either ingredient is detrimental to perfect operation of the engine.

Ignition of the fuel charge in the cylinder is regularly accomplished by an electric spark. There are two types in use: (a) the break, or low-tension, spark, produced by opening the circuit with a mechanical contact-breaker, and (b) the jump, or high-tension, spark, produced by an arc between two slightly separated finely-pointed terminals. The latter method is the one more generally favored. The spark gap is fixed in an instrument known as the spark plug.



The current is produced, either from a chemical battery or small dynamo, being stepped up to the required tension in an induction coil, or from a magneto-generator, frequently of the high-tension type.

The intense heat of the cylinder is absorbed by the cooling system, which may use either water circulating in and out through "jackets" on the cylinder walls, or by suitable radiating pins or flanges, through which air circulates. Several highly efficient types of air-cooling system have been devised, although water-cooling is the favorite method.

The motion of the engine shaft is transmitted to the road wheels through a speed-changing device, which operates to vary the final driving speed, also the final effective power, as for hill-climbing, by some device of varying the ratios of motion between the main motor shaft and the second shaft that drives direct to the road wheels. The favorite method of speed change is by spur gears, which, mounted on two parallel shafts, the one driven by the engine, the other driving direct to the transmission, may be readily slid into or out of mesh. When a spur on the driving or engine shaft meshes with one of twice its diameter on the driven, or second shaft, the final speed sent to the driven axle-gear is one-half that of the engine shaft. When the ratio from the engine shaft is two to one, the speed is twice that of the engine shaft. Other speed ratios are proportional.

The engine is connected to the first shaft through some form of friction clutch, usually of the cone type, although compression discs have constantly gained in favor of late years.

With the practical perfection of motors and other accessories, the size and power of automobiles has steadily increased. The prevailing types at the present time are the high-powered touring cars and the heavy-duty trucks. The automobile is rapidly solving the freight transportation problem, not only in large cities, where trucks of several tons' capacity are rapidly becoming every-day necessities, but also, following the example of England, for long-distance haulage. In the field of commercial utility the motor car will doubtless find its widest application.

J. E. HOMANS.

**Autonomy**, the arrangement by which the citizens of a State manage their own legislation and government; and this evidently may, with certain restrictions, be the case also within limited bodies of the same people, such as parishes, corporations, religious sects. Autonomy is frequently used to designate the characteristic of the political condition of ancient Greece, where every city or town community claimed the right of independent sovereign action. Recently the word is more specifically used of territories or provinces, which, while sub-

ject in some matter to a higher sovereignty, are autonomous in other respects. Thus the Treaty of Berlin made Eastern Rumania an autonomous province; though subject to the direct political and military authority of the Sultan, it was to have administrative autonomy in all its internal affairs. Egypt possesses a higher autonomy. The self-government enjoyed by the British colonies may be described as a modified form of autonomy.

**Autoplasty**, a mode of surgical treatment which consists in replacing a diseased part by means of healthy tissue from another part of the same body. The most familiar instance is the rhinoplastic or taliacotian operation, for supplying a new nose from the skin of the forehead. It is more popularly known as skin-grafting.

**Autopsy**, eye-witnessing, a direct observation; generally applied to a *post mortem* examination, or the dissection of a dead body.

**Autotype**, a method of phototyping. Tissue, being prepared with a liquid composed of gelatine, sugar, and bichromate of potash, is then used for taking a collodion negative in the ordinary way. It is next applied under water with the face down to a plate of glass, metal, or other paper, coated with gelatine and chrome alum. Means are then taken to remove the parts not hardened by light, and, finally, by another elaborate process, the plate is made ready for the printing-press.

**Autotypography**, a process invented by Mr. Wallis, by which drawings made on gelatine can be transferred to soft metallic plates, and afterward used for printing from, like ordinary copper plates.

**Autumn**, the season of the year which follows summer and precedes winter. Astronomically, it is considered to extend from the autumnal equinox, Sept. 23, in which the sun enters Libra, to the winter solstice, Dec. 22, in which he enters Capricorn. Popularly, it is believed to embrace the months of September, October and November.

**Autran, Joseph** (ō-trañ'), a French poet, born in Marseilles, in June, 1813. His verse is admired for its purity of form and refined sentiment. He attracted attention in 1832 with an ode to Lamartine, "The Departure for the East." His works include "The Sea," poems (1835); "Milianah," an epic (1842); "Rural Life" (1856); and "The Daughter of Æschylus," drama (1848), which won a prize from the French Academy. He died in Marseilles, March 6, 1877.

**Autun** (ō-tun'), a city of France, in the Department of Saone-et-Loire, on the Arroux, 43 miles S. W. of Dijon, on the railroad to Nevers. It is picturesquely situated.



## Auvergne

The Church of St. Martin, built by Queen Brunehaut, and containing her tomb, furnishes a variety of architectural styles. Autun is one of the most ancient French cities, and was made a Roman colony by Augustus, from whom it derived its old name of Augustodunum. It still presents many fine Roman remains. Talleyrand was Bishop of Autun at the commencement of the French Revolution. The Abbé Roquette, whom Molière is said to have taken for a model, was also one of the bishops.

**Auvergne** (ō-vârṇ), a province of Central France, now merged into the Departments of Cantal and Puy-de-Dôme, and an *arrondissement* of Haute-Loire. The Auvergne Mountains, separating the basins of the Allier, Cher, and Creuse from those of the Lot and Dordogne, contain the highest points of Central France: Mt. Dore, 6,188 feet; Cantal, 6,093 feet, and Puy-de-Dôme, 4,806 feet. The number of extinct volcanoes and general geologic formation make the district one of great scientific interest.

**Auvergne, Counts and Dauphins of**, a title which was, about the middle of the 8th century, conferred on Blandin, who served the Duke Waifre in his opposition to Pepin le Bref, founder of the Carolingian dynasty. The name figures through a great part of early French history.

**Auxerre** (ōz-âr'), the chief town of the French Department of Yonne, on the Yonne river, 109 miles S. E. of Paris, in a rich district abounding in vineyards. It presents an imposing aspect from a distance, the most prominent feature being the noble Gothic cathedral, which dates from 1215, but was not completed till the 16th century. There are two other interesting churches, a museum, a large library, statues of Fourier and Davout, etc. Auxerre was a flourishing town before the Roman invasion of Gaul. It was destroyed by the Huns in 451, and in 486 was wrested by Clovis from the Romans. The county of Auxerrois came finally in 1477 to the kingdom of France. The principal manufactures are wine (a light Burgundy), candles, chemicals and hosiery. Pop. (1901) 18,901.

**Auzout, Adrian** (ō-zö), a French mathematician; inventor of the micrometer, which is still in use among astronomers to measure the apparent diameter of celestial bodies. He was the first who thought of applying the telescope to the astronomical quadrant. He died in 1691.

**Ava, Arva, Yava, or Kava** (*piper methysticum*), a plant of the natural order *piperaceæ*, possessing narcotic properties. Until recently, it was ranked in the genus *piper* (pepper). It is a shrubby plant, with heart-shaped acuminate leaves, and very short, solitary, axillary spikes of flowers. It is a native of many of the South Sea

## Avalanches

islands, where the inhabitants intoxicate themselves with a fermented liquor prepared from the upper portion of the root and the base of the stem. The rhizome is thick, woody, rugged, and aromatic. The intoxicating liquor is prepared by macerating it in water. The savage Tahitians were accustomed to prepare it in a very odious manner; much as the Indians of the Andes prepare *chica*, or maize beer — chewing the root, depositing it in a bowl, straining through cocoanut husk, and mixing with water or cocoanut milk. As the beverage was drunk immediately afterward, no fermentation could have taken place, and the narcotic property is, therefore, ascribed to an acrid resin, *kawine*, which is present in the root. The taste is unpleasant to those unaccustomed to it, and has been likened to that of rhubarb and magnesia. The intoxication is not like that produced by ardent spirits, but rather a stupefaction like that caused by opium. It is succeeded by a copious perspiration. The habitual use of *ava* causes a whitish scurf on the skin, which, among the heathen Tahitians, was reckoned a badge of nobility, the common people not having the means of indulgence requisite to produce it. *Ava* is, like cocaine, a local anæsthetic.

**Avalanches**, masses of snow or ice that slide or roll down the declivities of high mountains, and often occasion great devastation. They have various names, according to their nature. Drift or powder avalanches consist of snow, which, loose and dry from strong frost, once set in motion by the wind, accumulates in its descent, and comes suddenly into the valley in an overwhelming dust-cloud. Avalanches of this kind occur chiefly in winter, and are dangerous on account of their suddenness, suffocating men and animals, and overturning houses by the compression of the air which they cause. Another kind of avalanche resembles a landslide. When the snow begins to melt in spring, the soil beneath becomes loose and slippery; and the snow slides down the declivity by its own weight, carrying with it soil, trees, and rocks. The greatest danger is where elevated tracts of moderate declivity are separated from the valleys by precipitous walls of rock; the softened snow of spring, beginning to roll or slide on these slopes, is hurled over the precipices with fearful force into the valleys. The very wind caused by them prostrates forests and houses. Ice avalanches are those that are seen and heard in summer thundering down the steeps — *e. g.*, of the Jungfrau. They consist of masses of ice that detach themselves from the glaciers in the upper regions. They are most common in July, August and September. Nine great Alpine avalanches, which cost 447 lives, are on record between 1518 and 1879, the most de-



## Avalon

structive being one of 1827, which swept away half the village of Biel, in the Upper Valais, with 88 inhabitants. Sudden avalanches, larger or smaller, constitute one of the special dangers of Alpine climbing.

**Avalon**, a peninsula forming the E. part of Newfoundland, in which St. John's, the capital, is situated.

**Avalon**, in medieval romances, the name of an island in the ocean, possessing a castle of loadstone. It is most fully described in the old French romance of Ogier le Danois. Avalon, as the abode of King Arthur, the old British hero, is generally identified with what is called the Isle of Glastonbury, in Somersetshire, England.

**Avars**, a people, probably of Turanian origin, who at an early period may have migrated from the region E. of the Tobol in Siberia to that about the Don, the Caspian Sea, and the Volga. A part advanced to the Danube in 555 A. D., and settled in Dacia. They served in Justinian's army, aided the Lombards in destroying the kingdom of the Gepidae, and in the 6th century conquered under their khan, Bajan, the region of Pannonia. They then won Dalmatia, pressed into Thuringia and Italy against the Franks and Lombards, and subdued the Slavs dwelling on the Danube, as well as the Bulgarians on the Black Sea. But they were ultimately limited to Pannonia, where they were overcome by Charlemagne, and nearly extirpated by the Slavs of Moravia. After 827 they disappear from history. Traces of their fortified settlements are found, and known as Avarian rings.

**Avatar** (-ă-tär'), more properly AVATARA, in Hindu mythology, an incarnation of the Deity. Of the innumerable avatars the chief are the ten incarnations of Vishnu, who appeared successively as a fish, a tortoise, a boar.

**Avatcha** (-vă'chă), a volcano and bay in Kamtchatka. The volcano, which is 9,000 feet high, was last active in 1855. The town of Petropavlovsk lies in the bay.

**Avebury**, a village of England, in Wiltshire, occupying the site of a so-called Druidical temple, which originally consisted of a large outer circle of 100 stones, from 15 to 17 feet in height, and about 40 feet in circumference, surrounded by a broad ditch and lofty rampart, and inclosing two smaller circles. Few traces now remain of the structure. On the neighboring downs are numerous barrows or tumuli, one of which, called Silbury Hill, rises to the height of 130 feet, with a circumference of 2,027 feet at the base, covering an area of more than five acres.

**Avebury**, SIR JOHN LUBBOCK, BARON, an English archæologist, naturalist, and

## Ave Maria

politician; born in London, April 30, 1834. He was educated at Eton, and in 1848 entered his father's banking house, becoming a partner in the business in 1856. In 1870 and 1874 he was elected to Parliament as member for Maidstone in the Liberal interest, from 1880 to 1900 sat for London University, and in the latter year was elevated to the peerage. He became a recognized authority on financial and educational questions, and his name is associated with over twenty important measures, including the Bank Holidays Act, and acts concerning ancient monuments, shop hours, and public libraries. But he attained even greater distinction as a popularizer of science, especially in the department of entomology through notable observations of ants, bees, and wasps. Among his numerous works may be mentioned: "Prehistoric Times" (1865; new edition 1900), a very valuable archæological text-book; "Origin of Civilization" (1870; new edition 1902); "Origin and Metamorphosis of Insects" (1873); "On British Wild Flowers" (1873); "Monograph on the Collembola and Thysanura" (1873); "Fifty Years of Science" (1882); "Ants, Bees, and Wasps" (1882), which has gone through many editions; "Flowers, Fruits, and Leaves" (1886); "The Senses and Instincts of Animals" (1888); "On Representation" (1890); "The Pleasures of Life" (1891), his most popular book; "The Beauties of Nature" (1892); "The Use of Life" (1894); "The Scenery of Switzerland" (1896); "Buds and Stipules" (1898); "The Scenery of England" (1902); "Coins and Currency" (1902); "Essays and Addresses" (1903); "Free Trade" (1904).

**Avellaneda y Arteaga, Gertrudis Gomez de** (ă-vă-lyă-nă'dă ē ār-tă-ăg'a). a Spanish author; born in Puerto Principe, Cuba, March 23, 1814. Under the pseudonym "Peregrina" she contributed to Andalusian journals many "Lyric Poems" (1851-1854), and afterward wrote a series of spirited novels: "Two Women," "The Baroness de Jonx," "Dolores," and others. She gained still higher distinction with the tragedies "Alfonso Munio," the hero of which was her own ancestor, and "The Prince of Viana." Her later compositions had a tone of melancholy, but are not inferior to those that went before them. She died in Madrid, Feb. 2, 1873.

**Ave Maria** (ă 'v ā m ā - r ē 'ă) ("Hail, Mary"), the first two words of the angel Gabriel's salutation (Luke i: 28), and the beginning of the very common Latin prayer to the Virgin in the Roman Catholic Church. Its lay use was sanctioned at the end of the 12th century, and a papal edict of 1326 ordains the repetition of the prayer thrice each morning, noon, and evening, the hour being indicated by sound of bells called the Ave



Maria or Angelus Domini. The prayers are counted upon the small beads of the rosary, as the pater noster is upon the large ones.

**Avena**, a genus of plants belonging to the order *graminaceæ*, or grasses. The *A. fatua*, or wild; the *A. strigosa*, or bristle pointed; the *A. pratensis*, or narrowed-leaved perennial; the *A. planiculmus*, or flat-stemmed; the *A. pubescens*, or downy; and the *A. flavescens*, or yellow oat, are species included in this genus. The first of these species is akin to the *A. sativa*, or cultivated oat. It is a cereal suitable for cold climates, not reaching proper maturity in the South. It attains perfection in Scotland, and is largely grown there. *A. nuda* is the naked or hill oat, or peel corn, formerly cultivated and used extensively by the poorer classes in the N. of England, Wales and Scotland.

**Avenel, Paul** (äv-nel'), a French poet and novelist, born at Chaumont, Oct. 9, 1823. Educated for commerce, he turned to literature and was active in connection with several periodicals. Besides a number of vaudevilles, he wrote "The Peasant Woman from the Abruzzi" (1861), a drama; "The King of Paris" (1860), a historical romance; "The Calicoes" (1866), scenes of real life. Among several collections of poems may be mentioned "Alcove and Boudoir," interdicted in 1855 and republished in 1885.

**Avenzoar** (av-en'zor), or, to give his complete name, ABU-MERWAN-MOHAMMED-BEN-ABDALMALEC-BEN-ZOHAR, an Arabian physician of the 12th century, born at Seville, in Spain, where his father practiced medicine. He became eminent in his profession, traveled much, and passed through many adventures, among which was a long imprisonment at Seville. He had the care of a hospital, and composed a work entitled "Al Theiser," containing a compendium of medical practice, and including many facts and observations not found in the preceding writers, which was probably the result of his own experience. He died at Morocco, in 1169. The report of his having lived to the age of 135 is probably an error arising from his having been confounded with his son, of the same name and profession, who lived at Morocco, and was the author of a treatise on the regimen of health.

**Average**, formerly the apportionment of losses by sea or elsewhere in just proportions among different individuals; now the medium or mean proportion between certain given quantities. It is ascertained by adding all the quantities together and dividing their sum by the number of them. For instance, to ascertain the average income of the clergy of any given church, their several incomes must be all added together,

and the sum total be divided by the number of clergymen. The more that the extremes vary, the less possible is it to reason out any individual case from a study of the average. Thus the knowledge of the average age at which people die in the United States affords no aid whatever toward discovering when any particular person will die, for some do so almost at the moment of birth and others linger on for nearly, if not quite, a 100 years. But for finding out general laws, the study of averages is of immense value. The average of qualities is ascertained in a similar way to that of quantities.

**Average, or General Average.**—A contribution made by merchants proportionally to the value of the goods which each has on board a particular vessel, to meet the loss which arises when in a storm the goods of one have had to be cast overboard to lighten the ship.

**Particular Average.**—The sum required to make good any fortuitous injury to the goods belonging to one person. It falls on him or on his insurers.

**Petty Average.**—An estimate of the probable aggregate amount of various petty charges, as for harbor dues, pilotage, etc., which the captain of a vessel must, in the first instance, pay, but which, of course, do not fall on him ultimately. Formerly they were often met, as they still are, by agreement between the owners of the vessel and those to whom the goods sent in it belongs. Hence in bills of lading the words occur, "paying so much freight, with primage and average accustomed."

**Averell, William Woods**, an American military officer, born in Cameron, N. Y., Nov. 5, 1832; was graduated at the United States Military Academy in 1855; served on the frontier and in several Indian campaigns till the beginning of the Civil War, when he was appointed Colonel of the 3d Pennsylvania Cavalry, and assigned to the command of the cavalry defenses of Washington. During the war he distinguished himself on numerous occasions as a cavalry raider and commander, and at its close was brevetted Major-General of volunteers. He resigned from the regular army while holding the rank of captain, in 1865, and, under an act of Congress, was reappointed captain in August, 1888, and was placed on the retired list in the same month. He was United States Consul-general at Montreal in 1866–1869. He died in Bath, N. Y., Feb. 3, 1900.

**Averkiyev, Dmitry Vassilyevich** (av-er'kē-yev), a Russian dramatist and critic, born Oct. 12, 1836. He wrote over 20 dramas and comedies, besides numerous literary criticisms. Among the former, mostly taken from old Russian life, the best are "In Old Kashira" (1872), a his-



torical tragedy; and "Frol Skobejeff" (1868), a comedy.

**Avernus**, or **Averno**, a lake in the neighborhood of Naples, about 2½ miles N. W. of Puzzuoli, and near the coast of Baiæ, the waters of which were so unwholesome and putrid that no birds ever visited its banks. The ancients made it the entrance of hell, by which Ulysses and Æneas descended into the lower regions. In the time of Vergil, a communication between it and the neighboring Lucrine Lake was made by Agrippa; but in 1538, the latter was filled by a volcanic eruption, when Monte Nuovo rose in its place, rendering the Averno again a separate lake. On its banks, instead of pestilential marshes, are now beautiful gardens and vineyards. The grotto of the Cumæan sibyl is still to be seen here. It may be observed that all lakes whose stagnated waters were putrid and offensive to the smell were indiscriminately called Averno.

**Averrhoa** (av-er-hō'a), a genus of plants, order *oxalidaceæ*. It consists of two species, both of which form small trees in the East Indies. They are remarkable for their leaves, which are pinnated, possessing, in a slight degree, the kind of irritability found in the sensitive plant; and for their fleshy oval fruits with five thick longitudinal wings. In the carambola (*A. aciambola*), the leaves are smooth, the flowers of a violet purple, and the fruit about the size of a goose's egg; it is of a pale yellow color, and is said to be agreeably acid in the East Indies. The other species, called the blimbing (*A. blimbi*), has downy leaves and fruit resembling a small cucumber. The latter is intensely acid and cannot be eaten raw. It is pickled or candied, or a syrup is obtained from it by boiling with sugar, and its juice is found an excellent agent for removing iron mold or other spots from linen. To the Malays it answers the same purposes as the citron, the gooseberry, the caper and the cucumber of Europe.

**Averroes** (av-er-ō'az), or **Averrhoes** (corrupted from EBN or IBN ROSHD or RUSHD), an Arabian philosopher and physician, born 1120. He succeeded his father in the chief magistracy of Cordova, capital of the Moorish dominions in Spain; was afterward nominated chief judge in Morocco, and, having there appointed deputies to his office, he returned to Spain. The liberality of his opinions, however, caused him to be persecuted by the more orthodox Moslems, and he was imprisoned; but, after doing penance and making recantation, he was liberated. Averroes greatly admired Aristotle, and his commentaries on the writings of that philosopher procured for him the title of "The Commentator." Of the personal character of Averroes almost nothing

is known. Renan says, with perfect truth, that neither by his studies nor his character does he appear to have departed much from the type of the "learned Mussulman." He knew what the others knew: in medicine, Galen; in philosophy, Aristotle, or his translators; in astronomy, the *Almagest*. Like every Mohammedan, he cultivated jurisprudence; and, like every distinguished Arabian, he was devoted to poetry. He died at Morocco in 1198.

**Avery, Benjamin Parke**, an American journalist and diplomatist, born in New York city in 1829; went to California in 1849 and became connected with several papers on the Pacific coast, among them being the San Francisco "Bulletin." In 1872 he was appointed editor of the "Overland Monthly." From 1874 to 1875 he was United States Minister to China. His chief work is "Californian Pictures in Prose and Verse" (1877). He died in Pekin, China, Nov. 8, 1875.

**Avery, Samuel Putnam**, an American merchant, born in New York city, March 17, 1822; became a copper-plate and wood engraver, and subsequently an art publisher and dealer, and retired from business in 1883. He was a founder of the Metropolitan Museum of Art; life member of the American Museum of Natural History, American Geographical Society, American Historical Society, American Zoological Society; president of the Grolier Club, and first president of the Sculpture Society. In 1891, with his wife, he created and endowed the Avery Architectural Library, in Columbia University, as a memorial of his deceased son; and in May, 1900, he presented to the trustees of the New York Public Library a collection of etchings, lithographs and photographs, numbering more than 17,500 pieces, and many large volumes illustrated by the same arts. He died Aug. 13, 1904.

**Avesta.** See ZENDAVESTA.

**Aveyron** (ä-vā-rôn), a Department occupying the S. extremity of the central plateau of France, traversed by mountains belonging to the Cevennes and the Cantal ranges; principal rivers: Aveyron, Lot and Tarn, the Lot alone being navigable. The climate is cold, and agriculture is in a backward state, but considerable attention is paid to sheep breeding. It is noted for its Roquefort cheese. It has coal, iron, and copper mines, besides other minerals. Area, 3,340 square miles; capital, Rhodéz. Pop. (1906) 377,299.

**Aviary**, a building or inclosure for keeping, breeding and rearing birds. Aviaries appear to have been used by the Persians, Greeks and Romans, and are highly prized in China. In England they were in use at least as early as 1577, when William Harrison refers to "our costlie and curious



## Avicebron

aviaries." An aviary may be simply a kind of very large cage; but the term usually has a wider scope than this.

**Avicebron**, or **Avencebrol** (ä-vē-thā-brōn'), properly SOLOMON BEN JEHUDA IBN GABRIOL, Hebrew poet and philosopher, born at Cordoba, about 1028. Of his poetical works, "The Royal Crown" is the most famous; of the philosophical, "The Fountain of Life," written in Arabic, but known only through a Latin translation (re-edited in Münster, in 1895). He died about 1058.

**Avicenna**, or **Ebn-Sina**, an Arabian philosopher and physician, born near Bokhara, A. D. 980. After practicing as a physician he quitted Bokhara at the age of 22, and for a number of years led a wandering life, settling at last at Hamaden, latterly as vizier of the Emir. On the death of his patron he lived in retirement at Hamadan, but having secretly offered his services to the Sultan of Ispahan he was imprisoned by the new Emir. Escaping, he fled to Ispahan, was received with great honor by the Sultan, and passed there in quietness the last 14 years of his life, writing upon medicine, logic, metaphysics, astronomy and geometry. He died in 1037, leaving many writings, mostly commentaries on Aristotle. Of his 100 treatises the best known is the "Canon Medicinæ," which was still in use as a text-book at Louvain and Montpellier in the middle of the 17th century.

**Avicennia**, or **White Mangrove**, a genus of *verbenacæ*, consists of trees or large shrubs resembling mangroves, and, like them, growing in tidal estuaries and salt marshes. Their creeping roots, often standing six feet above the mud in crowded pyramidal masses, and the naked asparagus-like suckers which they throw up, have a singular appearance. The bark of *A. tomentosa*, the white mangrove of Brazil, is much used for tanning. A green, resinous substance exuding from *A. resinifera* is eaten by the New Zealanders. The genus is named in memory of the Arabian physician Avicenna.

**Avienus, Rufus Festus** (av-ē-en'us), a Latin descriptive poet, who flourished about the end of the 4th century after Christ, and wrote "Descriptio Orbis Terræ," a general description of the earth; "Ora Maritima," an account of the Mediterranean coasts, etc.

**Avignon** (av-ēn-yôn') (ancient Avenio), a city of France, capital of the Department of Vaucluse, on the left bank of the Rhone, 76 miles N. N. W. of Marseilles, on the railway to Paris. Avignon was for a long time the residence of the Popes, and accordingly filled with convents, churches, etc., many of which are now in decay. It is situated in a fine plain, and is surrounded

## Avison

by high walls, flanked with numerous towers. The promenades along the walls, and the quays along the river, are both very fine. The streets are, in general, narrow and gloomy. The ancient palace of the Popes stands on the declivity of a rock. It is a Gothic building of different periods, and of vast extent, and now serves as a prison, military depot, and barracks. The Cathedral Church of Notre Dame des Dons is very ancient, as is also the spire of the Church of the Cordeliers. The latter church contained the tomb of Laura, immortalized by Petrarch. Avignon existed before the Roman invasion, and afterward became a Roman colony. In 1309, Clement V. transferred thither the abode of the Popes, who continued to reside here till 1377, when they returned to Rome; but two schismatical Popes, or Popes elected by the French cardinals, resided at Avignon till 1409. Avignon and its territory remained the property of the Holy See until 1797, when it was incorporated with France. Pop. (1901) 46,209.

**Avila** (ä'vē-lä), a town of Spain, capital of the Province of Avila, a modern division of Old Castile. It is the see of the bishop suffragan of Santiago, with a fine cathedral, and was once one of the richest towns of Spain. Principal employment in the town, spinning; in the province, breeding sheep and cattle. Pop. (1900), town, 11,885; province, 200,457.

**Avila, Gil Gonzalez d'**, a Spanish antiquary and biographer, 1577-1658; made historiographer of Castile in 1612, and of the Indies in 1641. Most valuable works: "Teatro de las Grandezas de Madrid" (1623), and "Teatro Eclesiastico" (1645-1653).

**Avila, Juan de**, a celebrated Spanish preacher, commonly called the "Apostle of Andalusia," was born at Almodavar del Campo, in 1500. His missionary labors in Andalusia were prosecuted with untiring zeal and singular success, until he arrived at the age of 50, when, with a worn-out constitution, he was obliged to desist. Died in 1569. His "Spiritual Letters" have been translated into most European languages.

**Avila y Zuniga** (ä'vē-la ē thö-nyē'ga), **Don Luis d'**, a Spanish general, diplomatist, and historian; a favorite of Charles V.; born about 1490, died after 1552. His chief work, translated into five or six languages, was on the war of Charles V. in Germany.

**Avison, Oliver R.**, an English physician, born in Yorkshire, June 30, 1860; removed to Canada in youth; was educated in the Ontario College of Pharmacy, the Toronto Medical School, and the Victoria University, and became Professor of Materia Medica, Instructor of Microscopy and Demonstrator



of *Materia Medica* in the University of Toronto. In 1893 he went to Korea as a medical missionary; the same year he was appointed to the charge of the Royal Korean Hospital, and in the following year became physician to the royal family.

**Avitus, Marcus Mæcilius**, an Emperor of the West. He was of a Gaulish family in Auvergne, and gained the favor of Constantius, the colleague of Honorius, and of Theodoric, King of the Visigoths. He served with distinction under Ætius, became Prefect of Gaul, and concluded a favorable treaty with the Goths. He afterward retired into private life until the invasion of Attila, when he induced the Goths to join the Romans against the common enemy. Avitus was proclaimed Emperor in 455, took for his colleague Marcianus, and died the year following.

**Aviz, Order of** (av'êth), an institution created in 1147, by Alphonso I., the founder of the Portuguese monarchy, and raised by him, in 1162, to the rank of an ecclesiastical order of chivalry. The knights were then called Knights of Evora, but took their present title in 1287, from their gallant defense of the fortress of Aviz against the Moors. The Order was changed from an ecclesiastical to a civil institution in 1789. The King of Portugal is the Grand Master of the Order.

**Avlona**, the best seaport in Albania, in the Province of Janina, on an eminence near the Gulf of Avlona, an inlet of the Adriatic, protected by the Island of Saseno, the ancient Saso. It is one of the stations of the Austrian Lloyd steamers, and carries on considerable trade with Brindisi, etc. The Christian inhabitants, who are chiefly Italians, are engaged in commerce, exporting oil, wool, salt, pitch, and especially some 40,000 tortoise shells yearly. The Turks are employed in the manufacture of weapons and woolen fabrics. Valonia, a material imported to England for tanning, is the pericarp of an acorn grown in the neighborhood. Up to 1691 the town belonged to the Venetians.

**Avoca, or Ovoca**, a beautiful valley and river of Ireland, near Glendalough, in the county of Wicklow, and celebrated as being the scene which gave rise to one of the finest of Moore's "Irish Melodies."

**Avocado**, a West Indian fruit, called also avocado pear, alligator pear, subaltern's butter tree, avigato, and sabacca. It belongs to the order *lauracæ* (laurels), and is the *persea gratissima*. It is found in tropical America. The fruit is about the size and shape of a large pear. A considerable part of it is believed to consist of a fixed oil. It is highly esteemed. The fruit itself is very insipid, on which account it

is generally eaten with the juice of lemons and sugar to give it poignancy.

**Avocet, or Avoset**, the English name of a genus of birds, with their feet so webbed that they might seem to belong to the *natatores* (swimmers), but which, by the other parts of their structure, are placed in the family *scolopacidæ* (snipes), and the sub-family *totaninæ* (tattlers). Their great peculiarity is a long, feeble bill, curved upward, with which they explore the sand for prey. *Recurvirostra avocetta* is a British bird. It was formerly abundant in the fenny districts, but is now rare. *R. americana* differs from it by having a red cap; and there are a few other foreign species.

**Avogadro's Law**, in physics, asserts that equal volumes of different gases at the same pressure and temperature contain an equal number of molecules.

**Avoirdupois**, a system of weights used for all goods except precious metals, gems, and medicines, and in which a pound contains 16 ounces, or 7,000 grains, while a pound troy contains 12 ounces, or 5,760 grains. A hundredweight contains 112 pounds avoirdupois.

**Avon**, the name of several English and Scottish rivers, the best known of which is that Avon which rises in Northamptonshire, and flows into the Severn at Tewkesbury, after a course of 100 miles. On its banks is Stratford-on-Avon, the birthplace and abode of Shakespeare, who has hence been styled the Bard of Avon.

**Avondale**, a parish of Scotland, in the county of Lanark. At the battle of Drumclog, fought near this place June 1, 1679, Grahame of Claverhouse, the famous Viscount Dundee, was defeated by the forces of the Scottish Covenant. A graphic description of this battle is found in Sir Walter Scott's "Old Mortality."

**Awe, Loch**, a lake of Scotland, in Argyleshire, 18 miles N. W. of Inverary. It is 23 miles long, by 3 broad. On one of its many islands stand the magnificent ruins of Kilchurn Castle, for centuries the baronial fortress of the Campbells, Earls of Breadalbane. In allusion to the vast territorial possessions of this family, extending over a tract of country for 100 miles, there is a saying in the Highlands, "It is a far cry to Loch Awe." This lake receives the river Urchan; and at its N. W. extremity rises the great mountain of Ben Cruachan, 3,670 feet in height.

**Ax, or Axe**, an instrument for cutting or chopping timber, or smaller pieces of wood. It consists of an iron head with one edge sharp, and a handle or helve, generally of wood. As a rule, it is used with both hands, while a hatchet, which is smaller, is intended for one.



**Axayacat**, or **Axayacatl**, a Mexican fly, the eggs of which, deposited abundantly on rushes and flags, are collected and sold as a species of *caviare*. The use of these as an article of diet was learned by the Spanish settlers from their predecessors, the native Indian Mexicans, who called the dish *ahuauhtli*.

**Axelsen**, or **Axelsen Tott**, a powerful Danish family who flourished in the latter half of the 15th century, and the members of which figured in the wars of Christian I. and John IV. of Denmark, and Karl Knutsen and Eric the Pomeranian, Kings of Sweden. PETER AXELSEN was the head of the family. Of his nine sons, the eldest, OLAF, made himself master of Gothland; the second, IVER, retained that possession, and became a corsair; the third, ERIC, was governor of Stockholm; and the fourth, AAGE, became a Danish councilor of State.

**Axil**, in botany, the angle between the upper side of a leaf and the stem or branch from which it grows. Buds usually grow out from the stem in axils of leaves, and this position is naturally termed axillary. In anatomical terminology, the axilla is the armpit.

**Axim**, an important station and port on the African Gold Coast, a little to the E. of the mouth of the Ancobrah river. Inland from Axim, in the basin of that river, and in the district between it and the Prah, gold mining operations have been carried on on a large scale.

**Axinite**, a triclinic mineral, called also yanolit and thumite. The crystals are broad with their edges sharp. The hardness is 6.5-7, the sp. gr. 3.271, the luster glassy, the color clove-brown, plain blue, and pearl-gray, these hues varying greatly according to the direction in which it is viewed. It has strong double refraction. Composition: Silica, 41.50 to 45; alumina, 13.56 to 19; lime, 12.50 to 25.84; sesquioxide of iron, 7.36 to 12.25; sesquioxide of manganese, 1.16 to 10; boric acid, 0 to 5.61; magnesia, 0 to 2.21; and potassa, 9 to .64. It is found, both in its normal state and altered, in Europe and in the United States.

**Axinomancy**, a mode of divination much practiced by the ancient Greeks, particularly with the view of discovering the perpetrators of great crimes. An ax was poised upon a stake, and was supposed to move so as to indicate the guilty person; or the names of suspected persons being pronounced, the motion of the ax at a particular name was accepted as a sign of guilt. Another method of axinomancy was by watching the movements of an agate placed upon a red-hot ax. This is only one of a multitude of analogous modes of

divination practiced in all ages and among all nations.

**Axiom**, a Greek word meaning a decision or assumption, is commonly used to signify a general proposition which the understanding recognizes as true, as soon as the import of the words conveying it is apprehended. Such a proposition is, therefore, known directly, and does not need to be deduced from any other. Of this kind, for example, are all propositions whose predicate is a property essential to our notion of the subject. Every rational science requires such fundamental propositions, from which all the truths composing it are derived; the whole of geometry, for instance, rests on comparatively a very few axioms. Whether there is, for the whole of human knowledge, any single, absolutely first axiom, from which all else that is known may be deduced, is a question that has given rise to much disputation; but the fact that human knowledge may have various starting-points answers it in the negative. Mathematicians use the word axiom to denote those propositions which they must assume as known from some other source than deductive reasoning, and employ in proving all the other truths of the science. The rigor of method requires that no more be assumed than are absolutely necessary. Every self evident proposition, therefore, is not an axiom in this sense, though, of course, it is desirable that every axiom be self evident; thus, Euclid rests the whole of geometry on 15 assumptions, but he proves propositions that are at least as self evident as some that he takes for granted. That "any two sides of a triangle are greater than the third," is as self-evident as that "all right angles are equal to one another," and much more so than his assumption about parallels. Euclid's assumptions are divided into three postulates, or demands, and 12 common notions; the term axiom is of later introduction. The distinction between axioms and postulates is usually stated in this way: an axiom is "a theorem granted without demonstration;" a postulate is "a problem granted without construction"—as, to draw a straight line between two given points.

**Axis**, a straight line, real or imaginary, passing through a body, and around which that body revolves, or at least may revolve; also, the imaginary line connecting the poles of a planet, and around which the planet rotates.

In geometry, an imaginary line drawn through a plane figure, and about which the plane figure is supposed to revolve, with the result of defining the limits of a solid. Thus, a circle revolving about one of its diameters, and at right angles to that di-



ameter, will constitute a sphere; hence the axis of a sphere is any one of its diameters. If an isosceles triangle revolve around an imaginary line connecting its apex with the center of its base, it will constitute a cone; hence the axis of a cone is an imaginary straight line drawn from its apex to the center of its base. A rectangle revolving around a straight line connecting the centers of any two of the opposite sides will produce a cylinder; hence the axis of a cylinder is a straight line drawn from the center of its apex to the center of its base. The axis of a parabola is the diameter which passes through its focus. In an ellipse the axis major (Latin=greater axis) is the diameter which passes through the foci; and the axis minor (Latin=lesser axis) the diameter at right angles to the axis major. In a hyperbola, the axis major is the diameter which passes through the foci; the axis minor is the distance between two points formed when a straight line drawn through the center of the hyperbola, and at right angles to its major axis, is intersected by a circle described around a principal vertex as its center, and with a radius equal to the eccentricity of the hyperbola.

The conjugate axis of an ellipse or of a hyperbola is the straight line drawn through its center perpendicular to the transverse axis. The transverse axis of an ellipse or of a hyperbola is the straight line drawn through the two foci. The axis of symmetry of a body is any line in a regular polygon bisecting an angle or bisecting a side perpendicularly.

In astronomy the axis of the earth or the axis of rotation of the earth, is that diameter about which it revolves. It is the one which has for its extremities the North and South Poles. The term is similarly used of the sun, the moon and the planets. The axis of the celestial sphere is the imaginary line around which the heavens appear to revolve. The axis of an orbit is the major axis of the orbit of a planet, the line joining the aphelion and perihelion points. The minor axis is the line perpendicular to the former, and passing through the center of the ellipse.

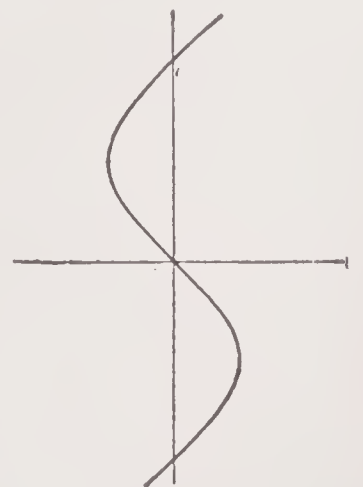
In mechanics, the axis of suspension of a pendulum is the point from which it is suspended, and, consequently, around which it turns. The axis of oscillation of a compound pendulum is an axis constituted by a series of points, so situated that their motion is neither retarded nor accelerated by their constituting part of a solid body, which, of course, can only move together. The axis of a balance is the line around which it turns. The axis in peritrochia is the same as the wheel and axle; one of the six mechanical powers, consisting of a peritrochium, or wheel and an axle.

In optics, the axis of a lens is a line passing through the center of its curved, and perpendicular to its plane, surface. The optic axis is the line corresponding to this in the eye. The ray of light passing along it is the only one which is not refracted. The other rays of light entering the eye have axes also, but this is the only one to which the term optic axis is applied. The visual axes are the axes of the several rays of light which enter the eye. The axis of refraction is a straight line drawn perpendicular to the plane of a transparent body, and, passing through the point of incidence of a luminous ray, striking it from without. As regards axes of double refraction, all doubly refracting substances have one or more lines, or one or more planes, along which no doubly refracting force exists. If there is one such line or plane, then the body is said to have one axis, or plane of axes, of double refraction; if two, two axes, or planes of axes, of double refraction, and so forth. A real axis, or plane of axes of double refraction, is one in which the doubly refracting force really does not exist; while a resultant axis, or plane of axes, or an axis or plane of compensation, is one in which it exists, but is neutralized by a counter force of equal intensity. A positive axis of double refraction is the term used when the refracted ray is bent toward the axes, or plane of axes of the body; and a negative axis of double refraction is the expression employed when it is bent in the contrary direction.

In architecture, a spiral axis is the axis of a spirally twisted column. The axis of an Ionic capital is a line passing perpendicularly through the middle of the eye of the volute.

In geology an axis is an imaginary line on the opposite sides of which the strata dip in different directions. If the angle formed at their point of junction be a salient one, they form an antielinal axis, or antielinal; but, if it is a re-entering one, then they constitute a synclinal axis, or synclinal.

In botany, the axis is that part of a plant around which the organs are symmetrically arranged. The ascending axis means the stem. The descending axis is the root. Reccessory axes are axes in addition to the main one, found in the stems of calycanthus, chimonanthus, and some other plants. The appendages of the axis are scales, leaves, bracts, flowers, sexes, and fruit. The axis of inflorescence is a peduncle



AXIS.



## Axis

which proceeds in a nearly straight line from the base to the apex of the inflorescence.

In anatomy, the axis of the body is the vertebral column, around which the other portions of the frame are arranged.

**Axis**, a species of deer, the *cervus axis*, found in India. It is spotted like the fallow deer, from which, however, the adult males, at least, may be distinguished by their possessing round horns without a terminal palm. There are several varieties, if, indeed, they are not distinct species. All are called by Anglo-Indian sportsmen hog deer.

**Axminster**, a market town of England, in the county Devon, on the Axe, at one time celebrated for its woolen cloth and carpet manufactures, and giving name to an expensive variety of carpet having a thick, soft pile, and also to a cheaper variety. Pop. (1891) 4,985.

**Axolotl** (*amblystoma maculatum*), a curious Mexican amphibian, not unlike a newt, from 8 to 10 inches in length, with gills formed of three long, ramified or branch-like processes floating on each side



AXOLOTL.

of the neck. It reproduces by laying eggs, and was for some time regarded as a perfect animal with permanent gills. It is said, however, that they frequently lose their gills like the other members of the genus, though some authorities maintain that the true axolotl never loses its gills, and that merely confusion with *A. tigrinum* has led to the belief, as this species sometimes retains its branchiæ, though usually it loses them. The axolotl is esteemed a luxury by the Mexicans. There are a number of species of *amblystoma* in North America.

**Axum**, a town in Tigré, a division of Abyssinia, once the capital of an important kingdom, and at one time the great depot of the ivory trade in the Red Sea. The site of the town still exhibits many remains of its former greatness; but modern Axum is only a miserable village.

**Ayacucho** (ā-ä-sö'gö), formerly Huamanga or Guamanga, a town in the Peruvian department of the same name, 220 miles E. S. E. of Lima. Founded by Pizarro in 1539, it is now a handsome and thriving town. Here, on Dec. 9, 1824, the combined forces of Peru and Colombia—the latter then comprising Ecuador, New Granada, and Venezuela—totally defeated the last Spanish army that ever set foot on the continent. Pop. 9,387.

**Ayala, Adelardo Lopez de** (ä-yä'lä), a Spanish dramatist, born at Guadalcanal,

## Ayeshah

Badajoz, March, 1829. After studying law in Seville, he went to Madrid, where he devoted himself entirely to poetry and speedily won national fame. His first drama, "A Statesman" (1851), met with immediate success, and was followed in the same year by "The Two Noblemen," and "Penalty and Pardon." To the modern comedy of manners, his specific domain, he first contributed "The Glass Roof," and in 1861 attained to wide reputation with "Percentage." Of his other works the most noteworthy are "The Modern Don Juan" (1863); and "Consuelo" (1878), a drama. He has also written beautiful sonnets. He died Dec. 30, 1879.

**Ayala, Pedro Lopez de**, a Spanish historian, poet, and statesman, born in 1332. In great favor with the Castilian kings, Peter the Cruel, Henry II., John I., and Henry III., he was invested with the highest dignities of State. His "Chronicles of the Kings of Castile" contains the history of that kingdom from 1350 to 1396. Of his poetical works, the "Rhyme-Work of the Palace," a didactic poem on social and political questions, stands foremost. He died in 1407.

**Aye-aye**, an animal of Madagascar, so called from its cry, now referred to the lemur family. It is about the size of a hare, has large, flat ears and a bushy tail; large eyes; long, sprawling fingers, the



AYE-AYE.

third or slender as to appear shriveled; color, musk-brown, mixed with black and gray ash; feeds on grubs, fruits, etc.; habits, nocturnal.

**Ayeen**, or **Akbery**, a very valuable statistical description of the Mogul Empire as it was in the reign of Akbar. It was compiled by Abul Fazi, the Vizier of the Emperor Akbar. There is an English translation of it by Gladwin.

**Ayeshah** (ī-esh'a), also **Aysha** or **Aisha**, the favorite wife of Mohammed, and daughter of Abu-Bekr, was born at Medina about 610 A. D.; and was only nine years of age



when the Prophet married her. She was the only one of Mohammed's wives who accompanied him in his campaigns. Although Ayesha bore no children to Mohammed, she was tenderly beloved by him. She was accused of adultery, but Mohammed produced a revelation from Heaven (now in the Koran) to the effect that she was innocent. Mohammed expired in her arms (632). She now successfully exercised her influence to prevent, Ali, the Prophet's son-in-law, from becoming caliph, and secured the succession for her father, Abu-Bekr. Again, on Othman's death, she headed a force to resist the accession of Ali, but the troops under her were in 656 defeated by Ali, and she was taken prisoner. She died at Medina (677 A. D.), highly venerated by all true Mussulmans, and named the Prophetess and the Mother of Believers.

**Aylesford**, a town and parish of England, in the county of Kent, 3 miles from Maidstone. In its vicinity is the remarkable monument called Kit's Coty House, a kind of Druidical cromlech of which the origin is obscure, and much contested among antiquaries.

**Aylmer, John**, an English prelate, born in Norfolk, 1521; was tutor to Lady Jane Grey. On the accession of Mary, he was forced to leave his country, but found a quiet retreat amid the beautiful scenery of Zurich. When Queen Elizabeth came to the throne, he returned to England; and in 1576 was made Bishop of London. He was a very diligent prelate, and severe against the Puritans, for which he has been severely censured by their writers; but it is said that he was learned in the languages, a deep divine, and a ready disputant. He died at Fulham in 1594.

**Aylmer, Matthew**, a Canadian military officer, born in Melbourne, P. Q., March 28, 1842; was educated in Montreal and at Trinity College, Dublin; and entered the British army in 1864; retired from the Imperial service and entered the Canadian Volunteer militia in 1870; and became Adjutant-General of the Dominion militia, the highest military office in Canada next to that of the Major-General commanding, in 1896; 8th Baron Aylmer in 1901.

**Aylmer-Gowing, Mrs. Emilia**, an English poet and reciter, born in Bath, October, 1846. She was educated partly in Brighton, partly in Paris, where she received the attention of Lamartine. After a short career on the stage she successfully produced two dramas, "A Life Race," and "A Crown for Love." Her "Ballads and Poems," and "The Cithern" have become popular, as well as two novels, "The Jewel Reputation," and "An Unruly Spirit." In 1891 she published "Ballads of the Tower and Other Poems."

**Aymon** (ā-môn'), the surname of four brothers, called respectively Alard, Richard, Guiscard, and Renaud, sons of Aymon or Haimon, Count of Dordogne, who figure among the most illustrious heroes of the chivalric poetry of the Middle Ages; but their historic existence must be considered problematical, as the deeds attributed to them possess, in so large a measure, a miraculous character. Their career belongs to the cycle of marvels of which Charlemagne is the central point, and their adventures furnished rich material to the romantic narratives of Italy in the 15th and 16th centuries, and, in fact, were the exclusive subject of some of these. A novel, entitled "The Four Aymon Brothers," by Huon de Villeneuve, a French poet of the age of Philip Augustus, details very minutely their exploits. Finally, Ariosto conferred a poetical immortality on the family by the publication of his "Roland," in which Renaud, the bravest of the four brothers, plays continually the most distinguished part.

**Ayoubites**, or **Ayyubites**, the Saraccenic dynasty founded by Saladin, which in Egypt supplanted the Fatimite caliphs, about A. D. 1171. Several of the descendants of Saladin, known as Ayoubites, afterward ruled in Egypt, Syria, Armenia, and Arabia Felix. In the 13th century their power was destroyed by the Mamelukes.

**Ayr** (ār), a town of Scotland, a royal and parliamentary borough and capital of Ayrshire, at the mouth of the river Ayr, near the Firth of Clyde. It was the site of a Roman station. William the Lion built a castle here in 1197 and constituted it a royal borough in 1202; and the Parliament which confirmed Robert Bruce's title to the crown sat in Ayr. It is picturesquely situated, and ranks among the better class of provincial towns. Two bridges connect Ayr proper with the suburbs of Newton and Wallacetown. One of the bridges, opened in 1879, occupies the place of the "new brig" of Burns' "Brigs of Ayr," the "auld brig" (built 1252) being still serviceable for foot traffic. Carpets and lace curtains are manufactured. The harbor accommodation is good, and there is a considerable shipping trade, especially in coals. The house in which Burns was born stands within 1½ miles of the town, between it and the Church of Alloway ("Alloway's auld haunted kirk"), and a monument to him stands on a height between the kirk and the bridge over the Doon. Pop. (1901) 23,697.

**Ayrer, Jacob**, a German dramatist; next to Hans Sachs the most prolific dramatist of Germany in the 16th century; in 1595-1605 he wrote more than 100 new plays, of which the "Opus Theatricum" (Nuremberg, 1618) contains 30 tragedies and com-



edies, and 36 Shrovetide plays and vaudevilles. In his dramas the influence of the English stage is apparent. He died in Nuremberg, March 26, 1605.

**Ayres, Anne**, an American author, born in England in 1816; was the first member of an American sisterhood in the Protestant Episcopal Church. She wrote "Evangelical Sisterhood" (1867); "Life of Augustus Muhlenberg." She died in February, 1896.

**Ayrton, William Edward**, an English electrician and inventor, born in London, in 1847; was graduated at University College, London, in 1867; entered the Indian telegraph service, having studied electrical engineering with Prof. William Thomson; became electrical superintendent and introduced throughout India the system of determining the position of a fault by electrically testing one end of a line. In 1873-1879 he was Professor of Natural Philosophy and Telegraphy at the Imperial College of Engineering in Japan; in 1879 became Professor of Applied Physics in London Technical College, and, in 1884, Chief Professor of Physics at the Central Institute, South Kensington. He was elected President of the Institute of Electrical Engineering in 1892. With Prof. Perry, he invented the ammeter, voltmeter, electric power meter, ohmmeter, and dispersion-photometer; and, with Profs. Jenkin and Perry, the system of telpherage. He has been a voluminous writer and is widely known for his "Practical Electricity."

**Aytoun, Sir Robert**, poet, born in Fife-shire, Scotland, in 1570. After studying at St. Andrews he lived for some time in France, whence, in 1603, he addressed a panegyric in Latin verse to King James on his accession to the crown of England. By the grateful monarch he was appointed one of the gentlemen of the bed chamber, and private secretary to the Queen, receiving also the honor of knighthood. At a later period of his life he was secretary to Henrietta Maria, Queen of Charles I. His poems are few in number, but are distinguished by elegance of diction. Several of his Latin poems are preserved in the work called "Deliciæ Poetarum Scotorum." He died in 1638.

**Aytoun, William Edmondstone**, poet and prose writer, born at Edinburgh in 1813; studied at the University of Edinburgh became a writer to the signet in 1835, and passed as advocate in 1840. He issued a volume of poems in 1832, by 1836 was a contributor to "Blackwood's Magazine," and he published the "Life and Times of Richard I." in 1840. In 1848 he published a collection of ballads entitled "Lays of the Scottish Cavaliers," which has proved the most popular of all his works. It was followed in 1854 by "Firmilian, a Spasmodic

Tragedy" (intended to ridicule certain popular writers); the "Bon Gaultier Ballads" (parodies and other humorous pieces, in conjunction with Theodore Martin), 1855; in 1856 the poem "Bothwell," and in subsequent years by "Norman Sinclair," "The Glenmutchkin Railway," and other stories. In 1858 he edited a critical and annotated collection of the "Ballads of Scotland." A translation of the poems and ballads of Goethe was executed by him in conjunction with Theodore Martin. In 1845 he became Professor of Rhetoric and English Literature in the University of Edinburgh, a place he held till his death. In 1852 he was appointed sheriff of Orkney and Shetland. He died at Blackhills, Elgin, 1865.

**Ayuntamiento** (ä-ön-tam-yen'to), the name given in Spain to the councils or governing bodies of towns. Sprung from the institutions of the Romans, and firmly established during the long struggles with the Moors, the ayuntamientos acquired great influence and political power, the nobility being admitted to them without their class privileges. Although this importance was gradually impaired, and under the Bourbons the last shadow of municipal freedom was lost, the remembrance of it continued to be cherished by the people. Accordingly, the Cortes, in 1812, adopted the leading features of the former system. On the return of Ferdinand VII., the ayuntamientos were abolished; restored in 1823; after the invasion by France, once more set aside; and again restored in 1837. The ayuntamiento, with the alcalde as president, was appointed by the free choice of the people. The government could provisionally annul its acts, but must afterward procure the ratification of the Cortes. The ayuntamientos were empowered to make up the lists of electors and jurors, to organize the national guards, to command the police within their own bounds, to direct the apportionment and raising of taxes, and to manage the funds of the commune. Subsequently they have been more than once modified, not without opposition, especially after the events of 1843. The municipal law of 1870 deprived them of all political authority, and regulated them as administrative bodies, subject in certain respects to the authorities of the provinces, the law courts, and the Cortes.

**Ayuthia** (i-öth-yä'), the ancient capital of Siam, on the Menam, 50 miles N. of Bangkok. It was founded in 1357, and was the capital until 1767, when it was sacked and half destroyed by the Burmese. In the 16th century it was three leagues in circumference, and was till recently the second city of the kingdom. It is now called Krung-Krao, and is mainly built on piles over the water. Some magnificent buildings still remain, now crumbling into ruins and



overgrown with luxuriant vegetation; notable among them are Buddhist temples, especially the Golden Mount, 400 feet high.

**Azalea**, a genus of plants belonging to the order *ericaceæ* (heathworts). Several foreign azaleas are cultivated in gardens and greenhouses on account of the abundance of their fine flowers, and, in some cases, their fragrant smell. There are numerous varieties of the species, and hybrids may be formed between azalea and the nearly-allied genus *rhododendron*. Azaleas are best cultivated in a peaty soil. The most delicate species is *azalea indica*.

**Azamgarh**, or **Azimgurh** (Azim's fort), a town in the Northwest Provinces of India, on the Tons river, 81 miles N. of Benares. It was founded in 1665 by Azam Khan, a large landholder in the neighborhood. The Europeans here were compelled to flee during the mutiny of 1857; the native infantry murdered their officers, and carried off the treasure to Fyzabad.

**Azeglio** (ä-zāl'yō), **Massimo Taparelli, Marquis d'**, an Italian author, artist, diplomatist, and statesman, born at Turin, in 1801, was the descendant of an ancient and noble Piedmontese family. At the age of 14 he was excommunicated for an assault upon his teacher, who was an ecclesiastic. In 1816 he accompanied his father to Rome, and there occupied his time principally with painting and music. He was already favorably known as a painter, when, in 1830, he went to Milan, married the daughter of Manzoni, the great novelist, and wrote several romances. The earliest of these was "Ettore Fieramosca," published in 1833, which, conceived in the style of Manzoni, and full of patriotic sentiments, was received with great enthusiasm. His next romance, "Niccolò de' Lapi," published eight years afterward, became equally popular, and is esteemed by Italian critics the best historical novel in any language. Deeply imbued with the spirit of Italian nationality, in 1842 Azeglio abandoned his favorite pursuits, and, with his friends, Balbo and Gioberti, he made a tour through the provinces of Italy, awakening the revolutionary spirit which troubled the last years of Gregory XVI. After the Revolution of 1848 he supported the cause of the King of Piedmont, and, at the head of the Papal troops, fought against the Austrians at Vicenza, where he was wounded. In 1849, Victor Emmanuel appointed him President of the Cabinet of Ministers, an office he undertook solely out of love for his King and country, and which he resigned in 1852 to his political adversary, Count Cavour. In 1859, after the peace of Villafranca, he undertook a confidential mission as Ambassador Extraordinary to England; and was afterward appointed governor of the city of Milan. His failing health, his

love of art, and some differences of opinion with his colleagues, caused him, however, to withdraw finally from public life. He died Jan. 15, 1866.

**Azerbaijan** (az-er-bi-jan'), a Province of Northwestern Persia; area, 40,000 square miles; pop. est. at 2,000,000. It consists generally of lofty mountain ranges, some of which rise to a height of between 12,000 and 13,000 feet. Principal rivers, the Aras or Araxes, and the Kizil-Uzen, which enter the Caspian; smaller streams discharge themselves within the Province into the great salt lake of Urumiyah. Agricultural products are wheat, barley, maize, fruit, cotton, tobacco, and grapes. Horses, cattle, sheep, and camels are reared in considerable numbers. Chief minerals, iron, lead, copper, salt, saltpeter, and marble. Tabreez is the capital.

**Azimuth**, the angular distance of a celestial object from the N. or S. point of the horizon (according as it is the N. or S. pole which is elevated), when the object is referred to the horizon by a vertical circle. Or the angle comprised between two vertical planes, one passing through the elevated pole, the other through the object. It is generally reckoned eastward or westward, from the N. or S. point for 180° either way; but Herschel prefers always reckoning it from the points of the horizon most remote from the elevated pole westward, so as to agree in its general direction with the apparent diurnal motion of the stars. Of course, he therefore counts from 0° to 360°. Azimuths, called also vertical circles, are great circles intersecting each other in the zenith and nadir, and cutting the horizon at right angles in all the points thereof. On these are reckoned the altitude of the stars, and of the sun when he is not in the meridian. A magnetical azimuth is an arch of the horizon, contained between the sun's azimuth circle and the magnetical meridian; or it is the apparent distance of the sun from the N. or S. point of the compass.

**Azof.** See Azov.

**Azores**, or **Western Islands**, a Portuguese archipelago, in the mid-Atlantic, between 36° 55' and 39° 55' N. lat. and between 25° 10' and 31° 16' W. long. Stretching over a distance of 400 miles, their nine islands are divided into three distinct groups—Sta Maria and São Miguel in the S. E.; Terceira, São Jorge, Pico, Graciosa, and Fayal in the middle; and Flores and Corvo in the N. W. Of these, Flores lies 1,176 miles W. of Cape Rocca in Portugal, 1,484 S. W. of Falmouth, and 1,708 E. S. E. of Halifax. In 1431–1453 the Azores were taken possession of by the Portuguese. They were at that time uninhabited; but that they had been



visited by the Carthaginians is proved by Punic coins found on Corvo. They seem to have been known to the Arabian geographer Edrisi in the 12th century; and they are marked distinctly on a map of 1351. The Portuguese colonists called the whole group Azores, from *acor* or *azor*, a hawk; and they named two individual islands, Corvo and São Jorge, from Corvi Marini and San Zorze, which, according to a map of 1375, had been previously seen in the Western ocean. In 1466 Alfonso V. made a life grant of the island of Fayal to his aunt, the Duchess of Burgundy, and from this circumstance many settlers migrated thither from Flanders.

The total area of the group is 922 square miles, and the pop. (1900) 256,291. The area, population, and the maximum altitude of the different islands are as follows: Sta Maria (38 square miles; 5,880; 1,889 feet); São Miguel (299 square miles; 127,566; 3,854 feet); Terceira (164 square miles; 48,920; 3,435 feet); Graciosa (24 square miles; 8,394); São Jorge (91 square miles; 16,138); Pico (173 square miles; 24,125; 7,613 feet); Fayal (69 square miles; 22,385); Flores (54 square miles; 10,700; 3,087 feet); Corvo (7 square miles; 1,000). The capital is Angra, in Terceira; but Ponta Delgada, in São Miguel, is a larger town. The Azores are of volcanic origin, and with the exception of Corvo, Flores, and Graciosa are still liable to eruptions and violent earthquakes, the worst of 21 shocks since 1444 having been those of 1591, 1638, 1719, and 1841. Hot mineral springs are numerous; and the baths of Furnas, in São Miguel, are much resorted to by invalids. The coast is generally steep and rugged; the interior abounds in ravines and mountains. Perhaps the greatest want of the group is a good harbor. The Azores are regarded as a Province, not a colony, of Portugal, and as belonging to Europe.

**Azote**, a name formerly given to nitrogen; hence substances containing nitrogen and forming part of the structure of plants and animals are known as azotized bodies. Such are albumen, fibrine, casein, gelatine, urea, kreatine, etc.

**Azotine**, a substance procured by decomposing wool by the action of steam at 150° C. under a pressure of five atmospheres; the product, afterward dried by evaporation, contains nitrogen completely soluble in water. Azotine is mixed with dried blood for a fertilizer.

**Azov**, a town in the S. of Russia, on the left bank of the Don, 7 miles from its mouth. The sand and mud deposited by the river have choked up the port, so that its trade and shipping have dwindled away, and the inhabitants depend mostly on fish-curing. Pop. 11,000. Azov was built 9 miles from the site of the ancient Greek

colony of Tanaïs; and when, in the 13th century, it was taken possession of by the Genoese, they altered its name to Tana. They were driven out of it by Timur (Tamerlane) in 1392. In 1471 it was taken by the Turks, and in 1696 by Peter the Great; and it was finally ceded to Russia in 1774.

**Azov, Sea, of**, named after the town, is a large gulf of the Black Sea, formed by the Crimean peninsula, or rather an inland lake connected with the Black Sea by the Strait of Yenikale or Kertch (ancient Bosphorus Cimmerius), 28 miles long, and barely 4 wide at the narrowest. The intricate Siwash or Putrid Sea, which is just a succession of swamps, is cut off from the W. portion of the Sea of Azov by the long, narrow slip of low, sandy land called the Peninsula of Arabat. The ancient name of the Sea of Azov was Palus Mæotis or Mæotic marsh, from the Mæotæ dwelling on its shores; by the Turks it is called Balik-Denghis, or fish sea, from its abundance of fish. The water is almost fresh. The whole sea is shallow, from 3 to 52 feet deep; and measuring 235 by 110 miles, it occupies an area of 14,500 square miles. The largest river emptying into it is the Dor. During the Crimean War, an expedition, having on board 16,500 English, French, and Turks, was sent to this sea in May, 1855, which bombarded the ports, and cut off supplies intended for Sebastopol.

**Azpeitia** (ath-pit'ya), a town in the Spanish Province of Guipuzcoa, in a fine valley on the Urola, 18 miles S. W. of San Sebastian. A mile from it is the famous convent of Loyola, now converted into a museum, built somewhat in the form of an eagle with outspreading wings, by the Roman architect, Fontana, in 1683. It comprises a tower of the Santa Casa, in which St. Ignatius of Loyola, the great founder of the Jesuits, was born in 1491. Here every year in July a great festival is held in his honor, to which pilgrims flock from all quarters.

**Azrael**, the name given to the angel of death by the Mohammedans.

**Azrek, Bahr-Ei**, or the **Blue River**, the principal stream of Abyssinia, which, after a winding course through Abyssinia and Senaar, falls into the Nile above Gerri.

**Aztecs**, a race of people who settled in Mexico early in the 14th century, ultimately extended their dominion over a large territory, and were still extending their supremacy at the time of the arrival of the Spaniards, by whom they were speedily subjugated. Their political organization, termed by the Spanish writers an absolute monarchy, appears to have consisted of a military chief exercising important, but



not unlimited, power in civil affairs, in which the council of chiefs and periodic assemblies of the judges had also a voice. On the arrival of Cortes in 1519 the Aztec throne was occupied by Montezuma, an energetic prince, who, after his election to the throne, which for several generations had been occupied by his ancestors, made successful war on the powerful and highly civilized neighboring State of Tlascala, and on Nicaragua and Honduras. After a time, however, he grew indolent, and alienated the affections of his subjects by his arrogance and exactions, and by his unremitting devotion to the services of the temples. According to the oracles which he frequently consulted, great changes were impending over the empire, and the return of Quetzalcoatl was near at hand; and the fall of his race was impending. The tidings of the arrival on the coast of the expedition of Grigalya in 1518 terrified Montezuma and his priestly councilors; and when the hieroglyphic reports of his provincial officers announced the landing in the following year of Cortes and his companions, he endeavored to propitiate the dreaded strangers by sending an embassy charged with valuable gifts to meet him. The road to success was thus open to the Spanish captain, who, with a handful of men, advanced from St. Juan de Ulloa to Mexico, and subdued the Aztecs, whose power crumbled before the energy and civilization of their Christian invaders.

Slavery and polygamy were both legitimate, but the children of slaves were regarded as free. Although ignorant of the horse, ox, etc., they had a considerable knowledge of agriculture, maize and the agave being the chief produce. Silver, lead, tin, and copper were obtained from mines, and gold from the surface and river beds, but iron was unknown to them, their tools being of bronze and obsidian. In metal-work, feather-work, weaving and pottery they possessed a high degree of skill. To record events they used an unsolved hieroglyphic writing, and their lunar calendars were of unusual accuracy. They believed in one supreme invisible creator of all things, the ruler of the universe, named Taotl, a belief, it is conjectured, not native to them, but derived from their predecessors, the Toltecs. Under this supreme being stood 13 chiefs and 200 inferior divinities. At their head was the patron god of the Aztecs, the frightful Huitzilopochtli, the Mexican Mars. Quetzalcoatl, the beneficent god of light and air, with whom at first the Aztecs were disposed to identify Cortes, also claimed their reverence. Their temples, with large, terraced, pyramidal bases, were in charge of an exceedingly large priesthood, with whom lay the education of the young. As a civilization of apparently independent origin, yet

closely resembling in many features the archaic Oriental civilizations, the Aztec civilization is of the first interest, but in most accounts of it a large speculative element has to be discounted.

**Azuline**, or **Azurine**, blue dyes belonging to the coal-tar class.

**Azulai**, **Hayim David** (hä'gēm dä'vēd ä-zö-lī'), a Jewish bibliographer, born in Jerusalem; lived in the 18th century. Most of his life was spent at Leghorn. Of his numerous works the best known is "Shem-ha-Gedōlm" (the names of the great), a bibliography containing the names of over 1,300 Jewish authors, and more than 2,200 of their works. He died at Leghorn, Italy.

**Azuni**, **Domenico Alberto** (az-ö'nē), an Italian jurist, born in Sassari, Sardinia, in 1749. He became judge of the Tribunal of Commerce at Nice, and in 1795 published a work in which he endeavored to reduce maritime laws to fixed principles, and which appeared in French in 1805, under the title of "Droit Maritime de l'Europe." Napoleon appointed him one of the commissioners for compiling the new commercial code. He died Jan. 23, 1827.

**Azure**, the heraldic term for the color blue, represented in engraving by horizontal lines.

**Azurine** (*Luciscus caeruleus*), a fresh water fish of the same genus as the roach, chub and minnow; called also blue roach.

**Azurite**, a mineral, called also lazulite; also a brittle, transparent, or subtranslucent mineral, with monoclinic crystals. The hardness is 3.5-4.25; the sp. gr., 3.5-3.831; the luster vitreous, or verging on adamantine; the color azure-blue, passing into Berlin blue. Composition: Carbonic acid, 24 to 25.46; oxide of copper, 68.5 to 70; and water, 5.46 to 6. It is found in England, as also in France, Austro-Hungary, and Siberia.

**Azzarkal** (az-ar-kal'), an Arabian mathematician and astronomer, born in Cordoba in the first half of the 11th century. He was royal astronomer of Al-Mamoun, King of Toledo. He invented divers instruments for making observations, constructed a water-clock of extraordinary dimensions, as well as a planisphere and an astrolabe, upon new principles.

**Azzubeydi** (az-ö-bī'dē), **Mohammed Ibn el Hasan**, an Arabian lexicographer, born in Seville in 927. He was cadi of Seville and preceptor of Hiscam, son and heir of the Sultan. He wrote an abridgement of the great biography of the Spanish grammarians, by Khalil; a treatise on grammar, and a work upon the character of the syntax of the Arabic language. He died in 989.





**b**, the second letter in all European alphabets, in Hebrew, and most other languages. It belongs to the mutes and labials, and as all labials are easy to be pronounced, **b** is one of the first letters which children learn to speak, after they utter **a**. The first syllable which they pronounce is generally **ba** or **pa**. The difference in the pronunciation of **b** and **v** is so slight, that in all original languages a considerable period elapses before the two sounds cease to be used indifferently. In some languages **b** continues to be pronounced **v**, under certain circumstances. In the Spanish it has this sound between two vowels in the middle of a word, and generally when it occurs between a vowel preceding and an **r** succeeding it. The modern Greeks pronounce **b** always **v**, and represent our sound of **b** by combining the two letters  $\mu\pi$ ; for example, Boston they write  $M\ \pi\sigma\tau\omicron\nu$ . The languages of the American Indians have few perfect labials, and are therefore spoken with an open mouth, and scarcely any motion of the lips. Another letter into which **b** is often changed is **p**, which requires merely a stronger breathing. In one part of Saxony **p** and **b** are used indifferently, in another part **b** is not used at all. Some languages regularly change **b** into **p** under certain circumstances; as the Latin, when this letter occurs before **p**; thus **ob** is changed into **op** before *ponere* (*opponere*). The German pronounces **b**, at the end of a word or syllable, invariably **p**.

**B** is often used as an abbreviation, and its common meanings are before (as in **B. C.**), and bachelor (as in **B. A.**, **B. D.**, **LL. B.**). With the Greeks and Hebrews **B** signified 2; among the Romans, 300; with a dash over it, 3,000; and with a sort of accent under it, 200.

In music **B** is the designation of the seventh note in the natural diatonic scale of **C**. The ancients denoted by **B** the second interval in their musical scale, beginning with **A** — the only interval with them which had two chords differing half a note. The lower one was denoted by a small **b**, the higher one by a large **B**. See also ABBREVIATIONS.

**Baader, Franz Xaver von** (bä'der), a German philosopher and speculative Roman Catholic theologian, born in Munich, in 1765. He studied engineering, became superintendent of mines, and was ennobled for his services. He was deeply interested in the religious speculations of Eckhart, St. Martin, and Böhme, and in 1826 was appointed Professor of Philosophy and Speculative Theology in the University of Munich. During the last three years of his life he was interdicted from lecturing for opposing the interference in civil matters of the Roman Catholic Church. He died in 1841.

**Baal**, the chief male divinity among the Phœnicians, as Ashtoreth was the leading female one. The Carthaginians, who sprang from the Phœnicians, carried with them his worship to their new settlements, as is proved, among other evidence, by the names of some of their world-renowned heroes: thus Hannibal, written in Punic inscriptions, Hannibaal, signifies the grace of Baal; and Hasdrubal, or Asdrubal, Azrubaal = "Help of Baal." The worship of Baal early existed among the Canaanites and the Moabites, whence it spread to the Israelites, becoming at last for a time completely dominant among the 10 tribes, and to a certain extent even among the two, in consequence of the ill-advised marriage of Ahab with Jezebel, daughter of Ethbaal (the name means "with Baal"), King of Sidon. A number of places in Palestine and the neighboring countries commence with Baal, such as Baal-gad (Josh. xi: 17), Baal-meon (Numb. xxxii: 38), but whether in the sense of lord, possessor, or signifying Baal, is a matter of dispute. One place is simply called Baal (1 Chron. iv: 33). This divinity seems to have symbolized the sun, and less frequently the planet Jupiter. He was worshipped under different forms, or in different relations: thus there were Baal-berith = the Covenant Baal, or lord; Baal-zebub = the fly-lord; Baal Peor = the Baal of Mt. Peor, or Baal of the opening, the Moabitish national divinity. Perhaps the Babylonian Bel was only Baal with a dialectic difference of spelling, though Prof. Rawlinson thinks differently (Isa. xlvi: 1). There was an affinity between Baal and Mo-



loch. The Beltein or Beltane fires, lit in early summer in Scotland and Ireland, seem to be a survival of Baal's worship.

**Baalbek** (ancient HELIOPOLIS, city of the sun), a place in Syria, in a fertile valley at the foot of Antilibanus, 40 miles from Damaseus, famous for its magnificent ruins. Of these, the chief is the temple of the Sun, built either by Antoninus Pius or by Septimus Severus. Some of the blocks used in its construction are 60 feet long by 12 thick; and its 54 columns, of which 6 are still standing, were 72 feet high and 22 in circumference. Near it is a temple of Jupiter, of smaller size, though still larger than the Parthenon at Athens, and there are other structures of an elaborately ornate type. Originally a center of the sun-worship, it became a Roman colony under Julius Cæsar, was garrisoned by Augustus, and acquired increasing renown under Trajan as the seat of an oracle. Under Constantine its temples became churches, but after being sacked by the Arabs in 748, and more completely pillaged by Tamerlane in 1401, it sank into hopeless decay. The work of destruction was completed by an earthquake in 1759.

**Baal-zebub.** See BEELZEBUB.

**Baar** (bär), a plateau in Germany, in the province of Baden and Württemberg, formerly constituting a county of the Furstenberg principality. It contains the sources of the Danube.

**Baasha**, in Bible history, a King of Israel, son of Abijah. While Nadab, King of Israel, was engrossed in the siege of Gibbethon, Baasha instituted a plot against his life, and after slaying him, massacred all his relations. He then seized the kingdom, proving a wicked and irreligious ruler, and inimical to Judah. His war with Asa was made unsuccessful by the defection of Benhadad, King of Syria, who had hitherto allied himself with Israel. Through the prophet Jehu, Baasha was warned that his idolatry would lead to the extirpation of his direct descendants, which happened in the succeeding generation.

**Bab**, a name assumed by Mirza Ali Mohammed ibn Redha, founder of the Babists. See BABI.

**Baba** (the old), in Slavonic mythology, originally a thunder-witch (the devil's grandmother), was represented, like Dame Holle, as a little, ugly old woman, with a monstrous nose, long teeth, and disheveled hair, flying through the sky in an iron mortar. By the Czechs she is called now the iron, now the golden, Baba.

**Baba**, a Turkish word, signifying father, originating, like our word papa, in the first efforts of children to speak. In Persia and Turkey it is prefixed as a title of honor to

the names of ecclesiastics of distinction, especially of such as devote themselves to an ascetic life; it is often affixed in courtesy, also, to the names of other persons, as Ali Baba.

**Baba**, a cape near the N. W. point of Asia Minor.

**Bába Búdan** (bä-bä bö-dan'), a spur of the West Gháts, Mysore, India, which strikes E. for 15 miles, leaving a narrow opening at its W. end for the passage of the Bhadra, then S. in an unbroken line for 20 miles, inclosing between itself and the main chain of the Gháts a rich, but unhealthy valley. To this spur belong three peaks above 6,000 feet high, among these Mulaina-giri, 6,317 feet, the highest in the West Gháts. On the slopes of Kalhatti, one of these peaks, is a hill station, a resort of Europeans during the heat. Coffee was first planted in India on another part of this spur toward the close of the 17th century, by a Mohammedan saint named Bába Búdan.

**Babbage, Charles**, an English mathematician and inventor of a calculating machine; born near Teignmouth, England, Dec. 26, 1792. He was educated first at the Totness grammar school, then at the private school of the Rev. Stephen Freeman, of Forty Hill, Enfield. Thence he was transferred to Peterhouse, Cambridge, where he became closely associated with Herschel (afterward Sir John) and Mr. Peacock, then tutor of Trinity College. Being in possession of an independent fortune, Babbage was in a position to devote all his time and energies to his favorite studies—mathematics and mechanics. In 1822 we find him broaching the idea of a difference engine, by which intricate arithmetical calculations could be correctly and rapidly performed. Through the recommendation of the Royal Society he received, in 1823, a grant from the government of £1,500 for the construction of such a machine. After a series of experiments lasting eight years, and an expenditure of £17,000 (£4,000 of which was sunk by the originator of the scheme, the balance voted by the government), Babbage abandoned the undertaking in favor of a much more complicated work, an analytical engine, worked with cards, like the jacquard loom. The government, alarmed at the probable demands, refused to support Babbage in his new adventure, and as a quarrel ensued with his engineer, who withdrew his tools, the pet project was never completed. The machine, along with some 400 or 500 plans, was presented in 1843 to the King's College Museum, London. Among the many treatises he published on subjects connected with mathematics and mechanics, the most valuable and interesting are: "On the Economy of Machinery and Manufactures;" "The Decline of Sci-



## Babbitt

ence"; and an autobiographic sketch, "Passages in the Life of a Philosopher." In 1828 he was appointed Lucasian Professor of Mathematics in his university, an office he held for 11 years. In 1832 and 1834 he stood for Finsbury in the Radical interest, but was unsuccessful. He was one of the founders of the Royal Astronomical Society, and a fellow of the Royal Society. He died in London, Oct. 18, 1871.

**Babbitt, Isaac**, an American inventor, born in Taunton, Mass., July 26, 1799; learned the goldsmith's trade; early became interested in the production of alloys; and in 1824 manufactured the first britannia ware in the United States. In 1839, he discovered the well known anti-friction metal which bears his name, Babbitt metal. For this discovery, the Massachusetts Charitable Mechanics' Association awarded him a gold medal in 1841, and subsequently Congress voted him \$20,000. He died in Somerville, Mass., May 26, 1862.

**Babbitt Metal**, a soft metal resulting from alloying together certain proportions of copper, tin, and zinc, or antimony, used with the view of as far as possible obviating friction in the bearings of journals, cranks, axles, etc. Invented by Isaac Babbitt.

**Babcock, Charles**, an American clergyman; born in Ballston Spa, N. Y.; was graduated at Union College, New York, in 1847; ordained deacon in the Protestant Episcopal Church in 1860, and priest in 1864; held charges in New York in 1863-1892; and was Professor of Architecture at Cornell University in 1871-1901. He was an honorary member of the American Institute of Architects and the Royal Institute of British Architects.

**Babcock, Earle Jay**, an American educator; born in St. Charles, Minn., June 11, 1865; was graduated at the University of Minnesota in 1889; worked extensively with the United States Geological Survey; and in 1902 was director of the State School of Mines of North Dakota, and Professor of Chemistry and Geology in the State University. He was the author of many special scientific articles and of geological reports.

**Babcock, Orville E.**, an American military officer, born in Franklin, Vt., Dec. 25, 1835; served with distinction in the Civil War, and was a member of Gen. Grant's staff. When the latter was elected President, Babcock became his secretary, and the superintending engineer of several important public works. He was indicted in 1876 for taking part in revenue frauds, but on his trial was acquitted. He died in Florida, June 2, 1884.

**Babcock, Stephen Moulton**, an American educator; born in Bridgewater, N. Y.,

## Babel

Oct. 22, 1843; was educated at the Babcock High School, Clinton Liberal Institute, Tufts College, Cornell University, and at Göttingen, Germany; and was graduated at Tufts College in 1866. He gave special attention to the chemistry of milk and its products, and was the inventor of the Babcock milk-tester. He was instructor of chemistry at Cornell University in 1875-1876; chemist to the New York State Experiment Station in 1882-1887; Professor of Agricultural Chemistry at the University of Wisconsin from 1887; author of numerous articles on the composition of milk and butter; joint author of "A Manual of Qualitative Chemical Analysis."

**Babcock, Washington Irving**, an American shipbuilder; born in Stonington, Conn., Sept. 21, 1858; was graduated at the Brooklyn Polytechnic Institute in 1876 and at Rensselaer Polytechnic Institute in 1878; was employed at the Roach Shipyard, Chester, Pa., in 1878-1885, and with the Providence and Stonington Steamship Co., New York, in 1885-1887; was superintendent of the Union Dry Dock Co., Buffalo, N. Y., in 1887-1889; manager of the Chicago Shipbuilding Co., in 1889-1899, and became president of the latter in 1900.

**Babel**, a place or circumstances in which confusion of sounds — as, for instance, by several people speaking at once — is the predominating characteristic. The reference is to the confusion of tongues divinely sent in consequence of the building of the Tower of Babel (Gen. xi: 1-9). The magnificent temple of Belus, asserted to have been originally this tower, is said to have had lofty spires, and many statues of gold, one of them 40 feet high. In the upper part of this temple was the tomb of the founder, Belus (the Nimrod of the sacred Scriptures), who was deified after death. The Tower of Babel is most frequently identified by scholars with the Birs Nimrud, a ruin outside the limits of Babylon. On this site researches have been made by Rich, Layard, Rassam, Rawlinson and others. Among the clay cylinder records found by Rawlinson in the corners of the ziggurat or high place of Birs Nimrud, there is an account of the restoration by Nebuchadnezzar of an enormous ruined tower which he rebuilt into a seven staged ziggurat. The remains of Nebuchadnezzar's tower constitute the present Birs Nimrud, and exploration has brought to light the seven stages mentioned by the monarch. The mound of Birs Nimrud is so oriented that its corners are directed approximately toward the cardinal points of the compass. The remains of the tower are situated toward the S. E. edge of the mound. The masses of brick show a fusion that is apparently the result of a great conflagration.



**Bab-el-Mandeb** (*i. e.*, the gate of tears), so called from the danger arising to small vessels from strong currents, is the name of the strait between Arabia and the continent of Africa, by which the Red Sea is connected with the Gulf of Aden and the Indian Ocean. The Arabian peninsula here throws out a cape, bearing the same name as the strait, rising to the height of 865 feet. About 20 miles distant from this cape stands the wall-like coast of Africa, rising in Râs es Sean to the height of over 400 feet. Within the straits, but nearer to Arabia, lies the bare, rocky Island of Perim, since 1857 occupied by the British as a fort; its guns command the entrance to the Red Sea. The strait on the E. side of this island is called the Little Strait, and that on the W. the Great Strait.

**Babenberg**, an old, princely Franconian family, whose castle occupied the site of the later Bamberg Cathedral. They were most prominent in the wars of the 10th century. The Austrian dynasty of 976-1246 was formerly believed to be sprung from them.

**Baber** (or "The Tiger"), the historical surname of Zehir-ed-din-Mohammed, the conqueror of Hindustan and founder of the so called Mogul dynasty. Baber was of mixed Turkish and Mongol origin, being descended from Timour the Great on the father's side, and from Genghis Khan on the mother's. In feeling, as in personal characteristics, he was a Tartar (Turk), and often in his memoirs speaks most contemptuously of Mongols or Moguls. Yet Hindu ignorance has designated the throne which he established in India, as that of the Great Mogul (Mongol). Baber was born on Feb. 14, 1483, and at the age of 12, on his father's death, ascended the insecure throne of Ferghana in Turkestan; soon after he was attacked on all sides by his uncles and other neighboring princes, which obliged him, in his turn, to assume the aggressive. Accordingly, at the age of 15, Baber seized on Samarcand, the capital of Timour, but, while thus engaged, a revolution at home deprived him of his sovereignty. After many years of an adventurous and romantic career, he raised an army, entered Hindustan, and was met by Ibrahim, the ruling Sultan of that country. The two armies fought the battle of Paniput, which decided the fate of India, on April 21, 1525. Baber, with his army of 12,000 men, completely overthrew that of Ibrahim, numbering 100,000, and entered Delhi in triumph. Difficulties and fresh foes had still to be encountered and mastered, but in the battle of Sakri, in February, 1527, Baber utterly defeated the opposing Hindu princes, and then proclaimed himself Padishah, or Emperor of Hindustan. After a rule of four years, he died near Agra, Dec. 26, 1530.

**Babeuf**, or **Babœuf**, **François Noel** (bä-bef), a French communist, who called himself Caius Gracchus, born at Saint-Quentin, 1760; founded in Paris a journal called the "Tribune of the People" (1794), in which he advocated his system of communism, known as Babœuvism, and contemplating absolute equality and community of property. His followers were called Babœuists. Betrayed in a conspiracy against the Directory, aiming to put his theories into practice, he was guillotined in Paris, May 27, 1797. His principal works were "Perpetual Register of the Survey of Lands" (1780), and "Of the System of Population" (1794).

**Bâbi** (bä-bē'), the name of a modern Persian sect, derived from the title, Bâb-ed-Din (gate of the faith), assumed by its founder, Mirza Ali Mohammed, a native of Shiraz, who, in 1843, after a pilgrimage to Mecca, undertook to form a new religion from a mixture of Mohammedan, Christian, Jewish, and Parsee elements. His controversies with the *mollahs* shortly led to his confinement to his own house, where he formulated his doctrines, privately instructed his disciples, and increased his pretensions. He now laid aside the title of Bâb, assuming that of Nokteh (point), and claimed to be the focus to which all preceding dispensations converged. He sent out missionaries in various directions, the most famous of whom was a woman, Gurred-ul-Ain (consolation of the eyes), remarkable for beauty and intelligence, who preached against polygamy. The sect soon became numerous, and were not molested by the reigning Shah; but on the accession of Nasir-ed-Din in 1848, apprehending persecution, they took up arms, proclaiming the advent of the Bâb as universal sovereign. Several Persian armies were routed, but finally the insurgents were reduced by famine, and most of them executed (1849-1850). The Bâb had held aloof from the revolt, but he was arrested and put to death, after a long imprisonment, in 1850. His successor was recognized in the youthful son of the Governor of Teheran, who retired to Bagdad, where he afterward lived quietly. An attempt of three believers to assassinate the Shah, in 1852, led to a terrible persecution of the sect; numbers were tortured and burned, among them Gurred-ul-Ain. Bâbism has nevertheless gained in strength, and is at present widely diffused in Persia; its members live in apparent conformity to orthodox Mohammedanism, but privately holding the Bâb's doctrines, which are contained in an Arabic treatise, "Biyan" (the exposition), written by the founder himself. They form essentially a system of Pantheism, with Gnostic and Buddhist additions. All beings are emanations from the Deity, by whom they will ultimately be reabsorbed.



Bâbism enjoins few prayers, and those only on fixed occasions; encourages hospitality and charity; prohibits polygamy, concubinage, and divorce; discourages asceticism and mendicancy; and directs women to discard the veil, and share as equals in the intercourse of social life.

**Babington, Anthony**, a Roman Catholic gentleman of Derbyshire, who associated with others of his own persuasion to assassinate Queen Elizabeth, and deliver Mary, Queen of Scots. The plot being discovered, the conspirators were executed in 1586.

**Babington, Churchill**, an English philologist, born in Leicestershire in 1821; educated at St. John's College, Cambridge; Disney Professor of Archæology there in 1865-1880; was a voluminous writer on ornithology, botany, archæology, numismatics, etc.; and a contributor to Smith's "Dictionary of Christian Antiquities." He died Jan. 13, 1889.

**Babingtonite** [named after Dr. Babington, of England, who, besides being a distinguished physician, published several important works on mineralogy in 1795-1799. A small gathering of mineralogists at his house ultimately developed in 1807 into the great Geological Society of London], a mineral placed by Dana under his amphibole group, the pyroxine sub-group, and the section of it with triclinic crystallization. The hardness is 5.5 to 6; the sp. gr. 3.35-3.37; the luster is vitreous, splendent; the color, dark, greenish-black. Composition: Silica, 47.46 to 54.4; protoxide of iron, 10.26 to 21.3; lime, 14.74 to 19.6; sesquioxide of iron, 0 to 11; protoxide of manganese, 1.8 to 17.91; magnesia, 0.77 to 2.2; alumina, 0 to 6.48. It occurs in the Shetland Islands, at Arendal in Norway, and in North America.

**Babiroussa** (a Malay word signifying stag hog), a species of wild hog, sometimes called the horned or stag hog, from the great length and curvature of its upper tusks or canines, which curl upward and backward somewhat like the horns of *Ruminantia*, the lower canines being also very prominent. It is nearly of the size of a common hog, but rather longer, and with more slender limbs. The head, which is small, is brown above, and the body, which has a rough, thick skin, occasionally forming folds, particularly between the ears and cheeks, is of a dirty brown, covered sparingly, not with bristles, but a very short hair, growing out of the small tubercles, to which the roughness of the skin seems to be chiefly owing; the upper part of the neck and belly, as well as the inside of the limbs, has a decidedly reddish tint, while a light dorsal band, about an inch broad near the neck where it begins, extends down the back and terminates near the tail. This band is

better furnished with hair than the rest of the body, and is more distinctly marked in the male than in the female. The ivory of the tusks is less hard and durable than that of the elephant, but of very fine quality; and the flesh is very savory, having a greater resemblance to that of the stag than the hog, but surpassing both in the delicacy of its flavor. The babiroussa is very numerous in Celebes, the Moluccas, and Java. It is hunted with dogs, and when taken makes little resistance; sometimes when pressed it endeavors to reach the sea, and eludes its pursuer by its dexterity in diving and swimming. The Dutch traveler, Valentyn, who had ample opportunity of studying the habits of the animal in its wild state, says that it has a nice sense of smell, and when endeavoring to scent its enemy, it often stands on its hind legs and leans against the trunk of a tree.

**Babism.** See BABI.

**Babo** (bä'bō), **Josef Marius von**, a German poet, born in Ehrenbreitstein, Jan. 14, 1756; was made Professor of Fine Arts at Munich in 1778, and of Æsthetics at Mannheim; later became director in the Munich Military Academy, and superintendent of the theatre. He was the author of "Otto of Wittelsbach," a tragedy (1781); "Oda" (1782); "Dagobert, the Frankish King" (1787); "The Pulse," a comedy (1804), etc. He died in Munich, Feb. 5, 1822.

**Baboo**, or **Babu**, a Hindu title of respect equivalent to sir or master, usually given to wealthy and educated native gentlemen, especially when of the mercantile class.

**Baboon**, a common name applied to a genus of monkeys, natives of Africa. This genus is the *Cynocephalus* or dog-headed monkey of modern naturalists, and is divided into two sub-genera, well characterized by the difference of their tails; the first is the baboon proper, having the tail longer than or nearly as long as, the body, and continuous with the dorsal spine; the second named mandrill, is characterized by a short, slender, and pig-like tail, placed perpendicular to the dorsal spine. These are sometimes considered as independent genera, the baboons proper being put in the genus *Cynocephalus*, the mandrill in the genus *Papio*. They are admirably adapted for their mode of existence, and a study of their natural habits would probably modify the disgust with which they are regarded in captivity. The most striking peculiarity of the baboons is the elongated, dog-like head, with its flat, compressed cheeks, projecting and strong teeth, and forehead depressed below the level of the superior margins of the orbits. Notwithstanding this close approximation to the shape of the dog's head, the form and



position of the eyes, combined with the similarity of the arms and hands, give to these creatures a resemblance to humanity as striking as it is disgusting. The whole aspect of the animal impresses the beholder with an idea of great physical strength, united with a temper at once inextinguishably vicious and brutally ferocious. Such is the true character of the baboons, capable of being ruled only by the severest treatment. Left to their own will, their savage nature immediately resumes its sway, and their actions are exceedingly cruel, destructive, and disgusting. In the vicinity of the Cape of Good Hope, where a species of baboon called the chacma or ursine baboon (*Cynocephalus porcellus*) is found in considerable numbers, the inhabitants wage war against them, on account of the ravages they commit in the fields and gardens. They make a very obstinate resistance to dogs, and only retreat before men when armed with guns. They feed exclusively on fruits, seeds, and other vegetable matter, and display a great deal of cunning and audacity when engaged in their marauding expeditions. This animal has the remarkable instinctive power of being able to detect the presence of water, and in South Africa is often employed for this purpose when the ordinary water supply fails. The baboon can never be called tamed, however long his confinement may have endured.

**Babrius** (bā'brē-us), a Greek writer of fables in verse; variously referred to the time immediately preceding the Augustan age, and to the 3d century of our era; his name also shows variants, as Babrias, Gabrius. Till 1842 only a few fragments of Babrius were known to be extant; but in that year, in the Laura of Mt. Athos, was discovered a manuscript containing 123 of his fables. In 1846 Sir George Cornewall Lewis published them together with the pre-existing fragments, and in 1859 or 1860 appeared a good English version by James Davies. The fables have also been edited by W. G. Rutherford and by F. G. Schneidewin.

**Babuyanes** (ba-bö'ya-nes), or **Madjicosima Islands**, a number of islands lying about 30 miles N. of Luzon, and generally considered the most northern of the Philippines. They are subject to the Loo-Choo Islands; aggregate pop. about 12,000.

**Babylon**, the capital of Babylonia, on both sides of the Euphrates, one of the largest and most splendid cities of the ancient world, now a scene of ruins, and earth-mounds containing them. Babylon was a royal city 1600 years before the Christian era; but the old city was almost entirely destroyed in 683 B. C. A new city was built by Nebuchadnezzar nearly a century later. This was in the form of a square, each side

15 miles long, with walls of such immense height and thickness as to constitute one of the wonders of the world. It contained splendid edifices, large gardens and pleasure-grounds, especially the hanging-gardens, a sort of lofty terraced structure supporting earth enough for trees to grow, and the celebrated tower of Babel, or temple of Belus, rising by stages to the height of 625 feet. (See BABEL.) After the city was taken by Cyrus in 538 B. C., and Babylonia made a Persian province, it began to decline, and had suffered severely by the time of Alexander the Great. He intended to restore it, but was prevented by his death, which took place here in 323 B. C., from which time its decay was rapid.

*Recent Discoveries.*—Interesting discoveries have been made on its site in recent times, more especially of numerous and valuable inscriptions in the cuneiform or arrow-head character. The modern town of Hillah is believed to represent the ancient city, and the plain here for miles around is studded with vast mounds of earth and brick and imposing ruins. The greatest mound is Birs Nimrud, about 6 miles from Hillah. It rises nearly 200 feet, is crowned by a ruined tower, and is commonly believed to be the remains of the ancient temple of Belus. Another great ruin mound, called Mujellibeh, has also been assigned as its site. In January, 1898, the German Oriental Society was organized at Berlin, for the purpose of exploring the mounds of ruins which lie along the banks of the Tigris and Euphrates. The first expedition of this society was sent to explore the ruins of storied Babylon, the city of Nebuchadnezzar. At Easter, 1899, the work was begun on the mound that covers ancient Babylon. It was the beginning of bringing to life the so-called "City of Life," which had been dead to the world for 3,000 years or more. One or two towers still protrude above the broad ruins of the gigantic city, the great mountain height of which has gained it the name "Kasr," citadel, from the Arabs. Here must be the palaces of Nebuchadnezzar, the conqueror of Jerusalem (588 B. C.), and inhabited first by him, then used by the Persian conquerors as their winter residence, and afterward fell into the hands of Alexander the Great. Nineveh and the palace of Sardanapalus have been the pride of England's discoverers; Babylon and the palaces of Nebuchadnezzar are to reflect age-long glory on the German genius for exploration. It is no small task, but fortunately it is in the best of hands, those of Dr. Robert Koldewey, the leader of the expedition, who may be relied upon to work wonders if given due support. Herodotus, who visited Babylon in the time of Artaxerxes I., said that the city was surrounded by a wall 50 royal ells (84 feet)



wide and 200 ells (336 feet) high, and that on top of this wall, on each edge, were one-story houses, leaving a space between the rows of houses on which four chariots abreast could drive.

*The Great Wall.*—As soon as Dr. Koldevey made his first attack on the mound, digging into it from the E. side of "Kasr" he struck this wall, undoubtedly the one mentioned by Herodotus. This was of course to be expected, if this was the ruin of Babylon, but, on digging farther into the mound, the thickness of the wall was ascertained to surpass all expectations. The outer, or E. shell, or retaining wall, was built of baked bricks and asphalt, and was  $23\frac{1}{2}$  feet thick. Beyond this was found a filling in of sand and gravel 69 feet thick, and then another retaining wall 44 feet thick, making the entire wall  $136\frac{1}{2}$  feet thick. This wall, to which there is no parallel on earth, took some hot, hard work to dig over and expose, and it was then found that the top of it was about  $22\frac{1}{2}$  feet below the surface of the mound. Then came the final and absolute proof that Diodorus, too, was correct when he stated that the bricks in the walls and citadels of Nebuchadnezzar were adorned with magnificent reliefs in colors. There can be little doubt that the walls uncovered point the way to the palaces of Nebuchadnezzar—the most promising field for wonderful discoveries to come. In April, 1900, Dr. Koldevey informed the Oriental Society of the discovery of a canal, built of Aramean brick, which is believed to be the long sought East Canal. A temple called Ernach, of the goddess Ninniach, was laid bare, and stones found inscribed from the time of Nebuchadnezzar.

**Babylonia** (now Irak Arabi), an old Asiatic empire, occupying the region watered by the lower course of the Euphrates and the Tigris, and by their combined stream. The inhabitants, though usually designated Babylonians, were sometimes called Chaldeans, and it is thought that the latter name represents a superior caste who at a comparatively late period gained influence in the country. At the earliest period of which we have record, the whole valley of the Tigris and Euphrates was inhabited by tribes of Turanian or Tartar origin. Along with these, however, there early existed an intrusive Semitic element, which gradually increased in number till at the time the Babylonians and Assyrians (the latter being a kindred people) became known to the western historians they were essentially Semitic peoples. The great city of Babylon, or Babel, was the capital of Babylonia, which was called by the Hebrews Shinar. The country was, as it still is, exceedingly fertile, and must have anciently supported a dense population. The chief cities, be-

sides Babylon, were Ur, Calneh, Erech, and Sippara. Babylonia and Assyria were often spoken of together as Assyria.

*Cuneiform Inscriptions.*—The discovery and interpretation of the cuneiform inscriptions have enabled the history of Babylonia to be carried back to about 4000 B. C., at which period the inhabitants had attained a considerable degree of civilization, and the country was ruled by a number of kings or princes, each in his own city. About 2700 B. C., Babylonia came under the rule of a single monarch. Latterly it had serious wars with neighboring nations, and for several hundred years previous to 2000 B. C. Babylonia was subject to the neighboring Elam. It then regained its independence, and for 1,000 years it was the foremost State of Western Asia in power, as well as in science, art, and civilization. The rise of the Assyrian empire brought about the decline of Babylonia, which latterly was under Assyrian domination, though with intervals of independence. Tiglath-Pileser II. of Assyria (745–727) made himself master of Babylonia; but the conquest of the country had to be repeated by his successor, Sargon, who expelled the Babylonian king, Merodach-Baladan, and all but finally subdued the country, the complete subjugation being effected by Sennacherib. After some 60 years the second or later Babylonian empire arose under Nabopolassar, who, joining the Medes against the Assyrians, freed Babylon from the superiority of the latter power, 625 B. C. The new empire was at its height of power and glory under Nabopolassar's son, Nebuchadnezzar (604–561), who subjected Jerusalem, Tyre, Phœnicia, and even Egypt, and carried his dominion to the shores of the Mediterranean and northward to the Armenian Mountains. The capital, Babylon, was rebuilt by him, and then formed one of the greatest and most magnificent cities the world has ever seen. He was succeeded by his son, Evil-Merodach, but the dynasty soon came to an end, the last King being Nabonetus, or Nabonadius, who came to the throne in B. C. 555, and made his son, Belshazzar, co-ruler with him. Babylon was taken by Cyrus, the Persian monarch, in 538, and the second Babylonian empire came to an end. Babylonia being incorporated in the Persian empire. Its subsequent history was similar to that of Assyria.

*Civilization and Arts.*—The account of the civilization, arts, and social advancement of the Assyrians already given in the article Assyria, may be taken as generally applying also to the Babylonians, though certain differences existed between the two peoples. In Babylonia, stone was not to be had, and, consequently, brick was the almost universal building material. Sculpture was thus less developed in Babylonia



## Babylonish Captivity

than in Assyria, and painting more. Babylonian art had also more of a religious character than that of Assyria, and the chief edifices found in ruins are temples. Weaving and pottery were carried to high perfection. Astronomy was cultivated from the earliest times. The Babylonians had a number of deities, but latterly the chief or national deity was Bel Merodach, originally the sun-god. Education was well attended to, and there were schools and libraries in connection with the temples. On the inscribed tablets that have been discovered are writings relating to religion, law, magic, poems, etc.

**Babylonish Captivity**, a term usually applied to the deportation of the two tribes of the kingdom of Judah to Babylon by Nebuchadnezzar, 585 B. C. The duration of this captivity is usually reckoned 70 years, though strictly speaking, it lasted only 56 years. A great part of the 10 tribes of Israel had been previously taken captive to Assyria.

**Babyroussa.** See BABIROUSSA.

**B. A. C.**, the abbreviation universally used by astronomers in referring to "The Catalogue of Stars of the British Association for the Advancement of Science," by Francis Baily, London, 1845. It contains the places of 8,377 stars, with precessions, proper motions, constants for the reduction to apparent place, etc., together with an elaborate preface, giving much valuable information.

**Baccalaureus**, a Latin word of the Middle Ages (of doubtful origin), which appears also in several other forms, and has given rise to the English word bachelor. It was used in various senses, being applied to a warrior not advanced to full knighthood, to a canon of the lowest rank, and to a scholar at a university who had passed three academical courses and examinations, and was himself entitled to give lectures without being reckoned among the independent lecturers. This was consequently the lowest academical degree, and the baccalaureus or bachelor is still one who holds a degree which is inferior to that of master or doctor. In the modern universities there are bachelors in the departments or faculties of arts, law, divinity, medicine, surgery, science, and music. At Oxford and Cambridge the bachelor created in the regular form is distinguished as a formed bachelor; one created by an extraordinary diploma is a current bachelor.

**Baccarat**, (bä-kä-rä'), a town of France, in the department of Meurthe-et-Moselle; has the most important plate glass works in France. Pop. of commune (1891) 5,723.

## Bacchanalia

**Baccarat**, or **Baccara**, a game played with the ordinary playing cards; very simple in its details and freer from complications than most games at cards. Any number of players may participate, and as many packs of cards may be used as necessary, the number being increased to correspond with the number of players. One member of the party is selected to act as banker. He deals out the cards from a box, after they have been shuffled. The face cards each count 10, and the others according to the numbers of their spots. After the bets have been made, the banker deals two cards to each of the players, including himself, but the other players must receive their cards before the banker is served. The aim of the players is to make the numbers 9, 19, 29, or as nearly those as possible, as 8, 18, and 28. Any player is at liberty either to "stand" or to be "content" with the two cards at first dealt, or to call for more, at the risk of exceeding 29, when his stake is forfeited to the dealer. If, after the first distribution of two cards to each, any player has a "natural"—*i. e.*, a sum making 9, or next in value, 19—he declares it wins,



BACCHANTES.

and the banker pays all who hold superior hands to his own, and claims from those holding inferior hands. The players stake their money separately, there being, in fact, as many separate games in progress as there are players, and the spectators may wager their money on any one of them, all of which must be accepted by the banker. Prior to the banker making a start, he states the amount of the bank. Any one sitting down at the table has the right to call the whole of the bank, selecting the left or the right on which to pick up the cards. Previous to the banker dealing the cards, it is the duty of two croupiers, one on the right and the other on the left, to count up the stakes deposited on either side, and then make up the bank. Thus the banker knows, to the smallest coin, the exact amount of his liabilities.

**Bacchanalia**, or **Dionysia**, feasts in honor of Bacchus, or Dionysos, characterized by licentiousness and revelry, and celebrated in ancient Athens. In the processions were



bands of Bacchantes of both sexes, who, inspired by real or feigned intoxication, wandered about rioting and dancing. They were clothed in fawn-skins, crowned with ivy, and bore in their hands *thyrsi*, that is, spears entwined with ivy, or having a pine cone stuck on the point. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness till the Senate abolished them in B. C. 187.

**Bacchante** (bak-an'tē), a person taking part in revels in honor of Bacchus.

**Bacchiglione** (bak-il-yō'na), a river of Northern Italy, rises in the Alps, passes through the towns of Vicenza and Padua, and enters the Adriatic near Chioggia, after a course of about 90 miles.

**Bacchus** (in Greek generally Dionysos), the god of wine, born of a mortal mother, yet one of the immortal gods. His history is one of the most perplexing in the Greek mythology. Semele was pregnant with him by Zeus. Before his birth, however, she became a victim of the craft of Hera. Zeus hastened to save the unborn fruit of his embrace, and concealed it till mature in his own thigh. He afterward committed the infant to Hermes, who carried him to the nymphs of Nysa in India, where he grew and prospered. His teacher was Silenus, afterward his constant companion.

In the vales of Nysa Bacchus invented the preparation of a beverage from grapes, and taught the planting of vines. To spread the knowledge of his invention he traveled over almost the whole known world, and received in every quarter divine honors. Drawn by lions (some say panthers, tigers, or lynxes), he began his march, which resembled a triumphal pomp, with a great suite of men and women, Sileni, Satyrs, and Maenades. Inspired by the presence of the god, rejoicing, brandishing the *thyrsus*, and crowned with vines and ivy, they danced around him, shouting "*Evoe! Eleleus!*" over hill and valley, accompanied by the tones of Phrygian flutes and timbrels. The Thebans would not acknowledge his divinity, and Pentheus armed himself against him. Bacchus resolved to punish the crime, and inspired the women with a fury which drove them from their dwellings to wander on Mount Cithæron. Pentheus himself was torn in pieces by his own mother and her sisters, to whom he appeared a wild beast. Bacchus punished the daughters of Mynias, who derided his feasts, with frenzy and transformation. At Naxos some Tuscan sailors attempted to carry him off to Italy, supposing him from his purple robe to be the son of a king. They fettered him; but the fetters fell off, vines and ivy entwined the vessel, and kept it fixed in the midst of the sea: the god transformed himself to a lion, and the seamen, seized with madness, leaped into the waves, where they were

changed into dolphins. On the other hand, he rewarded such as received him hospitably and rendered him worship, as, for instance, Midas, who restored to him the faithful Silenus.

His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality. To confer the same favor on his mother, Semele, he descended into the realms of Pluto, and conducted her to Olympus, where she was henceforth called Thyone. In the dreadful war with the giants he fought heroically, and saved the gods from impending ruin. During the rejoicing for victory Zeus joyfully cried to him, "*Evan, evoe!*" (Well done, my son!), with which words Bacchus was afterward usually saluted. We find him represented with the round, soft, and graceful form of a maiden rather than with that of a young man. An ornament peculiar to him is the tiara. His long waving hair is gathered behind in a knot, and wreathed with sprigs of ivy and vine leaves. He is usually naked; sometimes he has an ample mantle hung negligently round his shoulders; sometimes a fawn skin hangs across his breast. The bearded Bacchus is properly of Indian or Egyptian origin. His head is sometimes shown with small horns (the symbol of invincible force). In his hand is borne a *thyrsus*, or a drinking cup. The bull, panther, ass, and goat were symbolically associated with this god.

The feasts consecrated to Bacchus were termed *Bacchanalia*, *Dionysia*, or in general *Orgia*. They were celebrated with peculiar solemnity in Athens, where the years were universally reckoned by them. During their continuance the least violence toward a citizen was a capital crime. The great Dionysia were celebrated in spring. The most important part of the celebration was a procession representing the triumph of Bacchus. This was composed of the above-mentioned train of Bacchantes of both sexes, who, inspired by real or feigned intoxication, wandered about rioting and dancing, and gave themselves up to the most extravagant licentiousness. They were masked, clothed in fawn skins, crowned with ivy, and bore in their hands drinking cups and rods entwined with ivy (*thyrsi*). Amidst this mad crowd marched in beautiful order the delegated bodies of the *phratia* (corporations of citizens). They bore upon their heads consecrated baskets, which contained first-fruits of every kind, cakes of different shape, and various mysterious symbols. This procession was usually in the night-time. The day was devoted to spectacles and other recreations. At a very early hour they went to the theater of Bacchus, where musical or dramatical performances were exhibited. Thespis, known as the inventor



of tragedy is said to have introduced into the Bacchic performance an actor who carried on a dialogue with the *coryphæus* (leader) regarding the myths narrated of Bacchus or some other divinity. The chorus surrounding its leader, stood on the steps of the altar of Bacchus, while the actor occupied a table. Some regard this as the origin of the stage. The vintage festivals in rural districts were celebrated by Bacchic processions, ruder in form than those of Athens, but characterized by the same wild license and ribaldry. Coarse ridicule of individuals was a marked feature of these occasions. All over Athens reigned licentiousness and revelry. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness, till the senate abolished them, B. C. 187.

**Bacchylides** (bak-il'è-dēs), a Greek poet, a native of Julis, a town on the Island of Cos. He was a cousin of the still more famous lyric poet Simonides, with whom he remained for some time at the court of Hiero in Sicily. He traveled also in the Peloponnesus. He is said to have been a rival of Pindar. He flourished about 470 B. C. Until recently, this poet was known to the modern world only in fragments of beautiful versification. In 1895, however, a well preserved text was discovered and published, and Bacchylides has now taken permanent place as a master of Greek verse. The Macmillan Co. published a translation of the poems in 1897.

**Bacciferous** (bak-sif'er-us), a term applied to those trees that bear berries. They are of four kinds: (1) Such as bear a caliculate, or naked berry; the flower and calix both falling off together, and leaving the berry bare; as the sassafras trees. (2) Such as have a naked monospermous fruit; that is, containing in it only one seed; as the arbutus. (3) Such as have but polyspermous fruit; that is, containing two or more kernels or seeds within it; as the jessminum, ligustrum. (4) Such as have their fruit composed of many acini, or round, soft balls, set close together, like a bunch of grapes; as the uva marina.

**Bacciocchi, Felice Pasquale** (ba-chē-ōk'ē), a Corsican captain, poor, but of good family, born in Corsica, May 18, 1762. In 1797 he married Maria Elisa Bonaparte. In 1805, when Napoleon made his sister Princess of Lucca and Piombino, Bacciocchi was crowned with his wife. After the Emperor's fall, he lived quietly and in some poverty at Bologna, where he died April 27, 1841.

**Bacciocchi, Maria Bonaparte**, eldest sister of Napoleon Bonaparte, born at Ajaccio, Corsica, in 1777, married Felice Bacciocchi, and was created by her brother, in 1805, Princess of Lucca, Piombino, Massa, and Carrara, and in 1809 Grand Duchess of Tus-

cany. She shared her brother's fall, and spent her last years in Austria, dying on her estate near Trieste, Aug. 7, 1820. Her only son died in 1833, and her only daughter, the Countess Camerata, in 1869.

**Baccio della Porta.** See BARTOLOMMEO.

**Bach, Alexander von** (bäch), an Austrian statesman, born in Loosdorf, Jan. 4, 1813; was Minister of Justice in 1848, of the Interior in 1849-1859; and, subsequently, ambassador to Rome. In 1855, he negotiated the Concordat with the Papacy which brought Austria into submission to the Roman Church. He died Nov. 15, 1892.

**Bach, Heinrich**, a German musician, born Sept. 16, 1615; member of the celebrated family of musicians, father of Johann Christoph and Johann Michael Bach; was organist at Arnstadt, where he died July 10, 1691.

**Bach, Johann Christian**, a German musician, born in Erfurt, in 1640; a member of the family of musicians; son of Johannes Bach, the great uncle of Johann Sebastian Bach. He died in Erfurt, in 1682.

**Bach, Johann Christian**, a German musician, born in Leipsic, in 1735; a son of Johann Sebastian Bach; was organist in the Cathedral of Milan in 1754-1759, and in London in 1759-1782, from which residences he was surnamed "the Milanese" and "the English." He composed operas, masses, *Te Deums*, etc. He died in London, in 1782.

**Bach, Johann Christoph Friedrich**, a German musician, born in Leipsic, in 1732; a son of Johann Sebastian Bach; music master to Count Schaumburg at Bückeburg. He died in Bückeburg, in 1795.

**Bach, Johann Michael**, a German composer and instrument maker, born in 1648; a son of Heinrich Bach; father-in-law of Johann Sebastian Bach. He died in Arnstadt, in 1694.

**Bach, Johann Sebastian**, a celebrated musician, born at Eisenach, Upper Saxony, March 21, 1685.

When he was 10 years old his father, who was a musician at Eisenach, died, and Bach sought the protection of an elder brother, who, dying soon after, he was again left destitute, and, to earn a livelihood, entered the choir of St. Michael's,



Luneberg, as a soprano singer. In 1703 he became court musician at Weimar, the following year organist at Arnstadt, and in 1708 court organist at Weimar. While



## Bach

holding this office he labored to make himself master of every branch of music. In 1717 he was made Director of Concerts, and six years afterward Director of Music and Cantor to St. Thomas' School, Leipsic, an appointment which he held to his death. About 10 years later the distinctions of kapellmeister to the Duke of Weissenfels and court composer to the King of Poland were conferred upon him. Bach, who had a son in the service of Frederick the Great, received a pressing request to visit Potsdam, on the occasion of a concert there. He went, and acquitted himself to the satisfaction of that monarch, some of whose music he played at first sight. Bach's close studies affected his eyes, and an operation left him totally blind and hastened his death, in Leipsic, July 28, 1750. With the exception of Handel, Bach had no rival as an organist.

**Bach, Karl Philipp Emanuel**, a German musician, born in Weimar, March 14, 1714; son of Johann Sebastian Bach; was court musician in the service of Frederick the Great in 1740-1767. He wrote on the theory of piano playing and was a voluminous composer of piano music, oratorios, etc. He died in Hamburg, Dec. 14, 1788.

**Bache, Alexander Dallas** (bäch), an American scientist, born in Philadelphia, Pa., July 19, 1806; was graduated at the United States Military Academy, at the head of his class, in 1825; became Professor of Natural Philosophy and Chemistry at the University of Pennsylvania in 1828; was the organizer and first President of Girard College, 1836; and was appointed superintendent of the United States Coast Survey, in 1843. In the last office he performed services of lasting and invaluable character. He was regent of the Smithsonian Institution in 1846-1867; an active member of the United States Sanitary Commission during the Civil War; and President of the National Academy of Sciences in 1863. Besides a long series of notable annual reports of the United States Coast Survey, he published a report on "Education in Europe" (1839), and "Observations at the Magnetic and Meteorological Observatory at the Girard College" (3 vols., 1840-1847). He died in Newport, R. I., Feb. 17, 1867.

**Bache, Franklin**, an American chemist, born in Philadelphia, Pa., Oct. 25, 1792; was appointed Professor of Chemistry at the Philadelphia College of Pharmacy in 1831, and at the Jefferson Medical College in 1841. He published "System of Chemistry for Students of Medicine" (1819), and was one of the authors of Wood & Bache's "Dispensatory of the United States" (1833). He died in Philadelphia, March 19, 1864.

**Bache, George M.**, an American naval officer, born in the District of Columbia,

## Bachelor

Nov. 12, 1840; was graduated at the United States Naval Academy, in 1860; commanded the iron clad "Cincinnati" in the various engagements on the Mississippi river, until she was sunk by the Vicksburg batteries, May 27, 1863. He was highly commended by Admiral Porter, Gen. Sherman, and Secretary Welles for his conduct in the last engagement. Subsequently, he took part in both attacks on Fort Fisher, and, in the second one, Jan. 15, 1865, he led the naval assault on the fort. He was retired with the rank of commander, April 5, 1875, and died in Washington, D. C., Feb. 11, 1896.

**Bache, Hartman**, an American military engineer, born in Philadelphia, Pa., Sept. 3, 1798; was graduated at the United States Military Academy, in 1818; entered the United States Topographical Corps; and for 47 years was constantly employed on surveys and on works of hydrographic and civil engineering. On March 13, 1865, was appointed Brigadier-General, and March 7, 1867, was retired. His most notable achievements were the building of the Delaware Breakwater and the application of iron-screw piles for the foundation of lighthouses upon sandy shoals and coral reefs. He died in Philadelphia, Oct. 8, 1872.

**Bache, Sarah**, an American philanthropist, born in Philadelphia, Pa., Sept. 11, 1744; was the only daughter of Benjamin Franklin, and the wife of Richard Bache. During the Revolutionary War she organized and became chief of a band of patriotic ladies who made clothing for the soldiers, and in other ways relieved their sufferings, especially during the severe winter of 1780. At one time she had nearly 2,500 women engaged under her direction in sewing for the army. She personally collected large sums of money to provide the material for this work, and also for the purchase of medicines and delicacies for the soldiers in the hospitals, where she also personally acted as nurse. She died Oct. 5, 1808.

**Bacheller, Irving**, an American novelist, born in Pierpont, N. Y., Sept. 26, 1859. He was graduated at St. Lawrence University in 1879 and became a reporter of the Brooklyn "Times." Subsequently he established a newspaper syndicate. Chief works: "The Master of Silence," "The Unbidden Guest," "Eben Holden," "D'ri and I."

**Bachelor**, a term applied anciently to a person in the first or probationary stage of knighthood who had not yet raised his standard in the field. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college or university; or a man of any age who has not been married. A knight bachelor is one who has been raised to the dignity of a knight without



## Bachelor's Buttons

being made a member of any of the orders of chivalry such as the Garter or the Thistle.

**Bachelor's Buttons**, the double flowering buttercup (*ranunculus acris*), with white or yellow blossoms, common in gardens.

**Bachian** (bäc'h'an), one of the Molucca Islands, immediately S. of the equator, S. W. of Gilolo; area, 800 square miles. It is ruled by a native Sultan under the Dutch.

**Bachman, John**, an American clergyman and naturalist, born in Dutchess county, N. N., Feb. 4, 1790; became pastor of a Lutheran church in Charleston, S. C. He published, among other works, "Characteristics of Genera and Species as Applicable to the Doctrine of the Unity of the Human Race" (1854); but is best known by reason of his association with Audubon in the making of the "Quadrupeds of North America," he writing the principal part of the text, which Audubon and his sons illustrated. He died in Charleston, S. C., Feb. 25, 1874.

**Bacillaria**, a genus of microscopic algæ belonging to the class *diatomaceæ*, the siliceous remains of which abound in Cretaceous, Tertiary, and more recent geological deposits.

**Bacillus**, a name given to certain filiform bacteria, which have assumed much importance of late, principally because of their constant presence in the blood and tissues in splenic fever and malignant pustule. See BACTERIA.

**Back, Sir George**, an English explorer, born in Stockport, Nov. 6, 1796; entered the British navy in 1808, and in 1817 was in the expedition to Spitzbergen. He accompanied Sir John Franklin to the Arctic regions in 1819 and again in 1825. In 1833 he led a party in search of Sir John Ross, then in the Arctic Ocean, and in 1836, in command of the "Terror," he made his last trip to the North. The Geographical Society awarded him a gold medal in 1837, and in 1839 he was knighted. He became Rear Admiral in 1857, and Admiral in 1867. Among his works are "A Narrative of the Arctic Land Expedition" (1836); a "Narrative of the Expedition in Her Majesty's Ship 'Terror'" (1838), etc. He died in London, June 23, 1878.

**Backgammon**, a game of chance and calculation. It is played by two persons, with two boxes, and two dice, upon a quadrangular table, or board, on which are figured 24 points, or *flèches*, of two colors, placed alternately. The board is divided into four compartments, two inner and two outer ones, each containing six of the 24 points (alternate colors). The players are each furnished with 15 men, or counters, black and white. These are arranged upon the board in the following manner: To play into the left hand table, two of your men are placed upon the ace-point of your op-

## Back-Staff

ponent's inner table, five upon the sixth point in his outer table, three upon the cinque-point in your own outer table, and five upon the sixth point in your own inner table. The adversary's men are to be placed in corresponding order, in a position directly opposite. The game consists in moving your men from point to point, so as to bring them around into your own inner table (*i. e.*, that on your left hand), and then moving or bearing them off the board. The player who first clears off his men wins. The moves of the men are determined by the throws of the dice, according to the directions for playing. It will there be seen that the most advantageous throw at the outset is that of aces, as it blocks the bar, or sixth point in your outer table, and secures the cinque-point in your inner table, so that your adversary's two men cannot move if he throw either quatre, cinque, or size. This throw is frequently contested by inferior players, at the commencement of the game, by way of odds. As the grand object of the game consists in bringing around your men into your own inner table, all throws that contribute toward that end, and prevent your adversary from doing the same, are advantageous, and *vice versa*. During the progress of the game you should endeavor to block up or detain a part of your adversary's men in your own tables, and to obstruct his re-entering such of them as you may happen to have taken up, unless all your own men have passed his main body, and are so far advanced to your inner table (which we will here call home) as to possess the best chance, should he seek to win by running away. Each party plays into one of the tables on his own side; thus, if black plays into his left hand table, white plays into his right (*i. e.*, that which is exactly opposite) and *vice versa*, their men advancing in contra-position to each other. For right of first play each party throws a single die; he who throws the highest number wins, and may, if he chooses, adopt and play the joint number of the preliminary throw.

**Backhuysen, Ludolf** (bak'hoi-zen), a celebrated painter of the Dutch school, particularly in sea pieces, born in 1631. His most famous picture is a sea piece which the burgomasters of Amsterdam commissioned him to paint as a present to Louis XVI. It is still at Paris. He died in 1709.

**Back Land**, name applied to the region around the Arctic Circle, in British North America. It was explored by Capt. Back in 1831.

**Back-Staff**, an instrument invented by Capt. Davies, about A. D. 1590, for taking the altitude of the sun at sea. It consisted of two concentric arcs and three vanes. The arc of the longer radius was 30°, and that of the shorter one 60°; thus both together



## Bäckström

constituted 90°. It is now obsolete, being superseded by the quadrant.

**Bäckström, Per Johan Edvard** (bäk'strem), a Swedish dramatist and lyric poet, born in Stockholm, Oct. 27, 1841. His principal work is "Dagvard Frey" (1876), a tragedy; besides this, the dramas "A Crown" (1869); "Eva's Sisters" (1869), and "The Prisoner of Kallö" (1870), met with success. His lyrics were published in three collections (1860, 1870, 1876). He died in Stockholm, Feb. 13, 1886.

**Backus, Truman Jay**, an American educator, born in Milan, N. Y., Feb. 11, 1842; was graduated at the University of Rochester in 1864; and became President of the Packer Collegiate Institute in Brooklyn, N. Y. After going to Brooklyn, he served on several State commissions. His publications include "Great English Writers," "Outlines of English Literature," and a revised edition of Shaw's "History of English Literature." He died March 25, 1908.

**Bacolor** (bak'o-lôr), a town in the Island of Luzon, Philippine Islands; 10 miles N. W. of Manila; was the capital of the Philippines during the British invasion in 1762, when the Spaniards feared a bombardment and seizure of Manila; and was a scene of much activity in American operations against the Filipinos in 1899. Pop. (1903) 13,493.

**Bacon**, a word applied to the sides of a pig which have been cured or preserved by salting with salt and saltpeter, and afterward drying with or without wood smoke. By the old process of rubbing in the saline mixture, the curing occupied from three to four months. The method now generally adopted on a larger scale is to place the prepared flitches in a fluid pickle. The pickling, drying, and smoking now occupy not more than six weeks. Bacon may be called the poor as well as the rich man's food. By the former it is prized as a necessary of life; by the latter, for its exquisite flavor. The nitrogenous, or flesh forming, matter in bacon is small, one pound of bacon yielding less than one ounce of dry, muscular substance, while the amount of carbon compounds, or heat givers, is large, exceeding 60 per cent. Its digestibility, however, owing to the large proportion of fat it contains, is not less than that of beef or mutton.

**Bacon, Alice Mabel**, an American educator, born in New Haven, Conn., Feb. 26, 1858; was educated privately and took the Harvard examinations in 1881; taught at the Hampton Normal and Agricultural Institute in 1883-1888, and in Tokio, Japan, in 1888-1889; returned to the Hampton Institute in 1889, and founded the Dixie Hospital for training colored nurses in 1890. She published "Japanese Girls and Women," "Japanese Interior," etc.

## Bacon

**Bacon, Benjamin Wismer**, an American educator, born in Litchfield, Conn., Jan. 15, 1860; studied in Germany and Switzerland; and was graduated at Yale College in 1881; held several Congregational pastorates; and in 1896 became Professor of New Testament Criticism and Exegesis in Yale University.

**Bacon, Delia**, an American author, born in Tallmadge, O., Feb. 2, 1811; was eminent in her day as a teacher, and wrote several stories, but is now remembered only as an eloquent advocate of the theory that the plays of Shakespeare were written by Lord Bacon. She herself did not originate the idea, but was the first to give it any currency, in her "Philosophy of the Plays of Shakespeare Unfolded" (1857). The book had the honor of a preface from the pen of Nathaniel Hawthorne, and the theory has been accepted by a few persons in both England and the United States, who, though more noisy than numerous, have wasted not a little ingenious reasoning in its advocacy. She died in Hartford, Conn., Sept. 2, 1859.

**Bacon, Edwin Munroe**, an American author; born in Providence, R. I., Oct. 20, 1844; received an academical education; was on the staff of several Boston papers; and wrote "King's Handbook of Boston"; "Boston Illustrated"; "Historic Pilgrimages in New England"; "Literary Pilgrimages in New England"; "Boston of To-day"; and many other historical works also relating to Boston and New England.

**Bacon, Francis**, Viscount St. Albans, one of the most remarkable men of whom any age can boast; a reformer of philosophy, by founding it on the observation of nature, after it had consisted, for many centuries, of scholastic subtleties and barren dialectics; born in London, Jan. 22, 1561, his father being Sir Nicholas Bacon, lord keeper of the great seal. In his 13th year he entered the University of Cambridge, where he made astonishing progress in all the subjects there taught. He had not completed his 16th year when he wrote against the Aristotelian philosophy, which seemed to him more calculated to perpetuate disputes than to enlighten the mind. It was then the custom in England to send abroad young men destined for public life. Bacon went to Paris in the suite of Sir Amias Paulet, who soon after sent him to England with an important message. He discharged it to the satisfaction of the queen (Elizabeth), returned to France, and traveled through several provinces of that country to study its manners and laws. The death of his father, in 1579, called him back to England where, in order to be enabled to live suitably to his rank, he devoted himself to jurisprudence, and pursued the study of the law with so much success that he was made



counsel extraordinary to the queen before he was 28 years old. This place was more honorable than lucrative. His professional labors did not, however, make him lose sight of the idea which he had early conceived, of reforming the plan of scholastic studies agreeably to sound philosophy.

Bacon's talents and his connection with the lord-treasurer, Burleigh (who was married to a sister of Bacon's mother), and his son Sir Robert Cecil, first secretary of state, seemed to promise him the highest promotion. In 1584 he was sent to Parliament as member for Melcombe Regis, in 1586 he sat for Taunton. About 1591 he became a friend of the Earl of Essex, and when disappointed



FRANCIS BACON.

in not being made attorney-general the latter presented him with an estate in land. Bacon, however, soon forgot his obligations to his generous benefactor, and not only abandoned him as soon as he had fallen into disgrace, but without being obliged took part against him on his trial. Against this ingratitude the public voice was raised, and whatever Bacon might say in his justification, he remained at court the object of hatred to one party and of jealousy to the other, and the queen did not appear inclined to do anything in his favor. In Parliament he conducted himself for some time with dignity and independence. He had been chosen member for the county of Middlesex in 1593, and voted with the popular party against the measures of the ministers, though he continued in the service of the crown. But toward the end of Elizabeth's reign his parliamentary conduct became more servile. If anything can excuse him it is his poverty, which was so great that he was twice arrested for debt. The reign of

James I. was more favorable to him. This prince, who was ambitious of being considered a patron of letters, conferred upon him in 1603 the order of knighthood. Having been commissioned to make a representation of the oppressions committed by the royal purveyors in the king's name, he executed the task with so much address as to satisfy both the king and the Parliament. The House of Commons voted him the public thanks, and James made him one of the king's counsel, with a pension of £40, which was soon followed by another of £60. His situation now continually improved; he contracted an advantageous marriage; was made solicitor-general and then attorney-general; in 1617 became lord keeper of the seals; in 1618 was made lord high chancellor and created Baron of Verulam, and in 1621 Viscount St. Albans.

He might now have lived with splendor without degrading his character by those acts which have stained his reputation. Nevertheless, great complaints were made against him. He was accused before the House of Lords of having received money for grants of offices and privileges under the seal of State. He was unable to justify himself, and, desiring to avoid the mortification of a trial, confessed his crimes and threw himself on the mercy of the peers, beseeching them to limit his punishment to the loss of the high office which he had dishonored. After he had acknowledged by an explicit confession the truth of almost all the charges, notwithstanding the intercession of the king, and the interest which they themselves took in one of their most distinguished members, the lords sentenced him to pay a fine of £40,000, and to be imprisoned in the Tower during the pleasure of the king. He was also declared forever incapable of place or employment, and forbidden to sit in Parliament or to appear within the verge of the court. This severe sentence was doubtless just; yet it must be allowed that he was actuated neither by avarice nor corruption of heart, but that his errors are rather to be attributed to a weakness of character, which was abused by others. Traits of generosity and independence, which his life also displays, show clearly that he knew and valued virtue. He was unfaithful to it because he had not sufficient firmness to refuse the unjust demands of others. His sentence was not rigorously executed; he was soon released from the Tower, and the rest of his punishment was by degrees remitted entirely. He survived his fall only a few years, and died in Highgate, April 9, 1626.

All the studies and efforts of this great man aimed at a reform in the system of human knowledge. He examined the whole circle of the sciences, investigated their relations, and attempted to arrange them according to the different faculties of the hu-



man mind to which each belongs. In this, however, he could not succeed for want of a well-founded and natural division of the powers of the mind; for he divided the sciences into those of the memory, of the understanding, and the imagination. This he explains in his "Instauratio Magna," under the head "De Dignitate et Augmentis Scientiarum." He further perceived that, in all the branches of natural science, the only way to truth is by the observation of nature. How this observation is to be directed, and how nature is to be examined, is illustrated in several places. He explained his ideas on this subject in the above-mentioned treatise (*De Dignitate, etc.*), and in the "Novum Organum Scientiarum." His universal genius had attended to all the sciences; he perceived to what point each of them had advanced, what false directions they had taken, and how they were to be brought back to truth. As a metaphysician he displays no less penetration than profoundness in his views of the operations of the mind, of the association of ideas, and of the prejudices which surround us from our cradle, and prevent the free exercise of reason. As a natural philosopher he brought forward very ingenious views, and was on the route to several important discoveries. He invented a kind of pneumatic machine, by his experiments with which he was led to suspect the elasticity and gravity of the air, which Galileo and Torricelli afterward discovered. He apparently had a glimpse of the law of gravitation, which Newton afterward proved. He wanted only experiments in order to demonstrate the principles of this power. He treated also of natural history, but only in a brief manner, in his work "*Sylva Sylvarum*," etc.

He wrote treatises dealing with medical subjects; among others, one on life and death. But physiology and chemistry were then so imperfectly understood that he could not avoid falling into great errors. The science of law he treated not merely as a lawyer, but as a legislator and philosopher. His aphorisms are not less remarkable for profound views than for vigor and precision of expression. Morals are the subject of one of his finest works, entitled "*Essays or Sermones Fideles*"—showing the most profound knowledge of man and of human relations, and written in an eloquent and vigorous style. As an historian he is less distinguished, though his history of Henry VII. possesses solid merits. Of his knowledge of antiquity his work "*On the Wisdom of the Ancients*" bears witness, in which he explains the ancient fables by ingenious allegories. He possessed a less profound knowledge of mathematics, and to this it is to be ascribed that he who so generally discovered the errors of the human mind, and pointed out the truth, opposed the Co-

pernician system. In this point alone he remained behind some enlightened men of his time. In other departments of human investigation he soared to such a height, that his contemporaries could not fully estimate the extent of his genius, the justness of his views, and the importance of his labors. The influence of the Baconian philosophy upon the ideals and methods of education was destined to effect, during succeeding generations, a profound change in both the matter and the manner of instruction, although its practical results were slow in reaching the schools. Naturally this influence was first felt in the higher institutions of learning, but finally has reached even the elementary schools. To the inspiration of Bacon's thought was largely due the revolutionary character of the works of the great educational reformer, Comenius. The best edition of his works, which are partly in English, partly in Latin, is that by Spedding, Ellis, and Heath (1857-1874, 14 vols.; 7 containing "Life and Letters" by Spedding). Dr. E. A. Abbott's "*Francis Bacon*" (1885) is a valuable account of his life and works; and Dean Church's "*Life of Bacon*" (in the "Men of Letters" series) is also valuable, more especially as a corrective to Macaulay's misleading essay. A valuable exposition of his philosophy is given in Kuno Fischer's "*Francis Bacon of Verulam*" (1857).

**Bacon, Henry**, an American painter, born in Haverhill, Mass., in 1839. He served in the Civil War, studied art in Paris under Cabanel and Edward Frere, and painted, among others, "Boston Boys and Gen. Gage" (1875); "Paying the Scot" (1870), and "The Farewells" (1878).

**Bacon, John**, an English sculptor, born in London, Nov. 24, 1740; trained as a modeler and painter on porcelain, in 1769 he received the first gold medal for sculpture awarded by the Royal Academy, of which next year he was made an Associate, in recognition of the high merit of his statue of Mars. Among his principal works are the monuments to Lord Chatham in Westminster Abbey and the Guildhall, to Howard and Johnson in St. Paul's, and to Blackstone at All Souls' College, Oxford. Bacon's success aroused great jealousy, and his rivals claimed that he was deficient in imagination, and had no refined perception of beauty; but some of his emblematical figures display perfect classical taste. He died Aug. 4, 1799.

**Bacon, John Mosby**, an American military officer, born in Kentucky, April 17, 1844; served in the Union army, through the Civil War; was appointed Captain in the 9th United States Cavalry, in 1866, and Colonel of the 8th Cavalry in 1897. On May 4, 1898, he was appointed Brigadier-General of Volunteers and placed in command of the Department of Dakota. In Oc-



## Bacon

tober of that year he put down the outbreak of the Pillager band of the Chippewa Indians in Cass county, Minn. Subsequently, he was assigned to duty in Cuba, with headquarters at Neuvas, till May 8, 1899, when he was retired.

**Bacon, Leonard**, an American clergyman, born in Detroit, Mich., Feb. 19, 1802; graduated at Yale in 1820, after which he studied theology at Andover, Mass. In 1825 he became pastor of the First Congregational Church in New Haven, a post which he held officially, though not always actively, until his death. He was Professor of Didactic Theology in Yale (1866-1871). He was throughout his life an active opponent of slavery. In 1847 he joined with Drs. Storrs and Thompson to found the New York "Independent," in the joint editorship of which he continued for 16 years. Besides a vast number of reviews and pamphlets, he published "Views and Reviews" (1840); "Slavery Discussed in Occasional Essays" (1846), and "Genesis of the New England Churches." He died in New Haven, Conn., Dec. 24, 1881.

**Bacon, Nathaniel**, an Anglo-American lawyer, born in Suffolk, England, Jan. 2, 1642; became the leader in BACON'S REBELLION (q. v.), in Virginia, and died Oct. 29, 1676.

**Bacon, Roger**, an English monk, and one of the most profound and original thinkers of his day, was born about 1214, near Ilchester, Somersetshire. He first entered the University of Oxford, and went afterward to that of Paris, where he is said to have distinguished himself and received the degree of Doctor of Theology. About 1250 he returned to England, entered the Order of Franciscans, and fixed his abode at Oxford, but having incurred the suspicion of his ecclesiastical superiors, he was sent to Paris and kept in confinement for 10 years, without writing materials, books or instruments. The cause seems to have been simple enough. He had been a diligent student of the chemical, physical, and mathematical sciences, and had made discoveries, and deduced results which appeared so extraordinary to the ignorant that they were believed to be works of magic. This opinion was countenanced by the jealousy and hatred of the monks of his fraternity. In subsequent times he was popularly classed among those who had been in league with Satan. Having been set at liberty, he enjoyed a brief space of quiet while Clement IV. was Pope; but in 1278 he was again thrown into prison, where he remained for at least 10 years. Of the close of his life little is known. His most important work is his "Opus Majus," where he discusses the relation of philosophy to religion, and then treats of language, meta-

## Bacon's Rebellion

physies, optics, and experimental science. He believed in the philosopher's stone and in astrology. There are to be found in his writings new views on the refraction of light, on the apparent magnitude of objects, on the magnified appearance of the sun and moon when in the horizon, etc. He describes very exactly the nature and effects of convex and concave lenses, and speaks of their application to the purposes of reading, and of viewing distant objects, both terrestrial and celestial; and it is easy to prove from his writings that he was either the inventor or improver of the telescope. He also gives descriptions of the *camera obscura*, and of the burning glass. The discovery of gunpowder has been attributed to him. He was intimately acquainted with geography and astronomy, as appears by his discovery of the errors of the calendar, and of the causes of these inaccuracies, and by his proposals for correcting them, in which he approached very near to truth. He died in Oxford, in 1294.

**Bacon, Thomas Scott**, an American theological writer, born in Saratoga, N. Y., Feb. 1, 1825. Originally a lawyer, he became an Episcopal clergyman (1854). Besides sermons, addresses, reviews, etc., he has written "Both Sides of the Controversy Between the Roman and the Reformed Church" (1858); "The Reign of God, not the Reign of Law" (1879); "The Beginnings of Religion" (1887); "Primitive and Catholic Doctrine as to Holy Scripture," etc.

**Baconian Philosophy**, the inductive philosophy of which it is sometimes said that Lord Bacon was the founder. This, however, is an exaggerated statement. What Lord Bacon did for this mode of ratiocination was to elucidate and systematize it; to point out its great value, and to bring it prominently before men's notice; lending it the support of his great name at a time when most of his contemporaries were satisfied with the barren logic of the schools. The great triumphs of modern science have arisen from a resolute adherence on the part of its votaries to the Baconian method of inquiry.

**Bacon's Rebellion**, a popular uprising of the Virginian colonists, headed by Nathaniel Bacon, in protest against certain government abuses, which prevailed under the administration of Sir William Berkeley. Parliament had passed an act requiring that all goods, destined for Virginia, no matter what their source, should first be sent to the mother-country for transfer into British ships. The inter-colonial duties were also objectionable, and when, in 1673, the entire revenues of the colony were turned over to Lords Culpeper and Arlington, indignation was rife. But the most pressing cause of



complaint was the lack of official protection against Indian ravages, and the inattention of Governor Berkeley to all appeals for help. Bacon was a prominent member of the Council, and when the colonists, disgusted by the inaction of the Governor, determined to take Indian matters into their own hands, he was chosen leader. Berkeley proclaimed him a rebel, and part of his force deserted, but this did not prevent him from attacking the red men and capturing their fort. On his return he was taken prisoner, but quickly released. He promptly attacked Jamestown, extracting from the astonished Governor a repeal of the most obnoxious statutes, a major-general's commission for himself, and a complete acquittal from all blame for all concerned in the rebellion. He then returned to the Indians, leaving Berkeley to collect his scattered thoughts. Troops were sent for post-haste, but they refused to take up arms against Bacon. The audacious rebel, on repairing to Jamestown, found the Governor fled, but as soon as his back was turned the Indians recommenced their aggressions. He knew that if he turned his attention to the latter, Berkeley would take Jamestown; nevertheless, he decided to dispose of the savages first. This he did effectively at Bloody Run. He then marched rapidly to Jamestown, besieged it, forced the Governor to take refuge on a warship, and burned all the public buildings. After partially revising the laws with great benefit to the people, he died at the most critical moment of his career, and the rebellion, left leaderless, came to an end.

**Bacsanyi, Janos** (bak-san'yē), a Hungarian poet, was born May 11, 1763, at Tapoleza. His first work, published in 1785, procured him an appointment in a public office, but a liberal poem cost him this in 1793, as well as his liberty the year after. In 1796 he went to Vienna, and there he married a few years later the German poet, Gabrielle Baumgarten—an unhappy match. In 1809, Bacsanyi translated Napoleon's proclamation to the Hungarians, and was afterward obliged to take refuge in Paris. After the Peace of Paris, he lived at Linz, and there he died, May 12, 1845. His collected poems appeared at Pest in 1827.

**Bacteria** (Gr. *baktērion*, a little rod or staff), a class of very minute microscopic organisms or microbes which are regarded as of vegetable nature, and as being the cause or accompaniment of various diseases, as well as of putrefaction, fermentation, and certain other phenomena. Some of the better known of these organisms are so exceedingly minute, that under the highest power of improved microscopes they appear no larger than the periods of ordinary type. Various classifications have been proposed for them, for they differ largely in size, form, and

mode of multiplication. There is the *Micrococcus*, which is round and no larger than the 32,000th of an inch; the *Bacterium* proper, which is rod-shaped and about a 10,000th part of an inch; the *Bacillus* is a little larger than the latter and also rod-shaped (but the term "bacillus" is also used in a general sense); while the *Spirillum* is of a wavy form. In one thing, however, they all agree. They all consist of a kind of protoplasm (a jelly-like substance resembling white of egg) inclosed by a colorless or colored membrane, which may consist of cellulose or other material, and as organs of locomotion they possess the fine filaments known as cilia. Their reproduction is secured either by a dividing process (fission), in which the organism breaks in the middle, each part becoming an independent microbe; or by the formation of spores, which, when sufficiently nourished, become liberated and develop into forms similar to the adults.

It is only in quite recent times that the science of bacteriology has come into existence, and while much useful knowledge of these micro-organisms has been acquired, much still remains to be learned regarding them. It has been found that the action and life history of some of them are associated with serious diseases, such as diphtheria, tuberculosis, cholera, anthrax, erysipelas, tetanus, etc., each disease having its special bacillus; but others again are highly beneficial in the work they perform, as those that exist in abundance in many soils, and that carry on the process of nitrification, and so furnish nitrogen in a form in which it may be taken up by plants. For scientific purposes and experiment it is now common to cultivate bacteria artificially in some fluid, especially a gelatinous fluid, or in some more or less solid matter, in which they can live and multiply. Heat also destroys bacteria, and by this means a fluid may be "sterilized," that is, the bacteria or germs in it may be killed. Bacteria are extremely numerous as regards kinds or species, and are found almost everywhere—in air, soil, and water, in foods and beverages, on man and animals, both externally and internally; and it is often very difficult to distinguish one of these microbes from another.

*Plants or Animals.*—Bacteria possess characteristics of plants and animals. They resemble animals in their common power, independent motion, and in their habit of living upon complex bodies for food. But in general form, methods of growth, and formation of threads and spores they resemble plants. Though there are hundreds of different species there are only three general forms—spheres, rods, and spirals, reminding of billiard balls, pencils, and cork-screws. There is some, though slight,



variation in size. All are extremely minute and never visible to the naked eye. They range in size from 1-100,000th to 1-3,000th of an inch. Some species have the power of active motion, and may be seen moving rapidly to and fro in the liquid in which they are growing. This motion is produced by flagella, which protrude from the body.

*Marvellous Multiplication.*—They multiply by simple division or fission. Each individual elongates and then divides in the middle into similar halves; each of which then repeats the process. With some species the individuals remain attached after division, forming long chains; others produce solid groups of fours, eights, or sixteens. Some species that have been carefully watched under the microscope have been found, under favorable conditions, to grow so rapidly as to divide every half hour. At this rate in one day each microbe would produce over 16,000,000 descendants. At the end of the third day they would number millions of millions, the bulk and weight of which would be enormous, were it not that their rate of multiplication is checked either by lack of food or by the accumulation of their own excreted products, which are injurious to them.

*Harmful Bacteria.*—Bacteria abound in all putrescent or fermenting mixtures containing organic matter, and are the cause of fermentation and putrefaction. Some are present in, and the cause of, certain of the zymotic or ferment diseases, such as malignant pustule, erysipelas, tuberculosis, etc. Micrococci are spheroidal bacteria, and very small, never more than 1-25000th of an inch in diameter, often less. If they are kept out of surgical wounds there is no supuration. The discovery of this fact made hundreds of operations possible which of old were thought to be out of the reach of art—hence the wonderful success of antiseptic surgery. The disease called pyæmia consists of infection by micrococci. The minute capillaries all over the body are stuffed with these. In tropical dysentery, the intestinal walls are full of them, and they are abundant in puerperal fever, hospital gangrene, and ulcerative endocarditis. Bacteria were first seen by Leeuwenhoek in 1675. They abound near the earth in the air, but Tyndall was unable to detect their presence on the higher Alpine summits. Later investigations, however, by Dr. Binot showed that though rare on the summit of Mt. Blanc, bacteria are brought there by the wind from adjacent wooded regions. According to Binot, these germs “sink into the ice or old snow, which contains one or two to the cubic centimeter, on the average.” Bacteria may be collected by drawing air through cotton wool, which stops the germs, and other methods also are used. Pasteur and Tyndall proved that liquid exposed to

air which has been filtered from bacteria never putrefies. If we admit germs for one instant the fluid putrefies in a few hours. All dust is full of the spores of bacteria, and they are even found in distilled water, being so small as to pass through 16 superimposed layers of filter-paper. These spores resist drying for a long time, some for many years. In studying bacteria we plant them in suitable culture materials and grow them at our leisure. There are many such; perhaps the best in blood serum, coagulated and sterilized by heat. A few drops of the medium are placed on a microscope slide, inoculated by a platinum needle, heated to redness, and thus sterilized. The needle is dipped into the fluid the bacteria of which it is desired to grow, and drawn across the culture-serum on the glass. In a few hours the track of the needle will be covered with colonies of young bacilli, grown from the scattered germs left by the infected needle. Unless in large colonies bacteria are invisible, owing to their minute size and transparency, and one of the greatest discoveries of medical science has been that these growths are susceptible of staining, and may thus be rendered visible, as well as the fact that various forms of them stain different ways, and may thus be distinguished. In 1880 Pasteur found that these disease germs can be weakened by certain processes, so that the attenuated virus may be used as an inoculation to prevent the stronger disease, just as vaccine lymph protects from small-pox. He found that if he cultivated the chicken cholera bacillus, and put more than two months between each cultivation, the virus became weaker and weaker, and at last innocuous. This weak cultivation he used for protection very successfully in the case of chicken cholera, as well as in anthrax and hydrophobia. Bone dust used as manure has been known to infect human beings, as the spores are of almost incredible endurance in resisting destructive agents, age seeming in nowise to impair their virulence. Dr. Sternberg, Surgeon-General, United States Army, found them perfectly active after 11 years; even five months' sojourn in alcohol having a tonic effect on them rather than the contrary. When introduced into the body they grow with enormous rapidity, and live upon the oxygen of the blood, hence death results from asphyxia, with dyspnœa, cyanosis, and low temperature. Hydrophobia, that much dreaded disease, was shorn of much of its terrors by Pasteur, and he successfully attenuated its virus, and protected thereby the lower animals. In pneumonia abundant micrococci exist, and their inoculation, or even presence in the air, caused the disease, an acute lobular pneumonia, in animals, the lungs swarming with the organisms. In typhoid fever a peculiar bacillus is found, but as



none of the lower animals are subject to this disease it has not been artificially produced. In leprosy the bacillus lepræ is well known, and is used to make the diagnosis; but, for a similar reason, the disease has not yet been distinctly inoculated.

*Bacillus Tuberculosis.*—Very great interest attaches to the bacillus tuberculosis, which is so constantly present that it is used as a means of differentiating the inflammatory diseases of the lungs from tuberculosis. This organism always produces the disease when inoculated into animals. Statistics have been published showing that the bacillus was present in 2,417 out of 2,509 cases of supposed tuberculosis, and, as it is found in very small and infrequent numbers in some cases, it is probable that it was really present sometimes when overlooked, as it is so small, and the staining is not always well done. There are several forms of lesions long considered to be tuberculosis, as cheesy glands and the like, and in many of these the bacillus has been found, proving what surgeons had suspected a long time, that these sluggish inflammatory foci may be the source of a general tubercular infection. They have long been removed for cosmetic reasons, and wisely, as it now seems. The cholera, or comma bacillus, is the latest discovery, and as Koch has successfully inoculated it, producing in animals rapid death by cholera, the appearances, both *ante* and *post mortem*, being characteristic, it seems as if the true cause was found. Dr. Ferrán, of Barcelona, in 1885 vaccinated more than 500 persons, among whom were several medical men, with an attenuated cultivation of cholera virus. The symptoms of actual inoculation were pronounced and unmistakable. After convalescence was fully established a more active dose of the cultivated virus was injected under the skin, and invariably without further effect; a fact which would seem to show that the person who had been so treated was no longer susceptible to the contagion of cholera.

*Useful Bacteria.*—In many respects bacteria are man's greatest benefactors; for upon their activities is founded the continued life of the animal and vegetable kingdoms. As microbes consume the material which serves them as food they produce chemical changes therein, resulting in simpler products called decomposition or cleavage products. Sometimes, however, they possess the power of building other compounds out of the fragments, thus building up as well as tearing down. There are various industries based upon the decomposition powers of bacteria—viz.: The maceration industries—in the separation of the valuable fibers from the useless fibrous material in the preparation of linen, jute, hemp, and cocoanut fiber; also in the commercial preparation of sponges, and often

in the early stages of leather preparation. Some 50 years ago it was found that the mysterious substance known to brewers as yeast or barm was really composed of a vast number of minute oval particles endowed with the powers of growth and multiplication, and, therefore, undoubtedly living. Pasteur spent many of the best years of his life studying yeast. He found that success in brewing depends upon the use of pure yeast. Hansen has found that for each particular kind of beer a particular kind of yeast must be used. This has led to the cultivation of pure yeasts for brewing purposes. This cultivation requires the greatest technical skill and scientific accuracy, and special laboratories have been established for the purpose.

*Bacteria as Inebriates.*—There is one exception to the general antipathy manifested by the lower creation for alcohol, which exercises such a mesmeric influence over the human race. We find among the lowest of living organisms, a single form, the capacity for alcohol of which not only equals, but far exceeds, that of the most confirmed inebriate. The organism is a microbe, the existence and properties of which were first revealed by Pasteur. It has the property of taking up its abode in alcoholic liquids of moderate strength and of there multiplying with extraordinary rapidity, consuming the alcohol and transforming it into acetic acid or vinegar, but it refuses to have anything to do with spirituous liquids which contain more than about 10 per cent of alcohol. Through the agency of this small organism the wine prepared according to the most approved methods from the choicest vintages, matured for years in the best cellars in cask and bottle, is converted in a few hours into a sour liquid, and its value reduced from dollars to as many cents.

*Bacteria in the Dairy.*—In the majority of butter-making countries the cream is subjected to a process known as ripening or souring before it is churned; the cream is allowed to stand for from 12 to 17 hours, thus giving the bacteria an opportunity to grow in it. As a result the cream becomes somewhat soured, slightly curdled, and acquires a peculiarly pleasant taste and an aroma which was not present in the fresh cream. Then the cream is churned. Not only does the ripened cream churn more rapidly and give a larger yield of butter than the sweet cream, but there are developed the peculiar flavor and aroma which are characteristic of the highest product. The process is really a fermentation comparable to the fermentation that takes place in a brewer's malt. Bacteriologists have shown that the desirable flavors and aromas depend upon the proper bacteria. The dairy-men in the great butter producing countries of Northern Europe are making practical



use of this knowledge and are utilizing pure cultures of certain bacteria which have been found to be advantageous for the purpose of cream ripening and the production of agreeable flavors. In this way the product is more accurately regulated. In this country the use of pure cultures is still quite new. In cheese making the dairyman is even more dependent upon bacteria than he is in butter making. The value of cheese depends on its flavor, which is developed during the ripening, and this ripening is the result of bacterial growth, plus favorable warmth and moisture. Attempts to make cheese from sterilized milk are always unsuccessful. The cheese does not ripen. As yet cheese manufacturers have obtained no practical results along the line of inoculation with cultures. The food value of cheese depends upon the amount of casein it contains. The market value, however, is controlled entirely by its flavor, and this flavor is a product of bacterial growth.

*Nitrifying Bacteria.*—Everywhere in fertile soil is a class of bacteria which has received the name of nitrifying bacteria. They feed on the soil ingredients and have the same effect on the simple nitrogen cleavage products the vinegar-producing species have on alcohol—viz.: bringing about a union with oxygen. Thus these nitrifying organisms form the last link in the chain that binds the animal kingdom to the vegetable kingdom. For the nitrates are left in the soil, and may now be seized upon by the roots of plants and begin once more the journey around the food cycle. In this way it will be seen that while plants, by building up compounds, form the connecting link between the soil and animal life, bacteria in the other half of the cycle, by reducing them again, give us the connecting link between animal life and the soil. The food cycle would be as incomplete without the agency of bacterial life as it would be without the agency of plant life. It has been shown in recent years that we depend on our friends, the bacteria, as agents, in reclaiming the free nitrogen from the atmosphere. Moreover, it was found that some species of plants, chiefly the great family of legumes which contains the pea plant, the bean, etc., are able to obtain nitrogen from some other source than the soil in which they grow. When a legume thus obtains that material it develops upon its roots little bunches known as root nodules, or root tubercles. Microscopic examination shows that these nodules are simply nests of bacteria which possess the power of extracting the nitrogen from the atmosphere which permeates the soil.

*Aids to Digestion.*—The attention of investigators has recently been directed to a hitherto unknown class of bacteria which

have a share in the process of digestion in the stomach of man and the animals. It has long been known that the mouth, throat, intestines and other organs of the human system were inhabited by harmless bacteria. The so-called colon bacillus, occasionally found in water, indicates that the supply has been contaminated; but unless the typhoid bacillus accompanies it, no fears are entertained in regard to the immediate consequences of drinking such a fluid. The colon bacillus does not exercise any particularly useful function; but it was announced by Vignal, several years ago, that certain other microbes found habitually in the stomach possess properties similar to that of the saliva in aiding digestion. Numerous specimens were obtained and pure cultures made. With the artificially bred microbes a lot of experiments were tried. At least two kinds of organism were distinguished. One promoted the digestion of starch and another that of meat and albuminous substances. One acted most efficiently when it was slightly acidulated. The other needed to be a little alkaline. A third species seemed to have a special fitness for promoting the action of bile on fats. Vignal shows in a general way that these microbes played a part in the work of digestion. But no evidence was adduced as to how beneficial such activity was. Dr. M. Schottelius now reveals this in the "Archiv für Hygiene und Infektionskrankheiten." His investigation was conducted with chickens. He made no cultures of bacteria for this purpose. He assumed that newly hatched chickens would acquire them with their food very soon after hatching, if no precautions were taken to prevent such a result. In order to institute a proper comparison, therefore, he made elaborate provision for raising part of his chickens in such a manner that they would not have any bacteria in them. The difference in the rapidity with which the chickens grew in size was highly significant. Those which were confined in a sterilized vessel, ate sterilized food and breathed sterilized air, increased in weight 25 per cent. in 12 days. After that there was a trifling decrease. On the other hand, those which were brought up in the ordinary manner made a gain of 140 per cent. in 12 days. This is nearly six times as great a development as that of the protected chicks. But the increase continued, and on the 17th day the unprotected chickens weighed 10 times as much as when newly hatched. This was 10 times the growth of the specimens from which the bacteria had been so carefully excluded.

**Bacteriology**, that branch of biology which treats of bacteria. The study of these microscopic organisms has developed into one of the most important branches of modern biological science. Their importance



## Bactria

to mankind rests chiefly in the fact that their nourishment consists of albuminous substances, which they convert into complex chemical compounds, many of which are highly poisonous. These poisons are called toxins, and a very minute quantity is sufficient to produce destructive changes in the blood and tissue of man and animal, causing various diseases and death. The study of the chemistry of bacteria has shown that many of them do not grow upon living matter, but will flourish upon decomposing and putrefying substances, especially those which will only multiply in animal tissue, and in combination with certain mineral or vegetable acids from definite chemical compounds, some of which resemble the vegetable alkaloids, not alone in their basic properties, but also in their poisonous character. These products are termed ptomaines.

**Bactria** (bak'trē-a), a province of the ancient Persian empire, lying N. of the Paropamisus (Hindu Kush) Mountains, on the Upper Oxus. A northern branch of the same range separated it from the Sacæ, and it had Sogdiana on the N. and Ariana on the S. It thus corresponded pretty nearly with the modern Balkh. Here many scholars locate the original home of the Aryan or Indo-European family of nations. Its capital, Baetra, or Zariaspa, was also the cradle of the Zoroastrian religion. Originally a powerful kingdom, it maintained its independence until its subjugation by Cyrus about 540 B. C., when it became a satrapy of the Persian empire. It was included in the conquests of Alexander, and formed a part of the kingdom of the Seleucidæ until the foundation, about 256 B. C., by Diodotus, of the Greek kingdom of Bactria, which extended to the Indus, and which, after a long struggle, was overthrown by the Parthians. Numerous coins with Greek legends have been found in the *topes*, or burial places to the N. E. of Kabul.

**Bactrites** (bak'trites, or bak-trī'tēs), a genus of fossil *ammonitidæ*, with a straight shell, and indented, but not ramified septa. The genus ranges from the lower silurian to the devonian.

**Bactrus**, the ancient name of a river in the province of Balkh, Central Asia, upon which Bactria was situated.

**Baculites** (bak-ū-lī'tēs), a genus of fossil ammonites, characteristic of the chalk, having a straight, tapering shell.

**Bacup**, a municipal borough of England, in Lancashire, 18 miles N. of Manchester. The chief manufacturing establishments are connected with cotton spinning and powerloom weaving; there are also iron works, Turkey-red dyeing works, and in the neighborhood numerous coal pits and immense stone quarries. Pop. (1901) 22,505.

## Badeau

**Baczko, Ludwig von** (bäks'kō), a German historian and scholar, born in Lick, Prussia, June 8, 1756; was educated at Königsberg, studying philosophy, medicine, and law, but became blind in 1777, through an attack of small-pox. In 1816, he was appointed Director of the Institute for the Blind at Königsberg. He is the author of "A History of Prussia," a "History of the French Revolution," and "Concerning Myself and My Companions in Misfortune, the Blind" (1807). He died March 27, 1823.

**Badagri, or Badagry**, a British seaport on the Bight of Benin, in the extreme S. W. corner of the British Niger Territory, Africa. Early in its history, it was a noted slave mart; contained important manufactories; and had a population of 10,000. It was from this place that in 1825 Clapperton and Lander started on their expeditions to explore the African interior.

**Badajoz** (bä-dä-hōth'), the fortified capital of the Spanish province of Badajoz, on the left bank of the Guadiana, which is crossed by a stone bridge of 28 arches. It is a bishop's see, and has an interesting cathedral. During the Peninsular War, Badajoz was besieged by Marshal Soult, and taken in March, 1811. It was twice attempted by the English, on May 5 and 29, 1811; was besieged by Wellington on March 16, and taken April 6, 1812. Pop. 30,899.

**Badakshan** (bad-ak-shan'), a territory of Central Asia, tributary to the Ameer of Afghanistan. It has the Oxus on the N. and the Hindu Kush on the S.; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. 100,000.

**Badalocchio, Sisto Rosa** (ba-dal-ōk'yō), an Italian artist, born in Parma, in 1581; was a pupil of Annibale Carracci, and afterward his assistant. His most celebrated painting is "St. Francis Receiving the Stigmata," and he also executed a number of engravings of paintings by Carracci, Corregio, Raphael, etc. He died in Bologna, in 1647.

**Badderlocks**, also sometimes honeyware, or henware (*alaria esculenta*), an olive-colored sea weed belonging to the *phæosporeæ*, and allied to the common *laminaria*, which grows on rocks in deep water on the shores of Britain, Iceland, and the northern parts of Europe. It has a short cylindrical stem with lateral spore bearing processes, and a membranous olive green frond of 2 to 12 feet long, with a stout midrib. This midrib, together with the fruits, is eaten by the inhabitants of the sea coasts of Iceland, Denmark, Scotland, Ireland, etc., and is said to be the best of the esculent algæ. The name is supposed to be a corruption of balder-locks.

**Badeau, Adam** (ba-dō'), an American military officer, born in New York city, Dec.



29, 1831; educated at private schools. He served with gallantry in the Union army during the Civil War; was on the staff of General Sherman in 1862-1863, and secretary to General Grant in 1864-1869; and in the latter year was retired with the rank of Captain in the regular army and of Brevet Brigadier-General of Volunteers, and was appointed Secretary of Legation in London. He was Consul-General in London, 1870-1881, and during this period was given leave of absence to accompany General Grant on his tour around the world (1877-1878). In 1882-1884 he was Consul-General in Havana. After the death of General Grant he brought suit against his heirs for payment of services which he asserted had been rendered in the preparation of General Grant's "Memoirs," but lost his case. His publications include "The Vagabond" (New York, 1889); "Military History of Ulysses S. Grant" (3 vols., 1867-1881); "Conspiracy; A Cuban Romance" (1885); "Aristocracy in England" (1886), and "Grant in Peace" (1886). He died in Ridgewood, N. J., March 19, 1895.

**Baden** (bäd'en), **Grand Duchy of**, one of the more important States of the German empire, situated in the S. W. of Germany, to the W. of Württemberg. It is divided into four districts, Constance, Freiburg, Karlsruhe, and Mannheim; has an area of 5,823 square miles, and pop. (1905) 2,010,728.

*Topography.*—It is mountainous, being traversed to a considerable extent by the lofty plateau of the Schwarzwald, or Black Forest, which attains its highest point in the Feldberg (4,904 feet). The nucleus of this plateau consists of gneiss and granite. In the N. it sinks down toward the Odenwald, which is, however, of different geological structure, being composed for the most part of red sandstone. The whole of Baden, except a small portion in the S. E., in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the S. and W. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and include a considerable part of the Lake of Constance. The climate varies much. The hilly parts, especially in the E., are cold and have a long winter, while the valley of the Rhine enjoys the finest climate of Germany. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits, also. Of

the total area, 42 per cent. is under cultivation, 37 per cent. under forest, and 17 per cent. under meadows and pastures. The farms are mostly quite small. The manufactures are important. Among them are textiles, tobacco, and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes and other musical toys. The capital is Karlsruhe, about 5 miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Baden, and Heidelberg. Baden has warm mineral springs, which were known and used in the time of the Romans. Heidelberg has a university (Protestant), founded in 1386, the oldest in the present German empire. The railways have a length of 850 miles, and are nearly all State property.

*History.*—In the time of the Roman Empire, Southern Baden belonged to the Roman province of Rætia. Under the old German empire it was a margravate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of Grand Duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power is vested in the Grand Duke, the legislative in a House of Legislature, consisting of an Upper and a Lower Chamber. The former consists partly of hereditary members; the latter consists of elected representatives of the people. The revenue is mainly derived from taxes on land and incomes, and the produce of crown-lands, forests, and mines. The revenue in 1898 was \$19,283,644, and the expenditure, \$20,876,540. Baden sends three members to the German Bundesrath, or Federal Council, and 14 deputies to the Diet. Two-thirds of the population are Roman Catholics, the rest Protestants.

**Baden-Baden**, a town in the Grand Duchy of Baden; pop. (1905) 16,238. It is chiefly celebrated for its medicinal springs, which were known at the time of the Romans. Its gaming tables, the most renowned in Europe, were closed with the rest of the licensed German gaming houses in 1872. The mineral springs consist of thermal saline waters, whose temperature varies from 130° to 154° F. They contain chloride of sodium, with sulphate of lime, carbonate of iron, and carbonic acid, and a small quantity of lithia, and are used chiefly as hot baths, while the sufferer from chronic gout and rheumatism, dyspepsia from overwork, nervous affections, etc., is enjoying change of scene and a mild, pure atmosphere.

**Baden-bei-Wien** (bäd'en-bī-vēn'), a much frequented watering place of Lower Austria, about 15 miles S. S. W. of Vienna. It was the Aquæ Pannoniæ, or Cethiæ of the



Romans, and is still famous for its warm mineral springs, which are frequented during the season by from 12,000 to 15,000 persons, chiefly from the Austrian capital. Season from July to September. Pop. 6,050.

**Baden-Powell, Sir George Smyth**, an English politician and political writer, born in Oxford, Dec. 24, 1847. He became a member of various important commissions, among others that on United States and Canadian fisheries (1886-1887); the new Malta Constitution (1887); the Bering Sea inquiry (1891); the Joint High Commission (Washington, 1892); and the Paris Arbitration (1893). He was author of "New Homes for the Old Country" (1872), a storehouse of information about Australia; "Protection and Bad Times" (1879); "State Aid and State Interference" (1882); "The Truth About Home Rule" (1888); "The Land Systems of India" (1892), etc. He was a member of Parliament from Liverpool from 1885 till his death, Nov. 20, 1898.

**Baden-Powell, Robert Stevenson Smyth**, a British military officer; born in London, Feb. 22, 1857; was educated at the Charterhouse School; joined the 13th Hussars in 1876; was Adjutant in India, Afghanistan, and South Africa; Assistant Military Secretary on the staff in South Africa in 1887-1889; took part in the operations in Zululand, for which he was highly commended, in 1888; Assistant Military Secretary in Malta in 1890-1893; on special service in Ashanti, commanding the native levies, 1895, for which he was brevetted Lieutenant-Colonel; chief staff officer in the Matabeleland campaign, for which he was brevetted Colonel and became Lieutenant-Colonel, commanding the 5th Dragoon Guards, in 1897. In the war in South Africa in 1899-1900, he signally distinguished himself by his grand defense of Mafeking, Cape Colony. The Boers made the first attack on the town, Oct. 15, 1899, and were repulsed by his small force. On Oct. 21, the town was bombarded for four hours, and thereafter was fired upon almost daily. In November, the besieged made a successful attack on the Boers, but in the following month they sustained heavy losses in a sortie against them. The first column for the relief of the town started on Dec. 3. On Feb. 18, 1900, the Boers made a determined assault on the outworks, but were again repulsed. The relieving column met with reverses Feb. 2, March 14, and March 31. A second relief column was started March 5, and a third, March 25. On the last date the town was again bombarded, but without serious effects. On April 24, a still more determined bombardment was opened; on May 12, a desperate engagement occurred between the besieged and the besiegers; and on the 16th, the plucky garrison was relieved. In recogni-

tion of this heroic defense, the Queen promoted Baden-Powell to be a Major-General. In 1903 he visited the United States and received high honors. He published "Reconnaissance and Scouting" (1890); "Vedette" (1890); "Cavalry Instruction" (1895); "The Downfall of Prempeh" (1896); "The Matabele Campaign" (1896), etc.

**Badeni** (bäd'en-ē), **Count Cassimir Felix**, an Austrian statesman; born in Poland, Oct. 14, 1846. His father, though poor, was a man of intellect, and was made a count by the King of Poland just before the birth of Cassimir. He also fell heir to a fortune, and his two sons received a university education. Cassimir entered the Austrian civil service; became district chief at Zolkiew in 1871; Minister of the Interior in 1873; Governor of Galicia in 1888; and Prime Minister of Austria-Hungary, Sept. 15, 1895. In April, 1897, because of inability to maintain a Liberal majority in the newly elected Reichsrath, he resigned with his cabinet, but the emperor declined to accept his resignation, and he remained in office until Nov. 28, when he again resigned and a new cabinet was organized. The principal feature of his administration and the one which not only caused his fall, but a long period of political agitation, was his introduction of what is known as the "language ordinance," which allowed the official use of the Czech language in Bohemia and Moravia. This measure alienated the Germans and provoked a racial conflict of a most bitter character between them and the Czechs. He died July 9, 1909.

**Badenweiler** (bäd'en-vī'ler), a watering place in the grand duchy of Baden, near Müllheim. Its mineral springs are now rated among the indifferent waters, and it is of interest chiefly for the ruins of Roman baths that were discovered in 1847. The foundation of the town is referred to the time of Hadrian, and the remains of the vapor baths, of which there are excellent specimens, are supposed to be of the same period. The ruins show a division for men and for women, each having a large outer court opening into a dressing-room; there is the hot-air bath, the warm bath, and the cold bath. The walls and steps are in their original position. The whole structure is 318 feet by 90 feet.

**Badge**, a distinctive device, emblem, mark, honorary decoration, or special cognizance, used originally to identify a knight or distinguish his followers, now worn as a sign of office or licensed employment, as a token of membership in some society, or generally as a mark showing the relation of the wearer to any person, occupation, or order.

**Badger**, a plantigrade, carnivorous mammal, allied both to the bears and to the weasels, of a clumsy make, with short, thick legs, and long claws on the fore feet. The



only species known are two, the European (*M. vulgaris*) and American (*M. Labradorica*). The European badger has a broad, white stripe from its forehead down to the nose; and a longitudinal black stripe begins between the eye and snout, on each side, dilating as it goes backward, until it includes the eye and the ear, behind which it terminates. The hair covering the body is harsh, long, scattered, and of three colors, white, black, and red, differing in the proportion of these tints in different parts. Black is the predominant color on the inferior parts of the body.

The American badger is only found in the remote W. sections of the United States and in some parts of the British possessions in North America. It is very different from the European in physiognomy, having a forehead projecting considerably above the root of the nose, which, in the European species, forms a continuous line with the forehead, and in having a longer tail, covered with long hair, reaching almost to the ground when the animal is walking. The tail of the European badger is not more than half the length of the legs. The color of the American badger is chiefly grayish, and lighter than that of the European. The hair is soft and is used in furriery; a white stripe runs between the ears from nose to neck. It is more carnivorous than the European badger. The weight of the American species is from 14 to 18 pounds.

**Badger, George Edmund**, an American statesman, born in Newbern, N. C., April 13, 1795; was graduated at Yale College in 1813; became a lawyer at Raleigh; and was Judge of the North Carolina Superior Court in 1820-1825. He was appointed Secretary of the Navy, March 14, 1841, resigning after the death of President Harrison, and was elected to the United States Senate in 1846 and 1848. In 1853 he was nominated for Justice of the United States Supreme Court, but was not confirmed. He served in the State Convention called to pass on the question of secession, although opposed to such measure, and after making a strong speech in defense of the Union, was afterward known as a member of the Conservative Party. He died in Raleigh, N. C., April 13, 1866.

**Badger, Oscar C.**, an American naval officer, born in Windham, Conn., Aug. 12, 1823; entered the United States navy, Sept. 9, 1841; became Lieutenant-Commander, July 16, 1862; Commander, July 25, 1866; Captain, Nov. 25, 1872; Commodore, Nov. 15, 1881; and was retired Aug. 12, 1885. He served on the steamer "Mississippi" during the Mexican War, taking part in the attack on Alvarado, in 1846; led the party that attacked and destroyed the village of Vutia, Fiji Islands, while on the sloop "John Adams," in 1855-1856; and in the

Civil War commanded the ironclads "Patapsco" and "Montauk," in the operations in Charleston Harbor in 1863; and was Acting Fleet Captain on the flagship "Weehawken" in the attack on Fort Sumter, Sept. 1, 1863. He died in Concord, Mass., June 20, 1899.

**Badghis** (bäd'gis), a region N. of Herat, comprising the country between the Murghab and the Harirud rivers, as far N. as the edge of the desert. It lies just to the S. of the boundary line between Afghanistan and the Russian territories, as defined in 1887.

**Badgley, Sidney Rose**, a Canadian architect, born near Kingston, Ont., May 28, 1850. He studied architecture in Toronto, and, after practicing some time in St. Catharines, established himself in Cleveland, O. He has made a specialty of the architecture of churches and public buildings, and has planned and erected churches in almost all parts of Canada and the United States, and, among other structures, the Massey Music Hall, Toronto; the Slocum Library and Perkins Observatory, in Ohio; Wesleyan University, in Delaware, and the Medical College, in Cleveland. He published an "Architectural Souvenir" (1896).

**Badham, Charles**, an English educator, born in Ludlow, July 18, 1813; was considered one of the most eminent classical scholars of his day; and after serving for several years as Head Master of King Edward VI.'s Grammar School at Louth, he became Professor of Classics and Logic in the University of Sydney, Australia, in 1867. While in Sydney he established a system of teaching by correspondence, similar to the present university extension scheme. He published a number of works on Greek classics, and "Criticism Applied to Shakespeare" (1846). He died in Sydney, Feb. 26, 1884.

**Badia y Lablich, Domingo** (bäd-ē'a-ē-lä-blēck'), a Spanish traveler, best known by his assumed name, ALI BEY, born in Barcelona, in 1766; acquired the mastery of Arabic, and, disguising himself as a Mussulman, went to Africa in 1801, and, after residing in Morocco two years, made a journey to Mecca, being the first Christian to visit that city since the institution of Islam. On his return to Spain, in 1812, he was appointed Prefect of Cordova. He published "Voyage d' Ali-Bei en Afrique et en Asie" (1814). He died in Syria, Aug. 30, 1818.

**Badigeon** (bad-ē'jē-on), a preparation of sawdust, slaked lime, powdered stone, and alum, for coloring the walls of houses; a mixture of plaster and freestone used by sculptors in repairing defects in their work; a kind of cement used by joiners, etc.

**Badinguet** (bad-an-gā), afterward RADOT, a Moor, as whom Napoleon III. masqueraded



rated to escape from the fortress of Ham in 1846; afterward a nickname for Napoleon III. He died in 1883.

**Badlam, Stephen**, an American military officer, born in Milton, Mass., March 25, 1748; entered the Revolutionary army in 1775; became commander of the artillery, in the Department of Canada. On the announcement of the adoption of the Declaration of Independence, he took possession of the heights opposite Ticonderoga, and named the place Mt. Independence. Subsequently he rendered good service at Fort Stanwix, and in 1799 was made Brigadier-General. He died in Dorchester, Mass., Aug. 24, 1815.

**Bad Lands**, tracts of land in the N. W. part of the United States. The absence of vegetation enables the rains to wash clean the old lake beds, and in many instances to disclose remarkable fossils of extinct animals. They were first called Bad Lands (*mauvaises terres*) by the French explorers in the region of the Black Hills in South Dakota, on account of the ever changing irregularity of the surface, which the rain causes by the unconsolidated sediment moving into hills and ravines upon the solid strata.

**Badminton**, a special, sweetened claret, named for the Duke of Beaufort (of Badminton). As he was a patron of pugilists, the term came to mean, in the prize ring, blood, for which claret was previously a slang term.

**Badminton**, a popular game, closely resembling lawn tennis, played with battledore and shuttlecock on a rectangular portion of a lawn. The ground is divided crosswise by a strip of net, not less than three inches wide, suspended from poles at a height of five feet. As in lawn tennis, the ground on either side of the net is divided lengthwise into right and left courts. The first player, standing on a specified part of his right court, must strike the shuttlecock so as to fall across the net into the back section of the right court opposite. The opponent strikes it back, then it is returned by the first player, and so on till the first player misses the shuttlecock. After the first stroke, it suffices that the shuttlecock be sent across the net, if it does not fly beyond the boundaries.

**Badrinath** (-at'), a peak of the main Himalayan range, in Garhwal district, Northwestern Provinces, India; 23,210 feet above the sea. On one of its shoulders, at an elevation of 10,400 feet, stands a celebrated temple of Vishnu, which some years attracts as many as 50,000 pilgrims.

**Bæbia Gens** (bē'bya or bib'ya), a plebeian clan of ancient Rome. The first member of the family to obtain the consulship was Cn. Bæbius Tamphilus (182 B. C.). The

other distinguished ones are known under their family names, Dives, Herennius, Sulca, etc.

**Baedeker** (bā'de-ker), **Karl**, a German publisher, born in 1801; originator of a celebrated series of guide-books for travelers. He died in 1859.

**Baele** (ba'le), an African tribe, dwelling N. E. of Lake Tchad. It is nomadic, half heathen and half Mohammedan, and owns large herds of cattle, camels, goats, and sheep.

**Baena, Antonio** (bā-yā'nā), a Portuguese-Brazilian historian and geographer, born in Portugal about 1795; was an officer in the Portuguese, afterward in the Brazilian, army. He studied the geography and history of the Amazon valley. His principal works were "The Ages of Pará" (1838), a historic compend stopping at 1823, and "Chorographic Essay on the Province of Pará" (1839), a geographical and statistical work, giving the details of explorations made by himself. He died in Pará, March 28, 1850.

**Baer, Karl Ernst von** (bǎr), a Russian naturalist, famous especially as an embryologist, born at Piep, Esthonia, Feb. 28, 1792; was Professor of Zoology at Königsberg (1819), and Librarian of the Academy of Sciences at St. Petersburg (1834). His principal works were "History of the Development of Animals" (2 vols., 1828-1837), and "Researches Into the Development of Fishes" (1835). He died at Dorpat, Nov. 28, 1876.

**Baert, Alexandre Balthazar François de Paule, Baron de** (bǎr), a French author, born in Dunkirk, about 1750; became a Deputy in the General Assembly of 1789. When the Revolution became the Reign of Terror, he fled to the United States, remaining there some years. He returned to France in 1815, and once more became Deputy, maintaining his old position as a moderate reformer. He published two historical works, one on Great Britain and her colonies, the other on the country between the Black and Caspian Seas. He died in Paris, March 23, 1825.

**Bætica** (bī'tē-ka), an old Roman province, the central of the three divisions of ancient Spain, famed for its fertility, its mines of iron, gold, and silver, and its delightful climate. These advantages gave rise to a number of fabulous stories, which made it the home of Geryon, an assailant of Hercules, and placed there the Elysian Fields. Its cities were chiefly Phœnician and Carthaginian colonies, and became Roman possessions. Later it passed into the hands of the Vandals, and it was the first province conquered by the Moors.

**Baeyer, Adolf von** (bǎ'yer), a German chemist, born in Berlin, Oct. 31, 1835; son



## Baeyer

of Johann Jakob Baeyer; became Professor of Chemistry at Strasburg in 1872, and at Munich, in 1875, succeeding Liebig at the latter. He made many important discoveries in organic chemistry, especially cerulein, eosin, and indol.

**Baeyer, Johann Jakob**, a Prussian geometrician, born in Müggelsheim, Nov. 5, 1794; was an army volunteer in the campaigns of 1813 and 1814; joined the army in 1815; and became a Lieutenant-General in 1858. He had charge of a number of geodetic surveys; was elected President of the Geodetic Institute in Berlin in 1870; and was the author of numerous treatises on the refraction of light in the atmosphere, the size and form of the earth, etc. He died in Berlin, Sept. 10, 1885.

**Baez, Buenaventura** (bä'āth), a Dominican statesman, born in Azua, Haiti, about 1810; aided in the establishment of the Dominican Republic; was its President in 1849-1853; was then expelled by Santa Ana and went to New York city; was recalled in 1856, on the expulsion of Santa Ana, and again elected President; and was re-elected President in 1865 and 1868. During his last term, he signed treaties with the United States (Nov. 29, 1869) for the annexation of Santo Domingo to the United States, and for the cession of Samana Bay. The treaties failed of ratification in the United States Senate, and caused the downfall of Baez. He died in Porto Rico, March 21, 1884.

**Baeza** (bä-ā'tha), a town, Spain, in Andalusia, 22 miles E. N. E. from Jaën, with 10,851 inhabitants. The principal edifices are the cathedral, the university (now suppressed), and the old monastery of St. Philip de Neri.

**Baffa** (ancient Paphos), a seaport on the S. W. coast of Cyprus. Pop. 1,000. It occupies the site of New Paphos, which, under the Romans, was full of beautiful temples and other public buildings. Old Paphos stood a little to the S. E.

**Baffin, William**, an English navigator and discoverer, believed to have been born in London about 1584; but the earliest known fact regarding him is that he sailed in 1612 as pilot of the "Patience" from Hull, on a voyage of discovery to Greenland. In 1613-1614 he served in the Spitzbergen whale fishery, and he wrote an account of this and his previous voyage. In 1615 he took service with a company as pilot of the "Discovery," in search of a northwest passage, and made a careful examination of Hudson Strait. His recorded latitudes and notes of the tides are in remarkable agreement with those of a later date. In the following year, with Capt. Bylot, he discovered, charted, and named

## Bagatelle

Smith Sound, and several others, and explored the large inlet now associated with his name. Later investigation has confirmed his descriptions. His last voyages, 1616-1621, were to the East. At the siege of Ormuz, which the English were helping the Shah of Persia to recover from the Portuguese, he was killed, Jan. 23, 1622. See "Voyages of William Baffin, 1612-1622," edited by C. R. Markham (1880).

**Baffin Land**, a Canadian island, crossed by the Arctic Circle; area, 236,000 square miles.

**Baffin Sea** (erroneously styled a Bay), a large expanse of water in North America, between Greenland and the lands or islands N. of Hudson Bay, extending from 68° to 78° N., and 55° to 80° W. It communicates with the Atlantic Ocean by Davis Strait on the S., with the Arctic Ocean by Lancaster Sound and Jones Sound on the W., and with the Polar Sea by Smith Sound and Robeson Channel on the N. Depth, 200-1,050 fathoms. The tides do not rise more than 10 feet. The surface of the sea is covered with ice during the greater part of the year, which extends from shore to shore in winter, though possessing a slow, southward movement. In spring and summer, the great mass, known as the middle ice, begins to move less slowly southward, leaving navigable passages on the side of Greenland and America, and occasional channels, or crossings, between these coasts. The coasts are mountainous, barren, and deeply indented with gulfs. Whale and seal fishing is followed. This sea was discovered by the English navigator, Baffin, in 1616, while in search of a passage to the Pacific.

**Bagamoyo** (bag-a-moi'o), a town of German East Africa, on the coast opposite the island of Zanzibar; pop. (1899) about 13,000. It is an important trading station for ivory, gum and caoutchouc. There is telegraph connection with Zanzibar and the neighboring coast towns. Bagamoyo is a point of departure for caravans into the interior, but its harbor is not accessible to the largest vessels. The chief imports are cottons, iron ware, rice, oil, spirits, and beer.

**Bagasse** (bä-gäs'), the sugar cane in its dry, crushed state, as delivered from the mill, and after the main portion of its juice has been expressed; used as fuel in the sugar factory, and called also cane trash.

**Bagatelle**, a game played on a long, flat board, covered with cloth like a billiard-table, with spherical balls and a cue, or mace. At the end of the board are nine cups, or sockets, of just sufficient size to receive the balls. These sockets are arranged in the form of a regular octagon,



with the ninth in the middle, and are numbered consecutively from one upward. Nine balls are used, generally one black, four white, and four red, the distinction between white and red being made only for the sake of variety. In the ordinary game, at starting, the black ball is placed on a point in the longitudinal middle line of the board, a few inches in front of the nearest of the sockets, and the player places one of his eight balls on a corresponding point at the other end of the board, and tries to strike the black ball into one of the sockets with his own. After this, his object is to place as many of his balls as possible in the sockets. Each ball so placed counts as many as the socket is numbered for, and the black ball always counts double. He who first makes the number of points agreed on wins.

**Bagaudæ** (bag'ō-dī), a Gallic tribe which revolted under Diocletian and was subdued by Maximian in 286 A. D.

**Bagby, George William**, an American physician and humorist, born in Buckingham co., Va., Aug. 13, 1828; wrote under the pseudonym "Mozis Addums." He was editor of the Lynchburg "Express" (1853), and "Southern Literary Messenger" (1859); State Librarian of Virginia (1870-1878), and contributor to various magazines. He wrote "John M. Daniel's Latch-Key" (1868); "What I Did With My Fifty Millions" (1875), and "Meekins' Twinses" (1877). He died in Richmond, Va., Nov. 29, 1883.

**Bagdad** (bag-dad'), capital of the Turkish *vilayet* and city of the same name, in the southern part of Mesopotamia (now Irak Arabi). The greater part of it lies on the eastern bank of the Tigris, which is crossed by a bridge of boats; old Bagdad, the residence of the caliphs (now in ruins), was on the western bank of the river. The modern city is surrounded with a brick wall about 6 miles in circuit; the houses are mostly built of brick, the streets unpaved, and very narrow. The palace of the Governor is spacious. Of the mosques, only a few attract notice; the bazaars are all large and well stocked; that of Dawd Pasha still ranks as one of the most splendid in the world. Manufactures: leather, silks, cottons, woolens, carpets, etc. Steamers ply on the river between Bagdad and Bassorah, and the city exports wheat, dates, galls, gum, mohair, carpets, etc., to Europe. Bagdad is inhabited by Turks, Arabs, Persians, Armenians, Jews, etc., and a small number of Europeans. The Turks compose three-fourths of the whole population. The city has been frequently visited by the plague, and, in 1831, was nearly devastated by that calamity. Bagdad was founded in 762, by the Caliph Almansur, and raised to a high

degree of splendor, in the 9th century, by Haroun Al Raschid. It is the scene of a number of the tales of the "Arabian Nights." In the 13th century it was stormed by Hulaku, grandson of Genghis-Khan, who caused the reigning caliph to be slain, and destroyed the caliphate. The *vilayet* has an area of 54,503 square miles, and an estimated population of 850,000, and the city an estimated population of 145,000.

**Bagdad**, a town in Tamaulipas, Mexico, near the mouth of the Rio Grande; was of great importance during the Civil War to Confederate blockade runners.

**Bage, Robert** (bāj), an English novelist, born at Darley, Derbyshire, Feb. 29, 1728; began to write at the age of 53. Among his works were "Mount Henneth" (1781); "Barham Downs" (1784); "Hernsprong, or Man as He Is Not" (1796), etc. He died at Tamworth, Sept. 1, 1801.

**Bagehot, Walter** (bāj'ot), an English writer on political economy and government, born in Langport, Somersetshire, Feb. 3, 1826; was graduated at University College, London, studied law, and was admitted to the bar; but never entered practice. He became connected with his father's banking house and was drawn to the study of economics and political science. At first, a follower of Ricardo, he grew independent in his treatment of economic themes, and in certain aspects prepared the way for the labors of the historic school. For many years he was proprietor and editor of the "London Economist." As a writer, Bagehot was marked by a rare combination of spirited, brilliant style and deliberate judgment. His chief works are: "The English Constitution" (1867); "Physics and Politics," in which the life and growth of nations are studied in the light of Darwin's theory (1863); "Lombard Street: a Description of the Money Market," a treatise on money and its functions of great vogue (1873; 8th ed. 1878); "The Depreciation of Silver" (1877); and, posthumously, "Literary Studies" (1879); "Economic Studies" (1880), and "Biographical Studies" (1880). He died in Langport, England, March 24, 1877.

**Baggage**, a term supposed to be derived from the old French word *baguc*, meaning bundle. As ordinarily used, it includes trunks, valises, portmanteaus, etc., which a traveler carries with him on a journey. In England the word luggage is used to convey the same meaning. In a military sense, the word includes the tents, furniture, utensils, and whatever else is indispensable to the comfort of an army.

**Baggara** (bag'ra), an Arabic-speaking Hamitic tribe of the Upper Nile Valley. They occupy this valley as far E. as the ter-



## Baggesen

ritory of their neighboring negro tribesmen, the Shilluk. They are nomads, Egyptian soldiers, hunters, etc.

**Baggesen, Jens** (bäg'e-sen), a Danish poet; born in Korsør, Zealand, Feb. 15, 1764. He became involved in a great literary feud with Oehlenschläger. His first poetic effort, "Comic Tales" (1785), at once attracted attention; but "The Labyrinth" (1792), afterward entitled "Wanderings of a Poet," a description of his traveling impressions, equally distinguished for its overflowing humor and finished style, is his most important work, a landmark in Danish prose literature. In 1796 he was appointed a professor in the University of Copenhagen; in 1811 Professor of the Danish Language in the University of Kiel; in 1814 he returned to Copenhagen, where his feud with Oehlenschläger led him to take up his abode in Paris in 1820. Several collections of his works have been published. He died in Hamburg, Oct. 3, 1826.

**Baghelkand** (bag'el-kand), a tract of country in Central India, occupied by a collection of native States (Rewah being the chief, under the Governor-General's agent for Central India); area, 11,323 square miles; pop. 1,512,595.

**Bagheria**, or **Bagaria**, a town of Sicily, 8 miles E. by S. of Palermo by rail. It is beautifully situated at the base of the isthmus which separates the Bay of Palermo from that of Termini, and is surrounded by groups of palatial villas of the Sicilian nobility. Pop. 12,650.

**Baghistan.** See BEHISTUN.

**Bagirmi** (bag-ēr'mē), or **Baghermi**, a country in Central Africa, bounded on the W. by Bornu and a portion of Lake Tchad, and with the powerful Sultanate of Wadai to the N. E. Its area is estimated at nearly 71,000 square miles. The surface is flat, with a gentle rise toward the N.—its general elevation being about 1,000 feet above sea level. It is traversed and watered by the Shari and its affluents. The soil yields durra and millet, which the natives barter for tobacco, pearls, and cowry shells. The total population is about 1,500,000. Mohammedanism has been introduced among them, but gross superstitions still prevail. Dr. Naehrigal describes the natives as of the Sonrhai type, of low stature, and not of pleasant features. Though they wear almost no clothing, they are in many respects semi-civilized, having a regular government in the capital, Maseña, as well as a military system. The Sultan of Wadai took the capital in 1871, reducing the Sultan of Bagirmi to a more complete state of vassalage to him. The country was first visited by Barth in 1852. Most of it was recognized as in the German sphere by the Anglo-Ger-

## Bagni di Lucca

man agreement of 1893; but in 1900 it came under French influence.

**Bagley, Worth**, an American naval officer, born in Raleigh, N. C., April 6, 1874; was graduated at the United States Naval Academy in 1895; promoted to Ensign, July 1, 1897, and was detailed as inspector to the new torpedo-boat "Winslow" in November following. This boat went into commission the next month, and he was appointed her executive officer. In April, 1898, the "Winslow" was assigned to the American fleet off the coast of Cuba, and on May 9, while on blockading duty at the harbor of Cardenas, with the "Wilmington" and "Hudson," drew the fire of several Spanish coast-guard vessels. All the American vessels escaped untouched. Two days afterward, the three vessels undertook to force an entrance into the harbor, when they were fired on by Spanish gunboats. The "Winslow" was disabled, and with difficulty was drawn out of the range of the enemy's guns. The "Wilmington" then silenced the Spanish fire, and as the action closed, Ensign Bagley and four sailors on the "Winslow" were instantly killed by a shell, he being the first American naval officer to fall in the war with Spain.

**Baglivi, Giorgio** (bag-lē-vē), an Italian physician, born in Ragusa, Sicily, in 1669; became a disciple of the celebrated physiologist and anatomist, Malpighi; was appointed Professor of Medicine in the College de Sapienza, in Rome, by Pope Clement XI., and afterward became Professor there of Anatomy also. In opposition to the system known as Galenism, in medicine, he founded that of solidism. His principal writings were published under the title of "Opera Omnia Medico-Practica" (1704). He died in Rome, in 1707.

**Bagnacavallo, Bartolommeo Ramenghi** (ban-ya-ka-vä'lō), an Italian painter, born in 1484; called Bagnacavallo from the village where he was born. At Rome he was a pupil of Raphael, and assisted in decorating the gallery of the Vatican. He died in 1542.

**Bagneres de Bigorre** (bän-yār' de bē-gôr'), a watering place of France. Department of Hautes Pyrénées, on the left bank of the Adour. It owes its chief celebrity to its baths, which are sulphurous and saline, but it has also manufacturing and other industries.

**Bagneres de Luchon** (lū-shôn'), a town of France. Department of Haute Garonne, in a valley surrounded by wooded hills; one of the principal watering places of the Pyrenees, having sulphurous thermal waters, said to be beneficial in rheumatic complaints.

**Bagni di Lucca** (bän-yē dē lö'kä), a bathing place of Italy, 17 miles N. of Lucca; in



## Bagno a Ripoli

the fine valley of the Lima river, a branch of the Serehio; has hot springs of various temperature from 96° to 136° F.

**Bagno a Ripoli**, an Italian village, 5 miles distant from Florence, containing baths, around which wealthy Florentines have built palaces and villas.

**Bagno in Romagna** (rō-män'ya), an Italian bathing place, 35 miles E. by N. of Florence, on the right bank of the Savio, near its source. It has hot springs of temperature 108°–110° F., in which natron is present.

**Bagpipe**, a musical wind instrument of very great antiquity, having been used among the ancient Greeks, and being a favorite instrument over Europe generally in the 15th century. It still continues in use among the country people of Poland, Italy, the S. of France, and in Scotland and Ireland. Though now often regarded as the national instrument of Scotland, especially Celtic Scotland, it is only Scottish by adoption, being introduced into that country from England. It consists of a leather bag, which receives the air from the mouth, or from bellows; and of pipes, into which the air is pressed from the bag by the performer's elbow. In the common, or Highland form, one pipe (called the chanter) plays the melody; of the three others (called drones), two are in unison with the lowest A of the chanter, and the third and longest an octave lower, the sound being produced by means of reeds. The chanter has eight holes, which the performer stops and opens at pleasure, but the scale is imperfect and the tone harsh. There are several species of bagpipes, as the soft and melodious Irish bagpipe, supplied with wind by a bellows, and having several keyed drones; the old English bagpipe (now no longer used); the Italian bagpipe, a very rude instrument, etc.

**Bagratidæ** (bä-grä'tē-dē), **Bagratides**, or **Bagratians**, a line of kings and princes of Armenia that ruled in that country from the year 885 to the 11th century. After the seizure of Asia Minor by the Seljuks, some of the princes retained power as independent lords, holding the possession of mountain fastnesses. The dynasty ended with Leo IV., who was assassinated in 1342.

**Bagration, Peter Ivanovich, Prince**, a Russian general, descended from the royal family of the Bagratidæ of Georgia and Armenia, born in 1765. He entered the Russian service in 1783, and was trained under Suvorof. In 1788 he was engaged at the storming of Okzakof; fought in 1792 and 1794 against the Poles; in 1799, in Italy and Switzerland; and distinguished himself in the Austro-Russian War of 1805 against the French, especially in the sanguinary engagement of Nov. 16 of that year, when, with only 6,000 troops, he bravely

## Bahama Islands

stood during six hours against a force of 30,000 under Murat. Subsequently, he was engaged in the battles of Austerlitz, Eylau, and Friedland, and took a part in the Russian campaign against the Turks, especially in the siege of Silistria, 1809. In the campaign of 1812, he commanded the Second Russian Army of the West, and had the misfortune to fail in his attack on Davout, near Mohilev; but succeeded in forming a junction with the main army at Smolensk. He was, however, mortally wounded in the battle of Borodino, and died Oct. 7, 1812.

**Bagshaw, Edward**, an English author, date of birth unknown; espoused at first the cause of the Puritans, but later became a Royalist, and sat in the Parliament that Charles I. convened at Oxford; was taken prisoner by the Parliamentary army, and, during his detention, he composed various books, the most important of which is "The Right of the Crown of England as Established by Law." He died in 1662.

**Bagshot Beds**, in geology, the lowest strata of the Eocene formation of the British Islands. A white clay, forming one of the strata, exhibits beautifully distinct fossils. Bagshot sand is the collective name for a series of beds of siliceous sand, occupying extensive tracts around Bagshot, in Surrey, and in the New Forest, Hampshire, England, the whole reposing on the London clay; generally devoid of fossils.

**Bahama Bank, Great and Little**, shoals among the West India Islands; the former between 22° and 26° N., 75° and 79° W., having S. and W. the Bahama old and new channels. On it are the Islands of Providence, Andros, and Exuma. The Little Bank, N. W. of the foregoing, between 26° and 27° N., 77° and 79° W., has on it the Great Bahama and Abaco Islands.

**Bahama Bank**, a shifting sand across Ramsey Bay, Isle of Man, with a light-vessel, 1½ miles S. E. of S. E. tail of the bank, in 54° 19' 40" N., and 4° 12' 55" W., visible 11 miles.

**Bahama Channel, Old and New**, two American channels; the former separates the Great Bahama Bank and Cuba; the latter, also called the Gulf of Florida, is between the Great and Little Bahama Banks and Florida, and forms a part of the channel of the great Gulf Stream, which flows here at the rate of from 2 to 5 miles an hour.

**Bahama Islands**, or **Lucayos**, a group of islands in the West Indies, forming a colony belonging to Great Britain, lying N. E. of Cuba and S. E. of the coast of Florida, the Gulf Stream passing between them and the mainland. They extend a distance of upward of 600 miles, and are said to be 29 in number, besides keys and rocks innumerable. The principal islands are Grand Bahama,



Great and Little Abaco, Andros Islands, New Providence, Eleuthera, San Salvador, Great Exuma, Watling Island, Long Island, Crooked Island, Acklin Island, Mariguana Island, Great Inagua. Of the whole group about 20 are inhabited, the most populous being New Providence, which contains the capital, Nassau, the largest being Andros, 100 miles long, 20 to 40 broad. They are low and flat, and have in many parts extensive forests. Total area, 5,450 square miles. The soil is a thin but rich vegetable mold, and the principal product is pine apples, which form the most important export. Other fruits are also grown, with cotton, sugar, maize, yams, groundnuts, cocoanuts, etc. Sponges are obtained in large quantity and are exported. In 1897 the revenue was £62,754; expenditure, £63,405; imports, £186,010; exports, £149,085; and public debt, £119,026. The currency is English, but American coins circulate freely. The islands are a favorite winter resort for those afflicted with pulmonary diseases. San Salvador, or Cat Island, is generally believed to be the same as Guanahani, the land first touched on by Columbus (Oct. 12, 1492) on his first great voyage of discovery. The first British settlement was made on New Providence toward the close of the 17th century. A number of loyal Americans settled in the islands after the War of Independence. Pop. (1901) 53,735.

**Bahawulpur** (bä-hä'wül-pör), a town of India, capital of the State of the same name in the Punjab, two miles from the Sutlej; surrounded by a mud wall and containing the extensive palace of the Nawab. Pop. 13,635. The State has an area of 17,285 square miles, of which 10,000 is desert, the only cultivated lands lying along the Indus and Sutlej. Pop. (1901) 720,877.

**Bahia** (bä-ē'a), formerly San Salvador, a town of Brazil, on the Bay of All Saints, in the State of Bahia. It consists of a lower town, which is little more than an irregular, narrow, and dirty street, stretching about four miles along the shore; and an upper town, with which it is connected by a steep street, much better built. The harbor is one of the best in South America; and the trade, chiefly in sugar, cotton, coffee, tobacco, hides, piassava, and tapioca, is very extensive. Pop. (1900) 230,000. The State, area, 164,649 square miles; pop. (1900) 2,117,956, has much fertile land, both along the coast and in the interior.

**Bahia Honda** (bä-ē'a on'dä), a seaport of Cuba, on the coast of the Gulf of Mexico, and lying on a small bay, bearing the same name. The town and bay are about 50 miles W. of Havana, being commanded by a small fort. There are mines of coal and copper in the vicinity. A short distance to the S. are the sulphur springs of Aguacate.

**Bahr** (bar), an Arabic word signifying sea or large river; as in Bahr-el-Ihuleh, the Lake Merom in Palestine; Bahr-el-Abiad, the White Nile, Bahr-el-Azrek, the Blue Nile, which together unite at Khartum.

**Bahr, Johann Christian Felix** (bar), a German philologist, born at Darmstadt, June 13, 1798; educated at Heidelberg Gymnasium and University, of which last he became ordinary Professor of Classical Philology in 1823. His chief work is his "History of Roman Literature" (1828; 4th ed., 1868-1870), which is noted for its clearness and comprehensiveness. Three supplements to this work deal with the "Christian Poets and Historians of Rome" (1836); the "Christian-Roman Theology" (1837); and the "History of Roman Literature in the Carolingian Period" (1840). His edition of "Herodotus" (2d ed., 1855-1861) is also noteworthy. He died Nov. 29, 1872.

**Bahraich** (bär-īc'), a town of Oudh, India, near the old bed of the Gogra, 70 miles N. E. of Lucknow. It is an old town, with some local trade in piece goods and copper utensils. To the shrine of Masáūd, a warrior and Mussulman saint, there is a great concourse of pilgrims annually in the month of May. Pop. (1901) 27,304. The area of the district of Bahraich is 2,741 square miles, and the population, 878,048.

**Bahrein** (bä'rīn), **Islands**, a group of islands in the Persian Gulf, in an indentation on the Arabian coast. The principal island, usually called Bahrein, is about 27 miles in length and 10 miles in breadth. The principal town is Menamah or Manama; pop. 25,000; and the seat of government is Moharek, on an island of that name; pop. about 22,000. There are about 50 villages on the islands. The Bahrein Islands are chiefly noted for their pearl-fisheries, which were known to the ancients, and which employ in the season from 2,000 to 3,000 boats with from 8 to 20 men each. Total pop., est. at 70,000.

**Bahr-el-Ghazal** (bär-el-Gäz'-el), the name of the old Egyptian province which incloses the district watered by the southern tributaries of Bahr-el-Arab and Bahr-el-Ghazal. It was under the control of the Arabs till 1879, when a settled government was established under Gordon by Gessi Pasha on behalf of Egypt. The province remained in the possession of Egypt till the Mahdi's rebellion cut off all communication with Khartum and Egypt, and compelled the then ruler, Lupton Bey, who made a most gallant fight, to surrender in 1884. Lupton Bey claimed in 1883 that he was the only one of the Sudan governors who could show a profit on his administration. This he accomplished through the richness of the province in ivory, rubber, gum and other



products. It is said to be a good cotton-growing country, and abounds in timber. Slatin Pasha has drawn attention both to the fertility of the province and to its strategical importance. To the W. of it lies the Ubangi district of French Kongo; and it was thence that Major Marchand made his way through the Bahr-el-Ghazal to Fashoda in the summer of 1898.

**Bahr Yusuf** (bär-yö'suf), or **Bahr el Yusuf**, an artificial irrigation channel from the left bank of the Nile below Sint, to the Fayum; 270 miles long. According to Koptic traditions it was constructed during Joseph's administration.

**Baiæ** (bī'ē), an ancient Roman watering-place on the coast of Campania, 10 miles W. of Naples. Many of the wealthy Romans had country houses at Baiæ, which Horace preferred to all other places. Ruins of temples, baths, and villas still attract the attention of archæologists.

**Baif, Jean Antoine de** (bä-žf'), a French poet (1532-1589), one of the literary league known as the "Pléiade," and the chief advocate of its plan of reducing French poetry to the meters of the classic tongues; also a spelling reformer, in favor of the phonetic system. His most meritorious works were translations of Greek and Roman dramas.

**Baikal** (bī'käl), an extensive lake of Eastern Siberia; crescent-shaped, and surrounded by high and wild mountains rising 3,000 to 4,000 feet above its surface. Length, S. W. to N. E., 370 miles; breadth, 20 to 70 miles; altitude, about 1,400 feet; greatest ascertained depth, 4,500 feet; average depth of its southern part, about 800 feet. It is divided by Olkhon Island and Svyatoi Nos Peninsula into two basins, which may be considered as two longitudinal valleys connected together by a transverse passage. Receives the Upper Angara, Barguzin, and Selenga, all from the E., and very many mountain streams; its waters are discharged through the Lower Angara into the Yenisei. Frozen from January to the first part of May. Forms part of the line of communications between Russia, the Amur, and China, steamers plying between Listvenichnoye, at the outlet of the Lower Angara, and Posolskoye, in the delta of Selenga, smaller steamers plying up this latter to Verkhneudinsk, while in the winter the lake is crossed on the ice, and a temporary station is established half-way. Besides, a road has been built around its S. coast, past Kultuk, at the foot of the very steep slopes of the mountains. The Siberian railway will follow this road; but a temporary connection will be established from Listvenichnoye to Posolskoye by means of steamers.

**Baikie, William Balfour**, an English explorer, born in the Orkney Islands, Aug. 27, 1825; joined the British navy, and was

made Surgeon and Naturalist of the Niger Expedition, 1854. He took the command on the death of the senior officer, and explored the Niger for 250 miles. Another expedition, which started in 1857, passed two years in exploring, when the vessel was wrecked, and all the members, with the exception of Baikie, returned to England. With none but native assistants he formed a settlement at the confluence of the Benué and the Quorra, in which he was ruler, teacher, and physician, and within a few years he opened the Niger to navigation, made roads, established a market, etc. He died in Sierra Leone, Dec. 12, 1864.

**Bail.** (1) Of persons: Those who stand security for the appearance of an accused person at the fitting time to take his trial. The word is a collective one, and not used in the plural. They were so called because formerly the person summoned was *baillé*, that is, given into the custody of those who were security for his appearance.

(2) Pecuniary security given by responsible persons that an individual charged with an offense against the law will, if temporarily released, surrender when required to take his trial.

Several kinds of bail either exist or did so formerly at common law. An important one, of which much use was once made, was that called common bail, or bail below. The old practice being to arrest persons who now would only be summoned, an excuse was required for again letting those go against whom the charge was trivial. So, with all gravity, there were accepted as their securities John Doe and Richard Roe, two mythic personages whom no one had ever seen in the flesh, and who were known to be utterly unproducible if the friend for whose appearance they became responsible thought fit to decamp. If the charge was a more serious one, special bail, called also bail above, was requisite; it was that of substantial men, and in this case no shadowy personages would do. Modern legislation has so altered the form of process that Messrs. Doe and Roe's services are now seldom required.

**Bailey, Gamaliel**, an American journalist, born in Mount Holly, N. J., Dec. 3, 1807; with J. G. Birney, founded the anti-slavery journal, the "Cincinnati Philanthropist" (1836), the office of which was destroyed by a mob, though it continued to be published till 1847. He established the well-known newspaper, the Washington "National Era" (1847), in which the famous novel, "Uncle Tom's Cabin," appeared first. He died at sea, June 5, 1859.

**Bailey, Jacob Whitman**, an American scientist, born in Auburn, Mass., April 29, 1811; was graduated at the United States Military Academy, in 1832; and from 1834 till his death was Professor of Chemistry,



Mineralogy and Geology at the Military Academy. He was the inventor of the Bailey indicator and of many improvements in the microscope, in the use of which he achieved high distinction; and he is regarded as the pioneer in microscopic investigation. He was President of the American Association for the Advancement of Science in 1857; held membership in the principal scientific associations of the world, and was author of numerous papers on the results of his researches. He died in West Point, N. Y., Feb. 26, 1857.

**Bailey, James Montgomery**, an American author, born in Albany, N. Y., Sept. 25, 1841; served in the 17th Connecticut regiment during the Civil War; returned to Danbury, founded the Danbury "News" in 1870. His humorous articles in this paper were widely quoted. He wrote "Life in Danbury" (Boston, 1873); "They All Do It" (1877); "The Danbury Boom" (1880), etc. He died in Danbury, Conn., March 4, 1894.

**Bailey, Joseph**, an American military officer, born in Salem, O., April 28, 1827; entered the Union army as a private in 1861, and signally distinguished himself in the Red River campaign under Gen. N. P. Banks, in 1864, by building a dam and deepening the water in the channel, which enabled Admiral Porter's Mississippi flotilla to pass the Red River rapids in safety, and so escape a perilous situation. For this engineering feat, Bailey, who, before entering the army was a plain farmer, was breveted Brigadier-General, promoted Colonel, voted the thanks of Congress, and presented by the officers of the fleet with a sword and a purse of \$3,000. Subsequently, he was promoted to full Brigadier-General, and was engaged on engineering duty till his resignation, July 7, 1865. He died in Nevada, Mo., March 21, 1867.

**Bailey, Liberty Hyde**, an American horticulturist, born in South Haven, Mich., March 15, 1858; graduated at the Michigan Agricultural College in 1882; was associate to Dr. Asa Gray at Harvard University in 1882-1883; Professor of Horticulture and Landscape Gardening in the Michigan Agricultural College in 1883-1888; and in the last year became Professor of Horticulture in Cornell University. He was an associate editor of the revised edition of "Johnson's Universal Cyclopedia" (1892-1896); editor of "American Gardening"; became chairman of the Roosevelt Commission on Country Life in 1908. His works include "Annals of Horticulture," "Evolution of Our Native Fruits," "Principles of Fruit Growing," "Text-book of Agriculture," etc.

**Bailey, Loring Woart**, a Canadian scientist, born in West Point, N. Y., Sept. 28, 1839, a son of Jacob W. Bailey; was graduated at Harvard College in 1859, and in

1861 became Professor of Chemistry and Natural History in the University of New Brunswick, at Fredericton. Among his publications are "Mines and Minerals of New Brunswick," "Geology of South New Brunswick," "Elementary Natural History," etc.

**Bailey, Nathan**, an English lexicographer and classical scholar. He was a school teacher at Stepney, and a Seventh Day Baptist. Besides educational books, he was the author of a "Universal Etymological English Dictionary" (1721), the first English dictionary with any pretensions to being complete, and the basis of Dr. Johnson's better known work. He wrote also a "Domestic Dictionary" (1736). He died at Stepney, June 27, 1742.

**Bailey, Philip James**, an English poet, born in Basford, Nottinghamshire, April 22, 1816; he was educated in Glasgow, and studied law at Lincoln's Inn, being admitted to the bar in 1840. In his

twentieth year he began the composition of "Festus," a lyric-dramatic poem on the Faust legend. The poem was published in 1839, and attracted unusual attention. The 11th edition was published in 1889. His other works include "The Angel World" (1850); "The Mystic" (1855); "The Age," a colloquial satire (1858); and "The Universal Hymn" (1867). He died Sept. 6, 1902.

**Bailey, Samuel**, an English writer on political and mental philosophy, was born in Sheffield, in 1791, and became a banker. His first work was a volume of "Essays on the Formation and Publication of Opinions" (1821), in which he ably defended the proposition that a man's opinions are independent of his will. His "Essays on the Pursuit of Truth and on the Progress of Knowledge" (1829), are only less valuable. His many controversial books on questions of political economy are already almost forgotten, though these, as well as his pamphlets and treatises on political representation, primogeniture, and the like, are characterized alike by terse exposition and vigorous style. Not less interesting are his "Review of Berkeley's Theory of Vision" (1842); "Theory of Reasoning" (1851); and "Letters on the Philosophy of the Human Mind" (1855-1863). The third series of the last



PHILIP JAMES BAILEY.



## Bailey

contains an able defense of utilitarianism, in which the author avows himself a thorough determinist. He died in Sheffield, Jan. 18, 1870.

**Bailey, Theodorus**, an American naval officer, born in Chateaugay, N. Y., April 12, 1805; entered the navy in 1818; served on the W. coast of Mexico during the Mexican War; commanded frigate "Colorado," of the Western Gulf Blockading Squadron, in 1861-1862; and in the last year commanded the right column of Admiral Farragut's squadron in the passage of Forts St. Philip and Jackson, and led the fleet at the capture of the Chalmette batteries and the city of New Orleans. In 1862-1865 he commanded the East Gulf Blockading Squadron. He was commissioned Rear-Admiral and retired in 1866. He died in Washington, D. C., Feb. 10, 1877.

**Bailey, Vernon**, an American scientist, born in Manchester, Mich., June 21, 1863; received a university education; and in 1900 was chief field naturalist of the United States Biological Survey. Among his publications are "Spermophiles of Mississippi Valley," "Revision of Voles of the Genus *Eutamias*," "Mammals of District of Columbia," etc.

**Bailey, William Whitney**, an American botanist, born in West Point, N. Y., Feb. 22, 1843. He was educated at Brown and Harvard, having been a pupil of Prof. Asa Gray. In 1867 he was botanist of the United States Geological Survey of the 40th parallel; in 1867-1869 assistant librarian of the Providence Athenæum. He was appointed Instructor in Botany at Brown University in 1877, and became professor there in 1881. He has published "Botanical Collector's Handbook" (1881).

**Baillairge, Charles P.** (bī-yärzh'), a Canadian architect and civil engineer, born in Quebec, Sept. 27, 1826. Among his best known works as an architect are the Laval University, the asylum and churches of the Sisters of Charity and Good Shepherd, the Music Hall, the new jail, Dufferin Terrace, the aqueduct bridge over the St. Charles, and the Monument aux Braves de 1760, all in the city of Quebec. In 1863-1865 he was joint architect and engineer with Messrs. Fuller and Page, of the Parliamentary and departmental buildings in Ottawa. He is a member of the Royal Academy of Arts, Fellow of the Royal Society of Canada, and a past president of the Quebec Association of Architects. He has received many honors and diplomas from his own and other governments, and has published a large number of important works, including "Plane and Spherical Geometry and Trigonometry" (1863); "Key to the Stereometrical Tableau" (1870); "Homonymes Français" (1891); "English Homonyms" (1891), etc.

## Baillie

**Bailiff**, essentially a person intrusted by a superior with power of superintendence. In the United States the word bailiff has no precise meaning. The term is most frequently used to denote a court officer whose duty it is to take charge of juries and wait upon the court. In England, an officer appointed for the administration of justice in a certain bailiwick or district. The sheriff is the King's bailiff, whose business it is to preserve the rights of the King within his "bailiwick" or county. (1) The governor of a castle belonging to the King. (2) A sheriff's officer. Bailiffs are either bailiffs of hundreds or special bailiffs. (a) Bailiffs of hundreds are officers appointed by the sheriff over the districts so called, to collect fines, summon juries, to attend the judges and justices at the assizes and quarter sessions, and to execute writs and process. (b) Special bailiffs are men appointed for their adroitness and dexterity in hunting and seizing persons liable to arrest. They assist the bailiffs of hundreds in important work for which the latter have no natural aptitude or acquired skill. Special bailiffs being compelled to enter into an obligation for the proper discharge of their duty are sometimes called bound bailiffs, a term which the common people have corrupted into a more homely appellation. (Blackstone's "Commentaries," book i, chapter 9.)

**Baillie, Lady Grizel**, a Scotch poet, born in Redbraes Castle, Dec. 25, 1665; daughter of the first Earl of Marchmont; married George Baillie in 1692; published a large number of songs in Ramsay's "Miscellany" and other collections. She died Dec. 6, 1746.

**Baillie, Joanna**, a Scotch author; born in Bothwell, near Glasgow, Sept. 11, 1762; removed in early life to London, where in 1798 she published the first volume of her well-known "Plays on the Passions," in which she attempted to delineate the stronger passions by making each passion the subject of a tragedy and a comedy. These plays were not well adapted for the stage, but gave Miss Baillie a very extended reputation. Her first volume was followed by a second volume in 1802, a third (of miscellaneous plays) in 1804, and a fourth in 1812. Other plays appeared in 1836, and a complete edition of her whole dramatic works in 1850. The only plays performed on the stage were a tragedy entitled the "Family Legend," which was brought out at the Edinburgh Theater in 1810 under the patronage of Sir Walter Scott, and had a run of 14 nights and one of the plays on the passions entitled "De Montfort," which was brought out by John Kemble, and played for 11 nights, though an attempt to revive it at a later period failed. Miss Baillie also wrote songs and miscellaneous poems. All her productions are full of genius. The



language is simple and forcible, the female portraits are particularly beautiful, and great knowledge of the human heart is displayed in the delineations of character. She was an intimate friend of Sir Walter Scott, who greatly admired her writings, and her home was frequented by many of the prominent authors of the day. She died in Hampstead, Feb. 23, 1851.

**Baillie, Robert**, a Scotch Presbyterian clergyman, born at Glasgow in 1599, and educated at the university of that city. In 1638 he sat in that famous General Assembly which met in Glasgow to protest against the thrusting of Episcopacy on an unwilling people. In 1649 he was chosen by the Church to proceed to Holland, and to invite Charles II. to accept the covenant and crown of Scotland. He performed his mission skilfully; and, after the Restoration, through Lauderdale's influence, he was made principal of Glasgow University. He died in July, 1662.

**Baillie, Robert**, the "Scottish Sidney," was a native of Lanarkshire, who first came into notice in 1676 through his rescue of a brother-in-law, the Rev. Mr. Kirkton, from the clutches of Archbishop Sharp's principal informer. In 1683 he took a prominent part in a scheme of emigration to South Carolina, as he saw no other refuge from the degrading tyranny of the government. About the same time, however, he entered into correspondence with the heads of Monmouth's supporters in London, Russell and Sidney, and subsequently repaired there to concert measures for securing adequate reforms. On the discovery of the Ryehouse plot, he was arrested and sent down to Scotland. Accused of conspiring against the King's life, and of hostility to monarchical government, he was tried at Edinburgh and condemned to death upon evidence at once insignificant and illegal. The sentence was carried into execution on the very day that it was passed, Dec. 24, 1684.

**Baillou, Guillaume de** (bī-yö'), a French physician, born in 1538; became physician to the Dauphin in 1601; was author of several works, including "Adversaria Medicinalia," and is considered the first exponent of the nature of croup. He died in 1616.

**Bailly, Antoine Nicolas** (bä-yē'), a French architect, born June 6, 1810; was appointed to an office under the city government of Paris in 1834, and in 1844 was made architect to the French government. The Molière Fountain and the Tribunal of Commerce in Paris, and the reconstruction of the Cathedral of Digne, are his work. He died in Paris, Jan. 1, 1892.

**Bailly, Jean Sylvain**, a French astronomer and statesman, born in Paris, Sept. 15, 1736. After some youthful essays in verse he was induced by Lacaille to devote him-

self to astronomy, and on the death of the latter in 1753, being admitted to the Academy of Sciences, he published a reduction of Lacaille's observations on the zodiacal stars. In 1764 he competed ably but unsuccessfully for the Academy prize offered for an essay upon Jupiter's satellites, Lagrange being his opponent; and in 1771 he published a treatise on the light reflected by these satellites. In the mean time he had won distinction as a man of letters by his eulogiums on Pierre Corneille, Liebnitz, Molière, and others; and the same qualities of style shown by these were maintained in his "History of Astronomy" (1775-1787), his most extensive work. In 1784 the French Academy elected him a member.



JEAN SYLVAIN BAILLY.

The Revolution drew him into public life. Paris chose him, May 12, 1789, first deputy of the *tiers-état*, and in the Assembly itself he was made first president, a post occupied by him on June 20, 1789, in the session of the Tennis Court, when the deputies swore never to separate till they had given France a new Constitution. As mayor of Paris his moderation and impartial enforcement of the law failed to commend themselves to the people, and his forcible suppression of mob violence, July 17, 1791, aroused a storm which led to his resignation and retreat to Nantes. In 1793 he attempted to join Laplace at Melun, but was recognized and sent to Paris, where he was condemned by the Revolutionary Tribunal, and executed on Nov. 12.

**Bailly, Joseph A.**, a French sculptor, born in Paris, in 1825; removed to Philadelphia, Pa., in 1850; and produced "Adam and Eve," "Eve and Her Two Children," and the marble monument of Washington in front of the State-house (1869). He died June 15, 1883.



## Bailment

**Bailment**, "a delivery of a thing in trust for some special object or purpose, and upon a contract, express or implied, to conform to the object or purpose of the trust." (Story, on "Bailment.") There are various kinds of Bailment, such as the deposit of a thing by the owner with another to be kept, with or without reward; the committing a thing to another to have some act performed with regard to it, either gratuitously or for pay; the loan of a thing to another for use with or without pay; a pledge, or when a thing is bailed to a creditor as security for a debt, and the committing of goods to a common carrier for transportation. In most cases the contract involves the restoration of the thing bailed, either in specie or in a new form agreed upon. The party who delivers the thing bailed to another is called the bailor; the one receiving it is called bailee. Various degrees of diligence are required of the bailee, according to the nature of the bailment.

**Baily, Edward Hodges**, an English sculptor, born at Bristol in 1788; became a pupil of Flaxman in 1807, gained the Academy gold medal in 1811, and was elected R. A. in 1821. Principal works, "Eve at the Fountain," "Eve Listening to the Voice," "Maternal Affection," "Girl Preparing for the Bath," "The Graces." The *bas reliefs* on the S. side of the marble arch, Hyde Park, the statue of Nelson on the monument, in London, and various other public works, were from his chisel. He died in London in 1867.

**Baily, Francis**, an English astronomer, born in Berkshire in 1774; settled in London as a stockbroker in 1802. While thus actively engaged he published "Tables for the Purchasing and Renewing of Leases," the "Doctrine of Interest and Annuities," the "Doctrine of Life Annuities and Assurances," and an epitome of universal history. On retiring from business with an ample fortune in 1825 he turned his attention to astronomy, became one of the founders of the Astronomical Society, contributed to its "Transactions," and in 1835 published a life of Flamsteed. He died in 1844.

**Baily's Beads**, a phenomenon attending eclipses of the sun, the unobscured edge of which appears discontinuous and broken immediately before and after the moment of complete obscuration. It is classed as an effect of irradiation.

**Bain, Alexander**, a Scotch writer on mental philosophy and education, born in Aberdeen in 1818; was educated at Marischal College (then a separate university); Aberdeen; was for some years a deputy professor in the university; subsequently held official posts in London; and in 1860

## Baines

was appointed Professor of Logic and English in Aberdeen University, a post which he held till his resignation in 1881. His most important works are "The Senses and the Intellect" (1855); "The Emotions and the Will" (1859), together forming a complete exposition of the human mind; "Mental and Moral Science" (1868); "Logic, Deductive and Inductive" (1870); "Mind and Body" (1873); "Education as a Science" (1879); "James Mill, a Biography" (1881); "John Stuart Mill, a Criticism, with Personal Recollections" (1882); "Practical Essays" (1884); beside an English grammar, "Manual of English Composition and Rhetoric," etc. He died Sept. 18, 1903.



ALEXANDER BAIN.

**Bain, Alexander**, a Scotch electrician, born in Watten, Caithness, in 1810; went to London and began a series of electrical experiments in 1837; invented electric fire alarm and sounding apparatus, and the automatic chemical telegraph by which high speed telegraphy was for the first time possible. He died in 1877.

**Bainbridge, Edmond**, an English military officer, born in 1841; was educated at the Royal Military Academy; joined the army in 1860; and became Colonel in 1893. From 1876 he was connected with the ordnance branch of the military service, serving also as instructor in the School of Gunnery; and was director-general of British ordnance factories in 1899-1903.

**Bainbridge, William**, an American naval officer, born in Princeton, N. J., May 7, 1774; became a Captain in 1800; and commanded the frigate "Philadelphia" in the war against Tripoli. In 1812 he was given command of a squadron including the "Constitution," "Essex," and "Hornet." With the "Constitution" as his flagship, he conquered, in December of that year, the British frigate "Java," carrying 49 guns. Later he commanded a squadron in the Mediterranean, and was afterward stationed at various coast cities of his own country. He died in Philadelphia, July 28, 1833.

**Baines, Thomas**, an English artist and explorer, born in Norfolk, in 1822; became an artist; and in 1842 went to Cape Col-



ony, whence he accompanied the British army in the Kaffir War as artist. He afterward went with Gregory's party to explore Northwest Australia; with Livingston to the Zambesi; with Chapman's expedition to the Victoria Falls; and finally headed an expedition to the gold fields of Tati. Everywhere he made large numbers of sketches. A handsome folio of colored lithographs from his drawings at Victoria Falls was published in 1865. His last journey among the Kaffirs was very carefully mapped out and sketched. His writings are "Explorations in South-western Africa" (1864); "The Gold Regions of Southeastern Africa" (1877). He died in Durban, Natal, May 8, 1875.

**Baini, Giuseppe** (bī'nē), an Italian musician, born in Rome in 1775; was director of the Pope's choir from 1814 till his death in 1844. The severe gravity and profound science of his compositions contrasted strongly with the careless style and shallow dilettanteism of most of his compeers; but less by his compositions than by his historical researches did Baini secure for himself a prominent place in musical literature. His principal work is his "Life of Palestrina" (1828).

**Bairaktar** (bī-rāk'där) (more correctly, Bairak-dar), signifying "standard bearer," the title of the energetic Grand Vizier Mustapha. Born in 1755, of poor parents, he entered the military service at an early age, and soon distinguished himself by his valor. When he was Pasha of Rustchuk in 1806, he fought with some success against the Russians, and after the revolt of the Janissaries in 1807, by which Selim III. was deposed from the throne in favor of Mustapha IV., Bairaktar marched his troops to Constantinople, where they found the dead body of Selim lying in the first court of the seraglio. Bairaktar executed all those who had had any share in the murder, deposed Mustapha IV., and proclaimed the brother of this prince, Mahmoud II., Sultan on July 28, 1808. Bairaktar was now appointed Grand Vizier, and endeavored to carry out Selim's reforms, and to strengthen the regular army. His chief object was the annihilation of the Janissaries; but, favored by the fanatical people, these prætorians rebelled, and, with the support of the fleet, attacked the seraglio on Nov. 15, 1808, and demanded the restoration of Mustapha IV. Bairaktar defended himself bravely; but when he saw that the flames threatened to destroy the palace, and that he was in danger of falling alive into his enemies' hands, he strangled Mustapha, threw his head to the besiegers, and then blew himself up.

**Bairam** (bī'ram), the name of the only two festivals annually celebrated by the Turks and other Mohammedan nations. The first is also called Id-al-Fitr, *i. e.*, "the

festival of the interruption," alluding to the breaking of the universal fast which is rigorously observed during the month Ramadhan or Ramazan. It commences from the moment when the new moon of the month, Shewal, becomes visible, the appearance of which, as marking the termination of four weeks of abstinence and restraint, is looked for and watched with great eagerness. At Constantinople it is announced by the discharge of guns at the seraglio upon the sea-shore, and by the sounding of drums and trumpets in all public places of the city. This festival ought, properly, to last but one day; but the rejoicings are generally continued for two days more. The second festival, denominated Id-al-Azhâ or Kurbâ Bairâm, *i. e.*, "the festival of the sacrifices," is instituted in commemoration of Abraham offering his son Isaac, and is celebrated 60 days after the former, on the 10th of Zulhijjah, the day appointed for slaying the victims by the pilgrims at Mecca. It lasts four days. At each of these festivals but one *khutba* is read, *i. e.*, divine service is only once publicly performed, on the first day, about an hour after sunrise; and in the Turkish Empire even this solitary act of public worship is now no longer announced by the muezzins, or public criers, from the tops of the minarets or turrets of the mosques. At Constantinople the two Bairâms are celebrated with much pomp. The Sultan on this occasion receives the homage of the different Orders of the Empire, and proceeds in state, followed by all the higher officers, to the mosque. As the Mohammedans have a lunar year of 354 days, the two festivals run, once every 32 years, through all the seasons.

**Baird, Absalom**, an American military officer, born in Washington, Pa., Aug. 20, 1824; was graduated at the United States Military Academy and assigned to the artillery in 1849. He became Captain and Major in the regular army in 1861, and in the volunteer army was commissioned a Brigadier-General, April 28, 1862, and brevetted Major-General, Sept. 1, 1862, for his conduct in the Atlanta campaign. On March 13, 1865, he was brevetted Major-General, United States army, for his meritorious services in the field during the war. In 1885, he was promoted Brigadier-General and Inspector-General, United States army, and in 1888 was retired. He was continually in the field from the Manassas campaign, in 1861, till after the surrender of Gen. Johnston's army in 1865. Died 1905.

**Baird, Andrew Wilson**, an English military engineer, born in Aberdeen, Scotland, April 26, 1842; was educated in Aberdeen and at the Royal Military Academy; became a Colonel in the Royal Engineer Corps in 1893; was Special Assistant Engineer of



## Baird

the harbor defenses of Bombay, in 1864; assistant field engineer of the Abyssinian expedition in 1868, and, for nearly 20 years thereafter, was employed on the great trigonometrical survey of India. His services were rewarded with numerous official commendations, medals, and decorations; and he published a number of important works on his labors in India.

**Baird, Charles Washington**, an American historian and religious writer, son of Robert Baird; born at Princeton, N. J., Aug. 28, 1828; besides works on the Presbyterian liturgies (which he was the first to collect and investigate) and local histories, he wrote "History of the Huguenot Emigration to America" (2 vols., 1885). It is interesting, especially to the genealogist. He died in Rye, N. Y., Feb. 10, 1881.

**Baird, Sir David**, a British general, born in Scotland in 1757. Entering the army in 1778, he served in India, and, while brigadier-general, he led the storming party that carried Seringapatam by assault, in 1799. For his gallantry on this occasion he was thanked by both Houses of Parliament. He subsequently served his country by the capture of Cape Town, and at the taking of Copenhagen, and shared the glory of Corunna under Sir John Moore, after whose death on that field he became commander-in-chief. His severe wounds, however, incapacitated him from acting in that capacity. At the close of the war, he was created a baronet, and received the Order of the Bath. He died in 1829.

**Baird, Henry Carey**, an American political economist, nephew of Henry C. Carey, born in Bridesburg, Pa., in 1825. He is a publisher at Philadelphia. A protectionist, his economical views generally are similar to those of his distinguished uncle. He has written numerous economic pamphlets.



HENRY MARTYN BAIRD.

**Baird, Henry Martyn**, an American author, born in Philadelphia, Pa., Jan. 17, 1832; graduated from the University of the City of New York in 1850, and, after spending some years in Europe, took a course in theology at Union and Princeton. In

1859 he was appointed Professor of the Greek Language and Literature in the University of the City of New York. His prin-

## Baireuth

cipal works are the "History of the Rise of the Huguenots" (1879); "The Huguenots and Henry of Navarre" (1886), and "The Huguenots and the Revocation of the Edict of Nantes." He died Nov. 11, 1906.

**Baird, Julian William**, an American chemist, born in Battle Creek, Mich., Feb. 14, 1859; was graduated at the University of Michigan in 1882; assistant in the chemical laboratory there, in 1882-1883; instructor in chemistry and in charge of the qualitative analysis and assaying in Lehigh University in 1883-1886; became Professor of Analytical and Organic Chemistry in the Massachusetts College of Pharmacy, Boston, in 1886, and dean, in 1887.

**Baird, Robert**, an American historian, born in Fayette county, Pa., Oct. 6, 1798; published "History of the Waldenses, Albigenses, and Vaudois," "History of the Temperance Societies" (1836); "Religion in America" (1844); etc. He was corresponding secretary of the American and Foreign Christian Union (1849-1855, 1861-1863). He died at Yonkers, N. Y., March 15, 1863.

**Baird, Spencer Fullerton**, a distinguished American naturalist, born at Reading, Pa., Feb. 3, 1823; became Professor of Natural Sciences at Dickinson College, Carlisle, Pa., 1845; United States Commissioner of Fish and Fisheries, 1871; Secretary of the Smithsonian Institution, 1878. A very prolific writer, among his more important works may be named a "Catalogue of North American Reptiles" (1853); "Birds of North America" (with Cassin and Lawrence, 1860); "Mammals of North America" (1858); "History of North American Birds" (with Brewer and Ridgeway, 1874-1884), etc. His writings cover nearly every branch of natural history. He died at Wood's Holl, Mass., Aug. 19, 1887.

**Baireuth, or Bayreuth**, a city and capital of the Bavarian province of Upper Franconia, 43 miles N. N. E. of Nuremberg by rail. Beautifully situated on the Red Maine, it has broad, well paved streets, interspersed with groves, promenades, fine gardens, and public fountains. Its principal buildings are the old palace, dating from 1454; the new palace (1753), containing a gallery of paintings, and the old opera house (1748). A magnificent National theater for the performance of Wagner's music, finished in 1875, was in the following year opened with a grand representation of his Nibelungen trilogy. On Feb. 14, 1883, the great master (who died in Venice) was buried in the garden of his villa here. The chief articles of industry are cottons, woolens, linen, leather, tobacco, parchment, and porcelain. An active trade is also carried on in grain and horses. Jean Paul Richter died here in 1825, and a monument has been erected to his memory. Pop.



(1905) 31,903. The witty and accomplished Wilhelmina, the favorite sister of Frederick the Great, was married to Frederick, Margrave of the Principality of Baireuth. Her "Memoirs" were translated in 1887.

**Bairut.** See BEYROUT.

**Baiter, Johann Georg** (bī'ter), a Swiss philologist, born in Zurich, May 31, 1801; was professor in the University of Zurich, and from 1849 to 1865, director in the gymnasium there. He published, alone and with Sauppe, Orelli, and others, various editions of the classics, "Panegyrics of Soerates," "Ciceronis Scholista," "The Attic Oratoris" (1839-1850), etc. He died in Zurich, Oct. 10, 1877.

**Baize**, a sort of coarse woolen fabric with a rough nap, now generally used for linings, and mostly green or red in color.

**Baia** (bä'yä), an Italian seaport town, W. of Naples. It is the ancient BALÆ (q. v.).

**Baja**, a market town of Hungary, on the Danube, 90 miles S. of Pest. It is celebrated for its annual swine fair, and its trade in grain and wine. Pop. 19,000.

**Bajazet** (bī-ä-zēd'), or **Bayazeed, I.**, an Ottoman Sultan, born 1347, succeeded his father, Amurath I., in 1389. He was the first of his family who assumed the title of Sultan. The Turkish Empire at this time extended W. from the Euphrates to the shores of Europe, and Amurath had crossed the Bosphorus, subdued the greater part of Thrace, and fixed the seat of his power at Adrianople. Bajazet wrested the N. parts of Asia Minor from the dominion of various Turkish emirs whose power had long been established there. In Europe he conquered Macedonia and Thessaly, and invaded Moldavia and Hungary. Sigsmund, King of the latter country, met him at the head of 100,000 men, including the flower of the chivalry of France and Germany, but was totally defeated at Nicopoli, on the Danube, Sept. 28, 1396. Bajazet is said to have boasted, on the occasion of this victory, that he would feed his horse on the altar of St. Peter at Rome. His progress, however, was arrested by a violent attack of the gout. Bajazet was preparing for an attack on Constantinople, when he was interrupted by the approach of Timur the Great, by whom he was defeated at Angora, in Anatolia, July 28, 1402. He was taken captive, and died about nine months afterward, at Antioch in Pisidia. He was succeeded by Mohammed I. Modern writers reject as a fiction the story of the iron cage in which Bajazet was said to have been imprisoned. Bajazet was surnamed Ilderim or The Lightning; an epithet acquired from the fiery energy of his soul, and the rapidity of his destructive march. He was succeeded by his son, Soliman I.

**Bajazet II.**, a Sultan of the Turks; he succeeded his father, Mohammed II., in 1481. His brother, Zizim, contested the empire with him, assisted by Caith Bey, Sultan of the Egyptian Mamelukes, but was compelled to retreat into Italy, where he died in 1495. Bajazet undertook an expedition against Caith Bey, but was defeated, with great loss, near Mount Taurus in Cilicia, in 1489. He was more fortunate in Europe, where, in the same year, his generals conquered Croatia and Bosnia. Bajazet was engaged in long and bloody hostilities with the Moldavians, the Rhodians, and especially the Venetians, who frequently invaded the S. of Greece; and with Ishmael, King of Persia. At home, he had to contend against his rebellious son, Selim, to whom, at last, he resigned the empire. He died in 1512, on his way to the place which he had chosen for his retirement. It has been supposed that he was put to death by the order of his son. He was a man of uncommon talents, and did much for the improvement of his empire, and the promotion of the sciences.

**Bajus.** See BAIUS.

**Bajza, Joseph** (boi'zä), a Hungarian poet and critic, born in 1804; devoted himself to the field of history, and edited a "Historical Library" (1843-1845) and the "New Plutarch" (1845-1847). From 1831 he was a member of the Hungarian Academy, and from 1836 of the Kisfaludy Society. He ranks among the best lyric poets of Hungary. His "Poems" was published in 1835, and his "Collected Works" (2d ed., in 6 vols., by Toldy) in 1861. He died in 1858.

**Bakacs, Thomas** (bä-kägs'), a Hungarian statesman, son of a peasant, was born about the middle of the 15th century. He held several bishoprics in succession, became chancellor of the kingdom, and finally archbishop and cardinal. He preached a crusade against the Turks; but his army of peasants and vagabonds turned their arms against the nobility, and a bloody civil war ensued. He died in 1521, leaving enormous wealth.

**Bakalahari**, a Bechuana tribe inhabiting the Kalahari Desert, South Africa.

**Bakarganj** (bä-kär-gä'nē), a British district in the Dacca division of India, under the lieutenant-governor of Bengal, contains 3,649 square miles. It is fertile, and is watered at once by the lower streams of the Ganges and the Brahmaputra. In the S. of the district are the forest tracts of the Sunderbunds. Barisal, the headquarters, on the W. bank of Barisal river, is the only town with more than 5,000 inhabitants. Bakarganj, the former capital, situated near the junction of the Krishnakati



## Bakchiserai

and Khairabad rivers, is now in ruins. Pop. (1901) 2,291,752.

**Bakchiserai** (bäg-iz-er-ī'), (Turkish, "Garden Palace"), a town in the Russian government of Taurida, the residence of the ancient princes or khans of the Crimea, stands in a deep limestone valley, 15 miles by rail S. W. of the present capital, Simferopol. Pop. about 12,000, mainly remnants of the old Tartar inhabitants. The palace (1519) of the khans has been completely restored by the Russian government in the Oriental style.

**Bake, Jan** (bä'ke), a distinguished classical scholar, born at Leyden in 1787; from 1817 to 1857 was Professor of Greek and Roman Literature in the university there. He edited works by Cicero, Longinus, and others; and wrote many admirable critical papers. He died March 26, 1864.

**Bakel**, a town with a strong fort, in the E. of the French colony of Senegal, on the left bank of the Senegal river. Pop. 2,600.

**Baker, Sir Benjamin**, an English engineer, born near Bath, in 1840. In 1877 he superintended the removal of Cleopatra's Needle from Egypt to London. In conjunction with Sir John Fowler he drew the plans for the great bridge over the Firth of Forth. He has written numerous scientific treatises, including "Long Span Iron Bridges," "Suspension Versus Cantilever Bridges," "The Strength of Beams," and "Transportation and Re-erection of Cleopatra's Needle."

**Baker, Benjamin W.**, an American educator, born in Coles county, Ill., Nov. 25, 1841; was brought up on a farm; served in the Union army through the Civil War; was graduated at the Illinois State Normal University in 1870; became a Methodist Episcopal clergyman in 1874; and was financial secretary of the Illinois Wesleyan University in 1883-1893; president of Chad-dock College in 1893-1898, and of the Missouri Wesleyan College, at Cameron, in 1898-1906; then pastor at De Funiak Springs, Fla.

**Baker, Charles Whiting**, an American civil engineer, born in Johnson, Vt., Jan. 17, 1865; was graduated at the engineering department of the University of Vermont in 1876; managing editor of "Engineering News" in 1900; and author of "Monopolies and the People," etc.

**Baker, Edward Dickerson**, an American soldier and politician, born in London, England, Feb. 24, 1811; came to the United States in youth. He was elected to the Illinois Legislature in 1837, became a State Senator in 1840, and was sent to Congress in 1844. He served under General Scott in the war with Mexico and was elected United States Senator from Oregon in 1860. He entered the Federal army at the outbreak

## Baker

of the Civil War, and was killed at the battle of Ball's Bluff, Oct. 21, 1861.

**Baker, Frank**, an American zoologist; was graduated in the medical department of Columbian University in 1880; was Professor of Anatomy in the University of Georgetown; and in 1900 was superintendent of the National Zoological Park, in Washington, D. C. Dr. Baker is a Fellow of the American Association for the Advancement of Science, and a member of the Academy of Science, and the Anthropological and the Biological Societies, all in Washington.

**Baker, George Augustus**, an American painter, born in New York, in 1821; elected to the National Academy in 1851. He was especially celebrated as a portrait painter and reproduced flesh-tints very accurately. His principal works, aside from his portraits, are "Love at First Sight," "Wild Flowers," "Faith," and "The May Queen." He died in New York, April 2, 1880.

**Baker, George Augustus**, an American writer of verse and stories, born in New York, N. Y., in August, 1849; graduated from Columbia College Law School, and has written: "Point Lace and Diamonds," light society verse (New York, 1875); "Bad Habits of Good Society" (1876); "Mrs. Hephestus and Other Stories" (1887); and comedies.

**Baker, Harriette Newell (Woods)** (pseudonyms "Madeline Leslie" and "Aunt Hatty"), an American writer of juvenile stories, born in 1815. A very voluminous writer, several of her works have been translated into French and German. She has written "Tim, the Scissors-Grinder" (1861, sequel in 1862), her most popular work; "Up the Ladder" (1862); "The Two Homes" (1862); "The Organ-Grinder" (1863); "White and Black Lies" (1864); "Worth and Wealth" (1864); "Tim's Sister" (1864); "Wheel of Fortune" (1865); "Courtesies of Wedded Life" (1869); "Paul Barton" (1869); "Fashion and Folly" (1869); "Lost but Found" (1869); "Ingleside" (1886); "This and That" (1887); etc. She was a daughter of Rev. Leonard Woods and wife of Rev. Abijah R. Baker, and died in 1893.

**Baker, Henry**, an English naturalist, born in London in 1698; from a bookseller's apprentice became a teacher of deaf-mutes, and, making a large fortune, in 1729 married Defoe's youngest daughter. In 1740 he was elected a Fellow both of the Royal Society and of the Society of Antiquaries. He contributed many papers to the "Transactions" of the former society, received its Copley gold medal (1744) for his microscopical experiments, and published a philosophical poem on the "Uni-



verse." He was the founder of the Bakerian lectureship, and died Nov. 25, 1774.

**Baker, Ira Osborn**, an American educator, born in Linton, Ind., Sept. 23, 1853; became Professor of Civil Engineering in the University of Illinois in 1880. He has written several scientific works.

**Baker, James Hutchins**, an American educator, born in Harmony, Me., Oct. 13, 1848; was graduated at Bates College, Lewiston, in 1873; principal of the Denver High School in 1875-1891; and in the last year became president of the National Council of Education and also of the University of Colorado. He has published numerous lectures and monographs, and a work on "Elementary Psychology."

**Baker, John Gilbert**, an English botanist, born in Guisbrough, Yorkshire, Jan. 13, 1834; was appointed assistant curator at the herbarium at Kew in 1866. He was for many years lecturer on botany to the London hospital, and in 1882 he received a like appointment from the Apothecaries' Company; he is also a member of the Royal and Linnæan Societies. His voluminous writings include works on the flora of districts so diverse as the North of England, Madagascar, and Brazil; and from his pen have come both popular monographs and scientific catalogues of high value.

**Baker, Lafayette C.**, an American detective, born in Stafford, N. Y., Oct. 13, 1826; was chief of the Secret Service Bureau during the Civil War; and reached the military rank of Brigadier-General. He superintended the pursuit of Wilkes Booth, President Lincoln's assassin. He published a "History of the United States Secret Service" (1868). He died in Philadelphia, Pa., July 2, 1868.

**Baker, Marcus**, an American cartographer, born in Kalamazoo, Mich., Sept. 23, 1849; was graduated at the University of Michigan in 1870; became connected with the United States Coast and Geodetic Survey, in 1873, and with the United States Geological Survey, in 1886; and in 1900 was secretary of the United States Board on Geographic Names. He was cartographer to the Venezuela Boundary Commission, and after surveying and exploring in Alaska and along the Pacific coast, prepared, with William H. Dall, the "Alaska Coast Pilot." He died Dec. 12, 1903.

**Baker, Moses Nelson**, an American civil engineer, born in Enosburg, Vt., Jan. 26, 1864; was graduated at the University of Vermont in 1886; was editor for several years of the "Manual of American Waterworks," and in 1900 was associate editor of "Engineering News." He wrote "Sewage Purification in America," "Sewerage and Sewage Purification," etc.

**Baker, Osmon Cleander**, an American clergyman, born in Marlow, N. H., July 30, 1812; was educated at Wesleyan University; spent several years in teaching. He was one of the founders of the system of Methodist Episcopal Theological schools. He was professor in the Biblical Institute in Concord, N. H., in 1847-1852, and in the last year was elected a bishop of the Church. His work, "Guide-Book in the Administration of Discipline of the Methodist Episcopal Church" (1855), is a standard work. He died in Concord, N. H., Dec. 20, 1871.

**Baker, Sir Richard**, an English historian, born in Kent in 1568, educated at Oxford, knighted in 1603 by James I., and in 1620 appointed High Sheriff of Oxfordshire, where he had estates. Having given security for a debt incurred by his wife's family, he was thrown into Fleet Prison, where, after continuing some years, he died in 1645. During his imprisonment he wrote some devotional books, and his "Chronicle of the Kings of England," first published in 1641, and afterward continued by Edward Phillips, the nephew of Milton, and others—a work of great popularity in its day, though of no permanent value.

**Baker, Sir Samuel White**, a distinguished English traveler; born in London, June 8, 1821. He was trained as an engineer, and at the age of 24 he went to Ceylon, where he founded an agricultural settlement at Nuwara Eliya in 1847. In the early part of 1861, accompanied by his (second) wife, he set out for Africa on a journey of exploration. When he had ascended the Nile as far as Gondokoro he met Speke and Grant returning after their discovery of the Victoria Nyanza lake, and learned from them that another large lake in the district had been spoken of by the natives. This lake he determined to discover, and after many adventures he and his wife beheld the Albert Nyanza from a height on March 14, 1864. On his return home he was received with great honor and was knighted. In 1869 he returned to Africa as head of an expedition sent by the Khedive of Egypt to suppress the slave trade and to annex and open up to trade a large part of the newly explored country, being raised to the dignity of pasha. He returned home in 1873, having finished his work, and was succeeded by the celebrated Gordon. In 1879 he explored the island of Cyprus, and subsequently he traveled in Asia and America. His writings include: "The Rifle and the Hound in Ceylon" (1854); "Eight Years' Wanderings in Ceylon" (1855); "The Albert Nyanza" (1866); "The Nile Tributaries of Abyssinia" (1867); "Ismailia, a Narrative of the Expedition to Central Africa" (1874); "Cyprus as I saw it in 1879"; "Wild Beasts



## Baker

and Their Ways" (1890); also "Cast up by the Sea," a story published in 1869. He died Dec. 30, 1893.

**Baker, Thomas**, an English antiquary, born in 1656; educated at Cambridge. As a non-juror he lost his living at Long-Newton, in 1690, and was compelled to resign his fellowship on the accession of George I., but continued to reside at St. John's College till his death in 1740. His "Reflections on Learning" (1709-1710) went through seven editions. He left in manuscript 42 folio volumes of an "Athenæ Cantabrigienses," from which a "History of St. John's College" was edited by Professor Mayor in 1869.

**Baker, Valentine**, an English military officer, also known as Baker Pasha, was born in 1825; a brother of Sir Samuel White Baker. For his services in the Crimean War he was made Colonel of the 10th Hussars. In the Russo-Turkish War of 1877 he was in the Turkish service, and subsequently he served in Egypt. He wrote "Clouds in the East," and "The War in Bulgaria." He died at Tel-el-Kebir, Nov. 17, 1887.

**Baker, William Bliss**, an American artist, born in New York in 1859; studied at the National Academy; and is especially noted for his landscapes. Among his works are "In the Old Pasture," "October Morning," and "Under the Apple-Tree." He died in Ballston, N. Y., in 1889.

**Baker, Sir William Erskine**, a British military and civil engineer, born in Leith, Scotland, in 1808; served in the first Sikh War and afterward held many offices in the public works department of India. His engineering work in Scinde was very valuable, as the scheme of irrigation which he carried through has imparted fertility to a barren territory. He became a member of the Council of India in 1861; Major-General in 1865; a K.C.B. in 1870; and retired from public life in 1875. He died in Somersetshire, Dec. 16, 1881.

**Baker, William Henry**, an American gynecologist, born in Medford, Mass., March 11, 1845; was graduated at the Harvard Medical School; and became Professor of Gynecology there. His publications include "The Treatment of Cancer of the Uterus," "Diseases of the Urethra and Bladder," etc.

**Baker City, Ore.**, a city and county-seat of Baker Co., 360 miles E. of Portland, on the Powder river, and the railway of Oregon R. R. and Navigation Co. Near the eastern border, it has a good trade with the surrounding mining, farming, and stock-raising region in supplying their needs and exporting their products. Its industries mostly have reference to this trade, in iron works, saw and lumber mills, breweries, brickyards, etc. A biennially-elected mayor and a city council

## Baking

administer the government. The place was settled in 1860, and incorporated in 1872. Pop. (1900) 6,663; (1910) 6,742.

**Baker, Mount**, an occasionally active volcano in Whatcom County, Wash., belonging to the Cascade Range; very active in 1880; elevation, 10,827 feet.

**Baker's Dozen**, a familiar phrase said to have originated in an old custom of bakers, who, when a heavy penalty was inflicted for short weight, used to give a surplus number of loaves, called the inbread, to avoid all risk of incurring the fine. Thirteen, therefore, became a baker's dozen, and 13 also is assumed to be the number of witches who sat down together at dinner on the Lord's day, even as it was the number who were at that last Passover supper which immediately preceded the betrayal of Christ. Thirteen was also called the "devil's dozen."

**Baker University**, a co-educational institution at Baldwin, Kan.; founded in 1858, under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over \$220,000; productive funds, about \$150,000; income, about \$90,000; scientific apparatus, \$48,000; professors and instructors, 40; students, including summer school, about 800; volumes in the library, over 26,000; number of graduates, over 650.

**Bakewell, Robert**, an English agriculturist, celebrated for his improvements in the breeding of sheep, cattle, and horses, was born in Leicestershire in 1725. He commenced experiments in breeding sheep about 1755, upon his father's farm at Dishley, and for 50 years devoted himself to the acquisition and diffusion of information upon the subject.

**Bakhtegan** (bäg-te-gän'), or **Niris**, a salt lake in the Persian province of Farsistan, 47 miles E. of Shiraz. Lying 5,100 feet above the sea, it extends 74 miles south-eastward, and varies in width between 4½ and 13½ miles. It largely dries up in summer, when its bed yields very fine salt.

**Bakhtiara** (bägt-yär'ē), or **Bakhtyari**, (1) A range of mountains of Persia extending parallel to the Arva and Laristan ranges. (2) A half-civilized tribe living in the above mountains, estimated to number 232,800.

**Baki** (bä'kē'), the greatest lyric poet of Turkey; died about 1600. His "Divan" contains almost exclusively odes in praise of the Sultan.

**Baking**; the mode of cooking food in an air-tight chamber or oven. The term is also applied in the manufacture of bricks, pottery, etc. The oven that forms part of a kitchen range is simply an iron chamber, with flues for conveying the heated gases of the fire round it. Ovens are often heated by water (superheated), and frequently now by gas. Meat for baking is placed in a dish, from the bottom of which, in some



## Baking Powder

cases, it is raised on a wire frame or trivet. Baking, although a convenient mode of cooking meat, is not considered quite so good as roasting.

**Baking Powder**, a powder used in baking as a substitute for yeast. It consists of tartaric acid, bicarbonate of soda, and rice or potato flour. These ingredients must be powdered and dried separately, and then thoroughly mixed together. The flour is added to keep the powder dry, and prevent it absorbing moisture from the atmosphere. As the combination of tartaric acid with bicarbonate of soda produces tartrate of soda, which is an aperient, it would be better if manufacturers of baking powders would substitute sesquicarbonate of ammonia for the bicarbonate of soda. Baking powders are generally free from adulteration, although alum has sometimes been found, but in very minute quantity.

**Bakkebakke**, a tribe of African pigmies dwelling in the French Kongo territory.

**Baksheesh**, or **Bakshish**, an Eastern word, meaning a present or gratuity. In Egypt and other parts of the Turkish Empire (not, as is sometimes said, in India), the traveler has scarcely set foot on shore before clamors for baksheesh, on the most frivolous pretexts, or in simple beggary, without pretext at all, assail his ears from every quarter. Baksheesh is the first Arabic word with which he becomes acquainted, and he acquires it unwillingly. It will be for his interest, as soon as possible, in self-defense, to learn three words more — “*Lā shy hū*,” meaning “There is none.”

**Baku** (*bä-kö'*), a Russian port on the W. shore of the Caspian, occupying part of the peninsula of Apsheron. The naphtha or petroleum springs of Baku have long been known; and the Field of Fire, so called from emitting inflammable gases, has long been a place of pilgrimage with the Guebres or fire-worshippers. Recently, from the development of the petroleum industry, Baku has greatly increased, and is now a large and flourishing town. About 500 oil-wells are in operation, producing immense quantities of petroleum, much of which is led direct in pipes from the wells to the refineries in Baku, and it is intended to lay a pipe for its conveyance all the way to the Black Sea, at Batoum, which is already connected with Baku by railway. Some of the wells have had such an outflow of oil as to be unmanageable, and the Baku petroleum now competes successfully with any other in the markets of the world. Baku is the station of the Caspian fleet, is strongly fortified, and has a large shipping trade. Pop. (1900) 179,133.

**Bakunin, Michael** (*bä-kö'nin*), a Russian anarchist, the founder of Nihilism, born in 1814 of rich and noble family, entered the

## Balæniceps

army, but threw up his commission after two years' service, and studied philosophy at Moscow, with his friends Herzen, Turgenieff, Granowski (historian), and Belinski (critic). Having adopted Hegel's system as the basis of a new revolution, he went in 1841 to Berlin, and thence to Dresden, Geneva, and Paris, as the propagandist of anarchism. Wherever he went, he was influential for disturbance, and after undergoing imprisonment in various States, was handed over to Russia, in 1851, by Austria, imprisoned for five years, and finally sent to Siberia. Escaping thence through Japan, he joined Herzen in London, on the staff of the “*Kolokol*.” His extreme views, however, ruined the paper and led to a quarrel with Marx and the International; and having fallen into disrepute with his own party in Russia, he died suddenly and almost alone at Berne, in 1878. He demanded the entire abolition of the State as a State, the absolute equalization of individuals, and the extirpation of hereditary rights and of religion, his conception of the next stage of social progress being purely negative and annihilatory.

**Bala**, a township of England, in North Wales, county of Merioneth, 37 miles N. W. by W. of Shrewsbury, at the W. end of the largest of the Welsh lakes, in a wild and mountainous country. In the neighborhood occur the Bala Beds, a local deposit, which form a group in the Lower Silurian of Murhison. They consist of a few beds, rarely more than 20 feet in thickness. The beds are chiefly composed of hard crystalline limestone, alternating with softer argillaceous bands, which decompose more freely, and leave the limestone like a cornice molding, affording a characteristic by which, at a considerable distance, the Bala Beds can be distinguished from the rocks of hard, gritty slate above and below. Trilobite and cystidæ are the predominant fossils of the group.

**Balaam**, a heathen seer, invited by Balak, King of Moab, to curse the Israelites, but compelled by miracle to bless them instead (Num. xxii–xxiv). In another account he is represented as aiding in the perversion of the Israelites to the worship of Baal, and as being, therefore, slain in the Midianitish War (Num. xxxi; Josh. xiii). He is the subject of many rabbinical fables, the Targumists and Talmudists regarding him, as most of the fathers did, in the light of an impious and godless man.

**Balachong**, an Oriental condiment, composed of small fishes, or shrimps, pounded up with salt and spices and then dried.

**Balæna**, the genus which includes the Greenland, or right whale, type of the family *balænidæ*, or whale-bone whales.

**Balæniceps**, a genus of wading birds, belonging to the Sudan, intermediate between



## Balænidæ

the herons and storks, and characterized by an enormous bill, broad and swollen, giving the only known species (*B. rex*), also called shoe-bird, a peculiar appearance. It feeds on fishes, water snakes, carrion, etc., and makes its nest in reeds or grass adjoining water. The bill is yellow, blotched with dark brown, the general color of the plumage dusky gray, the head, neck, and breast slaty, the legs blackish.

**Balænidæ**, the true whales, the most typical family of the order *cetacea* and the sub-order *cete*. They are known by the absence of teeth and the presence in their stead of a horny substance called whalebone, or baleen. The family contains two genera, *balæna* and *balænoptera*.

**Balænoptera**, fin-back whales. A genus of *balænidæ*, characterized by the possession of a soft, dorsal fin, and by the shortness of the plates of baleen. *Balænoptera boops* is the northern porbeagle, or fin-fish, called by sailors the finner. It is the largest of known animals, sometimes reaching 100 feet in length. A somewhat smaller species, *B. musculus*, inhabits the Mediterranean.

**Balaghat** (bä-lä-gät'), the name given to a large tract of elevated country in the S. of India, extending from the rivers Tumbuddra and Krishna in the N. to the farthest extremity of Mysore in the S. Also the name of a British district in the Central Provinces.

**Balaguer, Victor** (bä-lä-gä'), a Spanish historian, born in Barcelona, Dec. 11, 1824; became keeper of the archives, Professor of History in the University, both in Barcelona, an active Liberal politician, and, in 1888, chief of the council on the Philippine Islands. He wrote "The Troubadours of Montserrat" (1850); "Political and Literary History of the Troubadours" (1878-1880); "Poems" (1874); "Don Juan de Serravalle" (5th ed., 1875), etc.

**Balahissar**, a village on the site of the ancient Pessinus, in the S. W. part of the province of Angora, in Asia Minor. The ancient town was famous for its worship of Cybele, and among the fragments of marble columns, friezes, etc., rise the ruins of her gorgeous temple, and remains of a theater in partial preservation, a castle, and a circus.

**Balaklava**, a small seaport in the Crimea, 8 miles S. S. E. Sebastopol, consisting for the most part of houses perched upon heights, with an old Genoese castle on an almost inaccessible elevation. The harbor has a very narrow entrance, and though deep, is not capacious. In the Crimean War it was captured by the British, and a heroically fought battle took place here (Oct. 25, 1854), ending in the repulse of the Russians by the British. The charge of the Light Brigade was at this battle.

## Balance

**Balalaika**, a musical instrument of very ancient Slavonic origin, common among the Russians and Tartars. It is a narrow, shallow guitar with only two strings.

**Balamban**, a small town on the W. coast of Cebu, Philippine Islands. It was occupied by a garrison of United States infantry after a battle with Filipino insurgents early in January, 1900. Balamban is on Tanon Strait, and has a native population of some thousands, and a public school in which English is taught.

**Balance**, an instrument employed for determining the quantity of any substance equal to a given weight. Balances are of various forms; that most commonly used, and well known under the designation of "the beam and scales," consists of a supported horizontal beam capable of turning in a vertical plane round its center. The scales or scale pans are suspended by chains from the extremities of the beam, called the centers of suspension. Midway between the centers of suspension, and directly above the center of motion (that is, the center of the beam), there rises from the upper surface of the beam a perpendicular slender stem called the tongue, which, when the beam is level, points to the top of the piece by which the whole is suspended. A good balance is necessary, not less for the ordinary commerce of society than for the purposes of science; and there are few indeed to whom it should be a matter of indifference to know the principles of construction which contribute to the excellence of this simple and useful instrument.

The characteristics of a good balance are three: (1) That the beam should rest in a horizontal position when the scales are either empty or loaded with equal weights. (2) A very small addition of weight put into either scale should cause the beam to deviate from the level, which property is denominated the sensibility of the balance. (3) When the beam is deflected from the horizontal position by inequality of the weights in the scales, it should have a tendency speedily to restore itself and come to rest in the level, which property is called the stability of the balance. The remarks which follow will guide in the construction of a balance which shall possess the foregoing properties: The arms of the beam should be exactly similar, equal in weight and length, and as long as possible. The centers of gravity and suspension ought to be in one straight line, and the center of motion should be immediately above the center of gravity. The center of motion and the centers of suspension should cause as little friction as possible, and their axes ought to be at right angles to the line which measures the length of the beam. The center of motion ought to be a knife-edge; and if the balance requires to be very delicate,



the centers of suspension ought to be knife-edges also; and if the centers of suspension be not knife-edges, the rings with which they are formed should be hard, polished, and of an oval form. There are means of testing whether or not these conditions have been observed in the construction of a balance. For if the balance have no tendency to one position more than another, when the scales are either loaded, empty, or off altogether, it is a proof that the centers of gravity and motion coincide, and the remedy is to lower the center of gravity. If the beam is disturbed by a small addition of weight to either scale, the arm at the loaded end descending and having no tendency to resume the horizontal position, then we may infer that the center of gravity is above the center of motion; and it is to be observed that the quicker the descent of the loaded arm of the beam is the farther must the center of gravity be lowered before the beam will acquire the requisite stability. If it require a considerable addition of weight in either scale to deflect the beam from the level, we may infer either that there is too much friction at the center of motion, or that the center of gravity is too low. If two weights are found to be in equipoise, one being in each scale, and if, when a transfer of them is made, and that which was in one scale is put into the other, there is no longer an equilibrium, then we may infer that the arms of the beam are of unequal lengths.

Various contrivances have been employed with a view to correct the defects of the common balance. The whole apparatus is not infrequently inclosed in a glass case, which prevents the heat from expanding the arms unequally, or currents of air from disturbing the equilibrium. A small weight has been made to slide up or down on the tongue, by which means the center of gravity may be raised or depressed at pleasure; and to regulate the equality of the length of the arms, a regulating screw is employed, by means of which the center of suspension of either arm may be moved nearer to or farther from the center of motion. Balances used for delicate purposes, such as for assaying, have the center of motion suspended; but that center is fixed on a pedestal, which firmly supports the whole. Various forms of hydrometer, for example Nicholson's, may be employed as balances. A hydrometer with a rather large body and narrow neck, and weighing much less than its own volume of water, may be fitted up as a convenient form of balance known as the hydrostatic balance. This form of balance is, however, used only in very special cases, since for ordinary purposes it possesses no particular advantages. The balances which we have considered above all require an assortment of weights; and it now remains for us to describe the more important of those balances which require only one weight, but are nev-

ertheless capable of determining a great many. Of this description is the *statera*, or Roman steel-yard, which, in all its forms, however complicated and elaborate, consists essentially of a steel lever movable around a fixed fulcrum. On one side of this fulcrum, and at a known distance from it, a fixed pan is suspended from the bar, and the body to be weighed is placed in this pan. The other arm of the lever is graduated, the divisions being shown by notches, and from it the single weight is suspended at such a distance (ascertained by trial) from the fulcrum as to counterbalance the turning effect due to the body and the pan and produce equilibrium. When that has been secured, we know from the principle of moments that, provided the apparatus was in equilibrium before the body and the weight were added, the number of pounds in the mass of the body multiplied by the number of units in the known distance of the point of suspension of the pan from the fulcrum must be equal to the number of pounds in the movable weight multiplied by the number of units in its distance from the fulcrum. By properly choosing the fixed distance of the pan and the value of the constant weight we may graduate the long arm of the lever so as to read off at once the weight of the body in the pan. Thus if the pan be suspended at a distance of one inch, and the movable weight be one pound, the weight of any body placed in the pan is equal to the number of inches from the fulcrum to the sliding weight in the position of equilibrium.

An extremely ingenious balance is that used in the Mint and the Bank of England for weighing "blanks" intended to be coined, as well as the coins themselves. The instrument is self-feeding, and when it has received a supply of blanks, each of them is in turn pushed into the upper orifice of a long flattened tube, which is just capable of admitting a disk of the size of a sovereign, and which is attached to a pivot at its upper end and free at its lower end. By an intricate mechanism, this tube is made to vibrate, so that when a blank of full weight is admitted the lower orifice of the tube is adjusted exactly over an opening of equal size in a box or compartment beneath, which is intended to receive all the blanks of the proper weight, and when a blank either too heavy or too light is admitted, the tube is adjusted in the same way over the openings in other two compartments which are respectively intended to receive the "too heavy" and "too light" blanks.

**Balance**, in horology: (1) Balance of a watch: The circular hoop or ring which takes the place of the bob of a pendulum in a clock. The action of the hair spring causes it to vibrate. (2) Compensating balance of a chronometer: A balance, or wheel, furnished with a spiral spring, with metals of



different expansibility so adjusted that, in alterations of temperature, they work against each other and render the movements of the chronometer uniform.

**Balance Electrometer**, an instrument invented by Cuthbertson for regulating the amount of the charge of electricity designed to be sent through any substance. Essentially it consists of a beam with both its arms terminating in balls. One of these is in contact with a ball beneath it, supported by a bent metallic tube, proceeding from the same stand as that on which the beam rests. When electricity is sent through the instrument, the two balls repel each other, and the beam is knocked up. Its other extremity consequently descends, the ball there coming in contact with another one at the top of an insulated column, and a discharge will there take place. The weight, overcome by the repulsive force, will measure the intensity of the latter. It has been superseded by instruments on other principles.

**Balance of Power**, a political principle which first came to be recognized in modern Europe in the 16th century, though it appears to have been also acted on by the Greeks in ancient times, in preserving the relations between their different States. The object in maintaining the balance of power is to secure the general independence of nations as a whole, by preventing the aggressive attempts of individual States to extend their territory and sway at the expense of weaker countries. The first European monarch whose ambitious designs produced a fear of his aiming at universal monarchy, and consequently induced a combination of other States to counteract these, was the Emperor Charles V. A similar apprehension and counter coöperation took place in the end of the 17th century, when the ambition of Louis XIV. excited the fears of Europe. About a century later the exorbitant power and aggressive schemes of the first Napoleon led to a general combination against him of the allied sovereigns, which resulted in his repression and overthrow. More recently we have the instance of the Crimean War, entered into to check the despotic power of Russia in her projects for coercing and ultimately engulfing the Ottoman empire. Indeed, the continued existence of Turkey as a European State has long been due to the operation of this policy among the Christian governments of Europe. The weakness and maladministration of the Sublime Porte would have resulted in the loss of the Ottoman possessions W. of the Bosphorus had it not been for this struggle for the balance of power.

**Balance of Torsion**, an instrument invented by Coulomb for comparing the intensities of very small forces. It consists of a metallic wire suspended vertically from a fixed point, to the lower end of which a hor-

izontal needle is attached with a small weight designed to keep the wire stretched. The magnitude of a small force acting on the end of the needle is measured by the amount of torsion, or twisting of the wire—in other words, by the arc which the needle passes over measured from the point of repose. In place of the wire, a spun glass filament or other fiber is sometimes used to suspend the needle. Some of the most important of Coulomb's investigations in electricity and magnetism were carried on by means of this instrument. The term torsion balance is sometimes applied to other forms of mechanism designed to measure delicate forces. In one kind of balance a horizontal wire passes through the center of gravity of a beam that tips with the torsional movements of the wire. The balance invented by Ritchie was of this nature.

**Balance of Trade**, a term formerly used by political economists to signify an excess of imports over exports, or of exports over imports in the foreign trade of a country, which required to be balanced by an export or import of the precious metals. According to what was called the "mercantile system," the country which had such a balance in its favor was supposed to be in an advantageous, and the country which had it against it was supposed to be in a disadvantageous position in regard to its foreign trade, and many regulations injurious to commerce were adopted by the greatest and most intelligent nations with a view to regulate their trade favorably in regard to this assumed standard. Since the days of Adam Smith the old mercantile system has been thoroughly discredited, but the true laws which regulate the transactions of different communities with each other, and which constitute the balance of trade properly so called, are yet far from being generally understood.

A few elementary positions may be laid down regarding them: (1) In the exchange of commodities between different nations, as between different individuals, the tendency of the exchange is always to an equilibrium, that is, that a given amount of labor, regulated by a given amount of skill of one nation, should exchange for an equal amount of equally skilled labor of another. The actual course of exchange may often diverge very far from this equilibrium, but whenever it does diverge, it brings into operation forces sufficient ultimately to neutralize the divergence, as the supply of labor will always tend most freely to the points where it can be pursued to the greatest advantage. (2) The whole exports and imports of a community must, in general, be periodically balanced. There are communities as well as individuals which have a tendency to live on credit, and sometimes imports may be gained in this way for



which no substantial return is ever made; but generally speaking balances of national trade cannot be permanently run up, so that the whole exports of a community during a considerable period, such as a consecutive series of years, may be taken as the measure of its importing power, and *vice versa*. (3) This real balance of trade does not produce any apparent balance. It is not and cannot be represented in statistics. As Adam Smith demonstrated, it is a matter of complete indifference in what sort of commodities any community pays a particular balance against it. The precious metals have no superiority over other kinds of merchandise.

There is, however, one phenomenon in regard to the balance of trade which requires explanation, as it constantly causes the whole subject to be misunderstood. Any nation taking the statistics of exports and imports at its own ports, that is the value of imports as they arrive and of exports as they leave, will nearly always make the balance of its entire foreign trade in its own favor; the reason is, that the former are estimated with all the expenses of transport added, the latter entirely free of these expenses. On statistics taken on equal bases, either invariably omitting or invariably including the expenses of transit, agency, etc., it would, however, be found that some countries habitually import more than they export, while others export more than they import. The explanation of this is not that the one class makes a profit, the other a loss, on its foreign trade. Actual profit or loss, that is a more or less favorable exchange in quantity or value of labor, is not at all gauged by statistics, as it directly affects the estimated value of the articles exchanged. The explanation of the difference simply refers to the distribution of the expenses of transit. In one sense all commerce is carried on at a loss. When two countries exchange their products, there are certain expenses to pay on the exchange. The advantage of the exchange consists in the fact that each gets an article it wants in place of an article it does not want, an article of which its supply is deficient, or which it has not at all, in place of an article of which its supply is superabundant. But the exchange by which this advantage is procured entails labor, and this labor must be paid for. The actual producers of the two countries, consequently, have their gross production diminished by the exchange. They have to give a portion of it to the agents who carry on the exchange.

Now these agents may belong in a much greater proportion to the one country than to the other. All the ships which carry on the commerce between two countries, for example, may be built in one of them; they may be regularly managed and receive all their most valuable supplies in the same

country. The ships are not actually exported, but the country which builds and manages them for the mutual benefit of its commerce with another country will necessarily import more from that country than it exports to it. It pays, in the first instance, the whole expense of transit, and the other country must ultimately contribute its share in larger exports. If these expenses could be exactly adjusted between two countries the estimated value of their whole exports would exactly balance, provided there were no cross transactions with other countries, whether the exchange between them was or was not favorable to the labor of one or the other; because if the labor of three Englishmen exchange for the labor of nine natives of Bengal, the estimated value of the labor of the nine will be exactly that of the three, and the only difference in the estimate of this value which would be made in London and Calcutta would be the expenses of transit and agency between the two places. If we suppose the whole expenses of the exchange between the two countries to be one-third of the gross produce, and the expense to be equally divided, then the three Englishmen would receive for their labor that of six Indians, while the nine Indians would receive only the labor of two Englishmen.

**Balanoglossus**, a worm-like animal of much zoological interest as a connecting link between invertebrates and vertebrates. The genus, which includes at least four species, occupies so unique a position that it is regarded as representative of a distinct class of *enteropneusta* (gut-breathers). The animals live in fine sand, which they appear to saturate with slime. They eat their way through it, drawing themselves on by means of the contractions of the most anterior part of their body. The body is richly ciliated and extremely soft; and it is thus very difficult to obtain large specimens intact. *Balanoglossus sarniensis*, which occurs as a rarity in the English Channel, has been aptly compared, as regards its softness, to wet bread. This form may attain a length of eight inches or more. Two species have been found in the Gulf of Naples, and two in more northerly waters. The body exhibits four distinct regions, a large proboscis in front of the mouth, a muscular collar of some length, a respiratory region, through slits in which water flows out from the gullet, and lastly, a long, gastric region with most of the digestive and reproductive systems.

Apart from numerous peculiarities in the structure and development of balanoglossus, the general fact of importance is its remarkable combination of characters uniting it to widely separated types. It is what is known as a synthetic type—that is to say, it unites features characteristic of



## Balanus

very different groups. In the language of zoological pedigree, it is a survivor of an ancestral group from which several others started. The anterior portion of the alimentary canal, which is supported by a horny basket-work, is pierced by paired respiratory gill-slits, to all appearance comparable to those which persist in low vertebrates, and appear in the embryonic life of all. There are also structures which are believed by some to be more or less directly comparable to the dorsal nerve cord and the supporting axis or notochord, so characteristic of vertebrates. Undoubted affinities must be admitted, and this fact likewise is interpreted in terms of the history, by regarding balanoglossus as a survivor of a primitive ancestral group, from which not only echinoderms, but vertebrata diverged.

**Balanus** ("acorn-shells"), a genus of sessile cirripeds, family *balanidæ*, of which colonies are to be found on rocks at low water, on timbers, crustaceans, shells of mollusca, etc. They differ from the barnacles in having a symmetrical shell, and being destitute of a flexible stalk. The shell consists of six plates, with an operculum of four valves. They pass through a larval state in which they are not fixed, moving by means of swimming feet which disappear in the final state. All the *balanidæ* are hermaphrodite. A South American species (*B. psittacus*) is eaten on the coast of Chile, the *balanus tintinnabulum* by the Chinese. The old Roman epicures esteemed the larger species.

**Balard, Antoine Jerome** (bä-lär'), a French chemist, born in Montpellier, Sept. 30, 1802; Professor of Chemistry at the College of France, Paris; discoverer of bromine, also of a process of extracting sulphate of soda directly from sea-water. He died in Paris, March 31, 1876.

**Balas**, a name used to distinguish the rose-colored species of ruby from the ruby proper.

**Balata**, the product of the bullet-tree — its milk or juice, in fact — which is a large forest tree, ranging from Jamaica and Trinidad to Venezuela and Guiana (*B. minusops*). The tree grows to a height of 120 feet, and has a large, spreading head. The bark is about one-half inch thick. The wood cutters of Guiana regard the tree as inexhaustible. So far back as 1863 samples of balata were examined in England, and the opinion was expressed by Sir William Holmes that "balata was not to be rivaled either by india rubber or gutta percha, possessing much of the elasticity of the one and the durability of the other, without the intractability of india rubber or the brittleness or friability of gutta percha." Its strength is very great, and it is unequaled for bands for machinery. It com-

## Balbinus

mands a higher price than gutta percha. It is somewhat softer at ordinary temperatures, and not so rigid in the cold. The manufacturers treat it as simply a superior kind of gutta percha. The instruments used for collecting the milk are an ax for felling obstructing trees, a cutlass for making the channels in the bark to cause the milk to flow, and two or three gourds in which to collect the milk. A tree of average size yields three pints of milk. The milk is dried in hollow wooden trays. When it is sufficiently dry it is removed from the trays in strips and hung upon lines to harden.

**Balausta**, the name given by Richard, Lindley, and others to the kind of fruit of which the pomegranate is the type. It consists of a many-celled, many-seeded, inferior indehiscent fleshy pericarp, the seeds in which have a pulpy coat, and are distinctly attached to the placentæ.

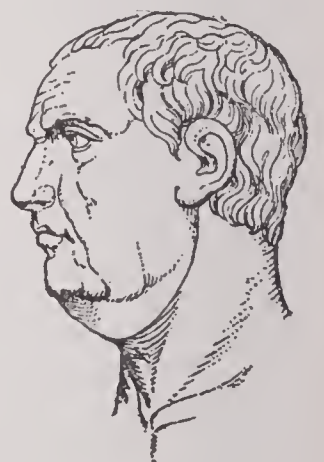
**Balbec.** See BAALBEK.

**Balbi, Adrien**, an Italian geographer and statistician, born in Venice in 1782. In 1808 his first work on geography procured his appointment as Professor of Geography in the College of San Michele, at Murano, and he became, in 1811, Professor of Natural Philosophy in the Lyceum, at Fermo. In 1820, he went to Portugal and collected there materials for his "Essai Statistique sur le Royaume de Portugal et d'Algarve" and "Variétés Politiques et Statistiques de la Monarchie Portugaise," both published in 1822, in Paris, where he resided till 1832. He then settled in Padua, where he died in 1848. Balbi's admirable "Abrégé de Géographie" was written at Paris, and translated into the principal European languages.

**Balbi, Gasparo**, a Venetian dealer in precious stones, born about the middle of the 16th century, who traveled first to Aleppo and thence down the Euphrates and Tigris to the Malabar coast, sailing finally for Pegu, where he remained for two years. His "Viaggio all' Indie Orientale," published on his return to Venice in 1590, contains the earliest account of India beyond the Ganges.

**Balbinus, Decimus Cælius**, a Roman Senator who, after the death of the two Gordiani, killed by the soldiers of Maximinus, was elected Emperor by the Senate, concurrently with Clodius

Pupienus Maximus, in opposition to the usurper Maximinus. The two Emperors



BALBINUS.



reigned little more than one year, and were assassinated by their soldiers, A. D. 238.

**Balbo, Count Cæsare**, an Italian author, born at Turin, in 1789. He is chiefly remarkable from the fact that his first important work, "*Le Speranze d'Italia*," published in 1844, may be regarded as having given the programme of the Moderate Party of Italian politics, and as having, together with the writings of d'Azeglio, Durando, and others, created the Liberal Party, in opposition to the Republican Party as represented by Mazzini. Balbo was an accomplished historian and translator. He died in June, 1853.

**Balboa, Vasco Núñez de**, a celebrated Spanish discoverer, born at Xeres de los Caballeros, in 1475. He accompanied Rodrigo de Bastidas in his expedition to the New World, and first settled in Haiti (or, as it was then termed, Hispaniola). Though an adventurer in search of fortune, his great ambition seems to have been to extend the boundaries of geographical knowledge, and especially to be able to announce to Europe the existence of another great ocean. He accordingly proceeded to the American continent, and there founded a colony, made numerous expeditions into the auriferous regions of the interior, and accumulated a vast amount of treasure. He now turned his attention to the great object of discovery on which he had set his heart. On Sept. 1, 1513, he began his perilous enterprise. Accompanied by a small band of followers, he began to thread the almost impenetrable forests of the Isthmus of Darien, and, guided by an Indian chief, named Ponca, clambered up the rugged gorges of the mountains. At length, after a toilsome and dangerous journey, Balboa and his companions approached, on Sept. 25, the summit of the mountain range, when Balboa, leaving his followers at a little distance behind, and advancing alone to the W. declivity, was the first to behold the vast unknown ocean, which he afterward took solemn possession of in the name of his sovereign, and named it the Pacific Ocean, from the apparent quietude of its waters. Surrounded by his followers, he walked into it, carrying in his right hand a naked sword, and in his left the banner of Castile, and declared the sea of the South, and all the regions whose shores it bathed, to belong to the crown of Castile and Leon. During his absence, however, a new governor had been appointed to supersede Balboa in Haiti: where, on his return, jealousy and dissensions springing up between them, Balboa, accused of a design to rebel, was beheaded in 1517, in violation of all forms of justice.

**Balbriggan**, a watering place in County Dublin, Ireland, 21 miles N. by E. of Dublin. It is a seat of linen, cotton, calico and

stocking manufactures. The cotton stockings made here are remarkable for fineness of texture and beauty of open work. Many women are employed in embroidering muslin.

**Balcony**, a gallery or projecting framework of wood, iron or stone, in front of a house, generally on a level with the lower part of the windows in one or more floors. Balconies are supported on brackets, cantilevers, rails, consoles or pillars, and are often surrounded by iron rails or by a balustrade of stone. They are very common outside the better houses in large towns. When they are sufficiently strong the inmates of the house can use them for standing or sitting in the open air; when more feebly supported, they may be employed as form-stands for plants in flower-pots.

**Baldachin** (bal'da-kin), a structure in form of a canopy, supported by columns, and often used as a covering for insulated altars. The form, for the most part, is square, and the top covered with cloth with a hanging fringe. The baldachin has been supposed to have been derived from the ancient ciborium (a large cup or vase). An isolated building, placed by the early Christians over tombs and altars, was called a eiborium. The modern baldachin is of the same form as the eiborium erected by Justinian in the Church of Santa Sophia, at Constantinople, which was made of silver, gold and precious stones, and supported by four silver-gilt columns. The baldachin is, however, deprived of the curtains, which in the ciborium were intended to inclose whatever was deemed sacred within. The Mohammedans seem to have copied the ciborium in their tombs. The baldachin carried over the Host in Catholic countries is not infrequently of an umbrella shape; a similar sort of umbrella may be seen on Etruscan vases. The baldachin in St. Peter's at Rome, made by Bernini, is the most celebrated, and is the largest known work of the kind in bronze. The dais, or covering, is supported on four large twisted columns of the composite order, placed upon pedestals of black marble, the dies of which are ornamented with bronze escutcheons. The columns are fluted for one-third their height; the remaining part is ornamented with bays and leaves of laurel, combined something after the manner of the columns of the temple designed by Raphael in one of his cartoons. The whole work is beautifully executed and highly finished. Above the columns are four figures of angels standing upright; at the top of the covering there is a cross, and below the entablature the banner-like cloth fringe of the portable baldachin has been imitated. The plan is square and the altar stands between the two pedestals of the foremost columns. The height is 126 feet 3 inches



## Balder

from the floor of the church to the summit of the cross, of which the pedestal is 11 feet 8 inches, the columns 50 feet 4 inches; the entablature 11 feet 6 inches, the covering 40 feet, and the cross is 12 feet 9 inches. There were 186,392 pounds of bronze employed on this work.

**Balder**, or **Baldur**, a Scandinavian divinity, represented as the son of Odin and Frigga, beautiful, wise, amiable and beloved by all the gods. His mother took an oath from every creature, and even from every inanimate object, that they would not harm Balder, but omitted the mistletoe. Balder was, therefore, deemed invulnerable, and the other gods in sport flung stones and shot arrows at him without harming him. But the evil god, Loki, fashioned an arrow from the mistletoe and got Balder's blind brother Höder to shoot it, himself guiding his aim. Balder fell dead, pierced to the heart, to the deep grief of all the gods. He is believed to be a personification of the brightness and beneficence of the sun.

**Bald Mountain**, the name of several eminences in the United States, of which the following are the principal: (1) In Colorado, height, 11,493 feet; (2) in California, height, 8,295 feet; (3) in Utah, height, 11,975 feet; (4) in Wyoming, in the Wind River Range, height, 10,760 feet; and, (5) in North Carolina, height, 5,550 feet. The last one was the cause of much excitement in May, 1878, because of inexplicable rumblings which lasted for about two weeks. The mountain shook as if in the throes of an earthquake, immense trees and rocks were hurled down its sides, and, for a time, fears were entertained lest a volcanic eruption should follow. A subsequent examination showed that a large section of the mountain had been split asunder, but no further disturbance occurred.

**Baldness**, an absence of hair on the head. Congenital baldness (complete absence of hair at birth) is sometimes met with; but, in most cases, is only temporary, and gives place, in a few years, to a natural growth of hair. Occasionally, however, it persists through life. Senile baldness (calvities) is one of the most familiar signs of old age. It commences in a small area at the crown, where the natural hair is first replaced by down before the skin becomes smooth and shining. From this area the process extends in all directions. It is more common in men than women. A precisely similar condition occurs not unfrequently at an earlier age (presenile baldness). It is generally due to hereditary tendency; but is favored by keeping the head closely covered, especially with a waterproof cap. The best authorities agree that this form of baldness is incurable. There is a condition, however, which in its

## Baldric

later stage much resembles the last, but is more amenable to treatment. Here the loss of hair begins simultaneously at two spots, at the crown, and about an inch behind the margin of the hair on the forehead. Its chief characteristic, however, is that loss of hair is preceded for some years by extreme scurfiness of the scalp. During this stage the process can be checked; sometimes, indeed, even after loss of hair has begun. The most successful treatment consists in thorough rubbing of the scalp with an ointment containing 1 part of precipitated sulphur to 10 parts of lard, at first nightly, then as the scurf diminishes, at gradually longer intervals.

Great loss of hair frequently follows severe illnesses or other causes which produce general debility. As health returns, the hair usually returns with it; its growth may be promoted by the use of lotions containing cantharides, ammonia, or some other stimulating agent. Baths containing common salt, and brisk rubbing, are also useful. Baldness in patches (*alopecia areata*) attacks chiefly children and young persons, frequently those of debilitated constitutions. The only change at first perceptible is that the hair falls out in one or more places, leaving smooth bare patches. These may gradually extend, and, with the progress of the disease, the affected skin becomes somewhat thinned. The scalp is the part most commonly attacked; but the disease may destroy every hair on the body. It is liable to be mistaken for ringworm; but in that disease the skin is rough and scaly, and the hairs, though broken off short, are not completely lost. *Alopecia areata* has been attributed to the action of a parasite; but it is more probably due to some obscure nervous influence. Mild cases almost always recover; and even in the worst forms of the disease complete restoration of the hair may take place, sometimes after many years of baldness. The treatment consists in stimulation of the affected skin, blistering, salt baths, the use of electricity, etc. In this, as in all other forms of loss of hair, attention must be paid to the general as well as the local treatment. A liberal diet and the use of iron and other tonics are frequently of the greatest service. The numerous and much advertised hair restorers, etc., in the market contain various stimulating substances, and are, generally speaking, beneficial in their action.

**Baldovinetti, Alessio**, a Florentine artist, born in 1422. Few of his works remain except a "Nativity" in the Church of the Annunziato, and two altar-pieces in the gallery of the Uffizi and the Academy of Arts, Florence. He died in 1499.

**Baldric**, a broad belt formerly worn over the right or left shoulder diagonally across the body, often highly decorated and en-



riched with gems, and used not only to sustain the sword, dagger, or horn, but also for purposes of ornament, and as a military or heraldic symbol. The fashion appears to have reached its height in the 15th century. In the United States it now forms a part of the uniform of Knights Templar and other fraternal organizations.

**Balducci, Francesco** (bäl-dö'chē), a leading Italian Anacreontic poet, born at Palermo; died at Rome in 1642. He wrote "Sicilian Songs" in the Sicilian dialect, etc.

**Baldung, Hans, or Hans Grün**, a German painter and wood engraver, born in Suabia, in 1470. His work, though inferior to Durer's, possessed many of the same characteristics, and on this account he has been sometimes considered a pupil of the Nuremberg master. His principal paintings are the series of panels (of the date of 1516) over the altar in Freiburg Cathedral; others of his works are to be found at Berlin, Colmar and Basel. His numerous and often fantastic engravings have the monogram H. and B., with a small G. in the center of the H. He died in Strasbourg, in 1552.

**Baldwin**, the name of a long line of sovereign Counts of Flanders, of whom the most celebrated was Baldwin IX., who became, afterward, Emperor of Constantinople, under the name of

**Baldwin I.**, the son of Baldwin VIII., Count of Flanders and Hainault, born at Valenciennes in 1170. In 1200, he joined the crusaders with his brother Thierry, and, in 1202, aided the Venetians in their attack upon Constantinople, of which city he was crowned Emperor, May 16, 1204. In the next year Baldwin was taken prisoner by the King of Bulgaria, and, it is said, died in captivity, in 1206. He was much esteemed by the Greeks for his charity, temperance and justice.

**Baldwin II.**, the last Frank Emperor of Constantinople, born in 1217. He was the son of Pierre de Courtenay, and succeeded his brother Robert in 1228. He was twice besieged in his imperial city, and being too weak to defend his dominions, repaired to Italy to seek aid from the Pope. At the court of France, Baldwin was favorably received by the king, St. Louis, to whom he presented a crown of thorns, which was held by all Christendom to be the genuine relic. Baldwin, in 1239, set out for Constantinople with a body of crusaders, who, however, soon quitted him, and took the route to Palestine. He succeeded, ultimately, in raising new forces in the West, and regained his capital; but, in 1261, Michael Paleologus invested it, and entered Constantinople on the 29th of July. Bald-

win fled to Sicily, where he died in obscurity, in 1273.

**Baldwin I.**, King of Jerusalem, was the son of Eustace, Count of Bouillon, and accompanied his brother Godfrey of Bouillon into Palestine, where he gained the sovereignty of the State of Edessa. He succeeded his brother on the throne of Jerusalem in 1100, and for 18 years waged war against the Turks, the Arabs, the Persians, and the Saracens. He took many towns, and secured for the Christians the coast of Syria, from the Gulf of Issus to the confines of Egypt. He died at Laris, in the desert, in 1118, and was buried on Mount Calvary. In the first canto of the "Gerusalemme," of Tasso, the poet has depicted the character of this monarch as well as that of his brother Godfrey.

**Baldwin II.**, King of Jerusalem, son of Hugh, Count of Rethel, was crowned in 1118, after Eustace, brother of Baldwin I., had renounced all claim to the vacant throne. In 1120 he gained a great victory over the Saracens, but, in 1124, he was taken prisoner by them, and was ransomed only by giving up the city of Tyre. In 1131 he abdicated in favor of his son-in-law, Foulques of Anjou, and retired to a monastery, where he died in the same year. The military and religious order of the Templars, for the defense of the Holy Land, was instituted in the reign of this monarch.

**Baldwin III.**, King of Jerusalem, son of Foulques of Anjou, whom he succeeded in 1142, under the guardianship of his mother. He took Ascalon and other places; but under his reign the Christians lost Edessa. Born in 1130; died at Antioch, in 1162. He was succeeded by his brother, Amaury I.

**Baldwin IV.**, son of Amaury, succeeded to the throne of Jerusalem on the death of his father, in 1174; but being leprous, Raymond, Count of Tripoli, governed the kingdom for him. He afterward resigned the throne to his nephew, Baldwin V., in 1183, and died in 1185.

**Baldwin V.**, King of Jerusalem, son of Sibylla, sister of Baldwin IV., was called to the throne when five years old, in 1183, and died of poison, supposed to have been administered by his mother, in order that her second husband, Guy de Lusignan, might enjoy the throne. The following year, 1187, the Christians lost Jerusalem, which was taken by Saladin.

**Baldwin, Abraham**, an American statesman and politician, born in Guilford, Conn., Nov. 6, 1754. From 1785 to 1788 he was a delegate to the Continental Congress. In 1789, he became a representative in Congress from Georgia, which office he held for 10 years. Then he was sent to the Senate, serving as president pro tem. in 1801-1802. He died in Washington, March 4, 1807.



## Baldwin

**Baldwin, Charles H.**, an American naval officer, born in New York city, Sept. 3, 1822. He entered the navy as a midshipman, in 1839. Serving on the frigate "Congress" during the war with Mexico, he figured in several sharp encounters near Mazatlan. He commanded the steamer "Clifton" at the passage of Forts Jackson and St. Philip, and at the first attack on Vicksburg. He became Rear-Admiral in 1883, receiving the command of the Mediterranean Squadron. He died in New York city, Nov. 17, 1888.

**Baldwin, Frank D.**, an American military officer; born in Michigan, June 26, 1842; entered the volunteer army in 1861 and the regular army in 1866; became colonel of the 4th United States Infantry, July 26, 1901; and was promoted Brigadier-General, U. S. A., June 9, 1902. He was awarded a Congressional medal of honor for service at the battle of Pine Tree Creek, Ga., July 20, 1864, and another for gallantry in an action against Indians in Texas. He greatly distinguished himself in the Philippines, in 1902. Retired in 1906.

**Baldwin, James Mark**, an American psychologist, born in Columbia, S. C., Jan. 12, 1861; educated at Princeton College, Leipsic, Berlin, and Tübingen Universities; was Instructor of German and French at Princeton in 1886-1887; Professor of Philosophy in Lake Forest University in 1887-1889, and in the University of Toronto in 1889-1893; Professor of Psychology at Princeton University in 1893-1903; then Professor of Philosophy and Psychology at Johns Hopkins University. He was Honorary President of the International Congress of Criminal Anthropology at Geneva in 1896; President of the American Psychological Association in 1897-1898; Judge of Award at the World's Columbian Exposition in 1893; was awarded a gold medal by the Royal Academy of Arts and Sciences of Denmark, in 1897, for the best work on the general question of social ethics; and was elected a member of the Institute International de Sociologie, in 1898. He is the author of "Handbook of Psychology" (2 vols., 1889-1891): a translation of Ribot's "German Psychology of To-day" (1886); "Elements of Psychology" (1893), etc. He was also editor-in-chief of the "Dictionary of Philosophy and Psychology," and a contributor of articles on psychology to "Johnson's Universal Cyclopædia" (1892-1895).

**Baldwin, John Denison**, an American journalist, politician, poet, and writer on archæology, born at North Stonington, Conn., Sept. 28, 1809. After studying law and theology, he entered journalism, was long editor and proprietor of the Worcester "Spy," and was a member of Congress in 1863-1869. He wrote "Raymond Hill

## Bale

and Other Poems" (1847); "Prehistoric Nations" (1869), and "Ancient America" (1872). He died at Worcester, Mass., July 8, 1883.

**Baldwin, Foy Spencer**, an American educator, born in Charlotte, Mich., July 6, 1870; was graduated at the Boston University in 1888; spent 1892-1893 studying economics in Germany; and became Professor of Economics in Boston University in 1895. Among his publications is "History of Mining Legislation in England."

**Baldwin, Joseph G.**, an American jurist, born in Sumter, Ala.; was a Judge of the Superior Court of California in 1857-1863; Chief Justice of the State from 1863 till his death, Sept. 30, 1864; and author of "Party Leaders" and "Flush Times in Alabama and Mississippi."

**Baldwin, Maurice Scollard**, a Canadian clergyman, born in Toronto, June 21, 1836; was graduated at Trinity College in that city, in 1862; became rector of St. Luke's Church in Montreal; was Dean of Montreal in 1882-1883; and in the last year was made Bishop of Huron. He published "Break in the Ocean Cable," "Life in a Look," etc.

**Baldwin, Theodore A.**, an American military officer, born in New Jersey, Dec. 21, 1839; entered the army as a private, May 3, 1862, and served in that grade and as quartermaster's sergeant in the 19th United States Infantry, till May 31, 1865, when he became First Lieutenant. He was promoted Captain, July 23, 1867; Major of the 7th Cavalry, Oct. 5, 1887; Lieutenant-Colonel of the 10th Cavalry, Dec. 11, 1896; and Colonel of the 7th Cavalry, May 6, 1899. He became a Brigadier-General, U. S. A., and was retired in 1903.

**Baldwin University**, a co-educational institution in Berea, O.; organized in 1846; under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over \$165,000; aggregate endowment funds, \$100,000; income from tuition, etc., over \$8,000; professors and instructors, about 26; students, about 400; volumes in the library, over 10,000; value of the same, about \$10,000.

**Bale.** See BASEL.

**Bale, John**, an English ecclesiastic, born in Suffolk in 1495. Although educated a Roman Catholic, he became a Protestant, and the intolerance of the Catholic party drove him to the Netherlands. On the accession of Edward VI., he returned to England, was presented to the living of Bishop's Stoke, Southampton, and soon after nominated Bishop of Ossory, in Ireland. Here, on his preaching the reformed religion, the popular fury against him reached such a pitch that in one tumult five of his domestics were murdered in his presence. On the accession of Mary, he lay some time



concealed in Dublin. After enduring many hardships he was enabled to reach Switzerland, where he remained till the death of Mary. On his return to England he contented himself with the calm enjoyment of a prebendal stall at Canterbury, where he closed his stormy life in 1563. He was so bitter a controversialist that he earned the title of "bilious Bale." The only work which has given him distinction among authors is his "Scriptorum Illustrium Majoris Britanniae Catalogus"; or "An Account of the Lives of Eminent Writers of Britain." This account, which, according to the title, commences with Japhet the son of Noah, reaches to the year 1557, at which time the author was an exile on the Continent. It is compiled from various writers, but chiefly from the antiquary Leland. With considerable allowances for the strong bias of party zeal this work may be read with advantage, though it is not without errors in regard to dates, and the needless multiplication of the titles of books. With every abatement, however, the principal work of Bale must ever be considered valuable as the foundation of English biography, being derived from manuscripts since lost.

**Balearic Crane** (*balcarica pavonina*), a handsome species of crested crane, inhabiting N. W. Africa.

**Balearic Islands**, a group of five islands, S. E. of Spain, including Majorca, Minorca, Iviza, and Formentera. The popular derivation of the ancient name *Baleares* (Greek *ballein*, to throw), has reference to the repute of the inhabitants for their skill in slinging, in which they distinguished themselves both in the army of Hannibal and under the Romans, by whom the islands were annexed in 123 B. C. After being taken by the Vandals, under Genseric, and in the 8th century by the Moors, they were taken by James I., King of Aragon, 1220-1234, and constituted a kingdom, which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1,860 square miles: pop. (1900) 311,649.

**Baleen**, whale-bone, in the rough or natural state.

**Bale=Fire**, in its older and strict meaning, any great fire kindled in the open air, or in a special sense, the fire of a funeral pile. It has frequently been used as synonymous with beacon-fire, or a fire kindled as a signal, Sir Walter Scott having apparently been the first to employ it in this sense; and it has at various times, with even less reason, been confounded with bale, in the sense of evil, or fatal.

**Balen, Hendrik van**, painter, born at Antwerp, in 1560. His works, chiefly classical, religious, and allegorical—some of them executed in partnership with Breughel—are to be found in most of the European galleries. He was the first master of Van

Dyck and Snyders. Three of his sons also followed the art, but the best of them, John van Balen (1611-1654), was inferior to his father. He died in 1632.

**Baler**, a town in the N. E. part of Luzon, Philippine Islands, on the Pacific coast. The population is several thousand, mostly natives. The most conspicuous edifice is a native Catholic church. The town is noted for the heroic defense of a Spanish garrison in 1899, during a siege by the Filipinos, lasting 11 months. The Spaniards were commanded by Lieut. Saturnino Martin Cerezo, who refused to surrender the town even when directed to do so by his superiors in Manila. He entrenched himself in the church and heroically resisted the besiegers until his supplies gave out, when he surrendered with all the honors of war, July 2, 1899. Baler was occupied by the American troops and garrisoned with two companies of the 34th Volunteer Infantry, under Major Shunk, in March, 1900.

**Bales, Peter**, a famous caligrapher, born in 1547. His skill in micrography is referred to by Holinshed and Evelyn. He was one of the early inventors of shorthand, and is said to have been employed to imitate signatures by Secretary Walsingham. He died about 1610.

**Balestier, Charles Wolcott**, an American novelist, born in Rochester, N. Y., Dec. 13, 1861; studied in Cornell University; and became connected with a New York publishing house. His novels, which deal largely with frontier life in Colorado, include "The Naulahka," written in collaboration with Rudyard Kipling, his brother-in-law; "Benefits Forgot" (1892), and a "Life of James G. Blaine." He died in Dresden, Saxony, Dec. 6, 1891.

**Balestra, Antonio**, an Italian painter, born in Verona, in 1666; became a pupil of Belucci, in Venice, and subsequently studied in Rome under Carlo Maratti. He executed the "Defeat of the Giants," which took the prize at the Academy of St. Luke, in 1694. His other paintings include "Saint Theresa," at Bergamo, a "Virgin," at Mantua; and a portrait of himself, at Florence. He was among the last of the Venetian school of artists. He died in Verona, April 21, 1740.

**Balfe, Michael William**, composer, was born in Dublin, May 15, 1808. His musical talent received early culture, and in his ninth year he made his debut as a violinist, having begun to compose at least two years earlier. In 1823 he went to London, and, during 1825-1826, studied in Italy under Paer, Galli, Federici, and Rossini. In 1826 he wrote the music for a ballet, "La Pérouse," performed at Milan; and in 1827 he sang in the Italian Opera at Paris with great applause, his voice being a pure, rich



baritone. In 1833 he returned to England, and in 1846 was appointed conductor of the London Italian Opera. He died at Rowley Abbey, his estate in Hertfordshire, Oct. 20, 1870. Of his numerous operas, operettas, and other compositions, produced in rapid succession from 1830, the most permanently successful have been "The Bohemian Girl" (1843); "The Rose of Castile" (1857), and "Il Talismano" (1874). If Balfe was wanting in depth and dramatic force, he had a very thorough knowledge of effect and command of orchestral resources; and his compositions are distinguished by fluency, facility, and melodic power. Some of the defects of his operas may be justly attributed to "Poet Bunn," the theatrical manager, who at once wrote and translated the libretti, and put the operas on the stage. Many of Balfe's songs are admirable.

**Balfour, Alexander**, a Scottish novelist and poet, born in Monikie, March 1, 1767; was a frequent contributor to periodicals; and author of "Campbell; or the Scottish Probationer" (1819); "Contemplations and Other Poems" (1820); "Farmer's Three Daughters" (1822); "The Foundling of Glenthorn; or the Smuggler's Cave" (1823); "Highland Mary" (1827), etc. He died Sept. 12, 1829.

**Balfour, Sir Andrew**, a Scottish botanist and physician, born in Fifeshire, in 1630. After completing his studies at St. Andrews and London, and traveling on the continent, he settled at Edinburgh, where he planned, with Sir Robert Sibbald, the Royal College of Physicians, and was elected its first President. Shortly before his death he laid the foundation of a hospital in Edinburgh, which, though at first narrow and confined, expanded into the Royal Infirmary. He died in 1694. His familiar letters were published in 1700.

**Balfour, Arthur James**, a British statesman; born in Scotland, July 25, 1848; educated at Eton and at Trinity College, Cambridge; entered Parliament in 1874; was private secretary to his uncle, the Marquis of Salisbury, in 1878-1880, and accompanied him to the Berlin Congress; was member of Parliament for Hertford in 1879, and for the East Division of Manchester in 1885; president of the Local Government Board in 1885; Secretary for Scotland in 1886; with a seat in the Cabinet; Lord Rector of St. Andrew's University in 1866; Secretary for Ireland in 1887-1891; member of the Gold and Silver Commission in 1887-1888; Lord Rector of Glasgow University in 1890; Chancellor of Edinburgh University in 1891; First Lord of the Treasury in 1891-1892; became the leader of the Conservative opposition in the House of Commons in 1892. In 1895 he again became First Lord of the Treasury and leader of the House. He was an effective speaker. As Chief Secretary for Ireland, he was successful. He

passed the Crimes Act and Law Act, secured a free grant for railways, made a tour of investigation and created the Congested Districts Board. In 1902-1905 he was the successor of Lord Salisbury as prime minister. His publications include: "A Defense of Philosophic Doubt" (1879); "Essays and Addresses" (1893); "The Foundations of Belief, Being Notes Introductory to the Study of Theology" (1895); "Economic Notes on Insular Free Trade" (1903), etc.

**Balfour, Francis Maitland**, an English embryologist, born in 1851; studied at Harrow and Trinity College, Cambridge. Articles on his special study gained him a high reputation while still an undergraduate, and after further work at Naples, he published in 1874, in conjunction with Dr. M. Foster, the "Elements of Embryology," a valuable contribution to the literature of biology. He was elected a Fellow of his college, Fellow and member of Council of the Royal Society, and in 1881 Professor of Animal Morphology at Cambridge. The promise of his chief work, "Comparative Embryology" (1880-1881), was unfulfilled, as in the latter year he was killed by a fall on Mont Blanc.

**Balfour, James**, a Canadian architect, born in Hamilton, Ontario, in 1852; acquired his professional education in Canada and Edinburgh; and began practicing in his native city. Among notable buildings of his designing are the Boys' Home and City Hall, in Hamilton; Alma Ladies' College, St. Thomas; and the Museum of Art, in Detroit, Mich.

**Balfour, Sir James**, a Scottish lawyer and public character of the 16th century, was a native of Fifeshire. In youth, for his share in the conspiracy against Cardinal Beaton, he was condemned with Knox to the galleys; but after his escape with the rest in 1550 he found it to his interest to change his opinions, and latterly he was appointed, through the favor of Queen Mary, Lord of Session, and member of the Privy Council. In 1567, he was appointed governor of Edinburgh Castle, but had no scruple in surrendering it to Murray, who made him President of the Court of Session. In 1570 he was charged with a share in the murder of Darnley, but got off by bribery. He was latterly instrumental in compassing the death of Regent Morton by the production of a deed signed by him and bearing on the Darnley murder. His own death took place shortly after, in 1583. The "Practicks of Scots Law," attributed to him, continued to be used and consulted in manuscript for nearly a century until it was supplanted by the "Institutes of Lord Stair."

**Balfour, John**, of Kinlock, or of Burley, in Scott's "Old Mortality," was one of the chief actors in the assassination of



## Balfour

Archbishop Sharp, in 1679, for which his estate was forfeited, and a price set on his head. He fought at Drumclog and Bothwell Bridge, and is said afterward to have escaped to Holland. By one account he died on a homeward voyage to Scotland, by another he never left the country, but settled in the parish of Roseneath, Dumbartonshire. Balfour of Kinlock is quite a different personage from Lord Balfour of Burleigh, who succeeded to the title in 1663, spent his youth in France, and died in 1688.

**Balfour, John Hutton**, a Scotch botanist, born in Edinburgh, Sept. 15, 1808; graduated at Edinburgh University in arts and in medicine; in 1841-1845 was Professor of Botany in Glasgow University; and in the latter year removed to Edinburgh to occupy a similar post, resigning his chair in 1879. He wrote valuable botanical text-books, including "Elements," "Outlines," "Manual," and "Class-book," besides various other works. He died Feb. 11, 1884.

**Balfour, Nesbit**, a British military officer, born in Dunbog, Scotland, in 1743; was promoted Lieutenant-General in 1798 and General in 1803; distinguished himself during the American Revolution; was wounded in the battle of Bunker Hill; fought at the battles of Elizabethtown, Brandywine, Germantown, and Long Island; and was present at the capture of New York. He was appointed commandant at Charlestown, in 1779. He died in Dunbog, in October, 1823.

**Balfrush** (or, more correctly, **Barfurush**, "mart of burdens"), a town in the Persian province of Mazanderan, on the river Bhawal, 12 miles from its mouth in the Caspian Sea. The river is not navigated; all goods being landed at the port of Meshed-i-Ser, on the Caspian. Balfrush is a center of trade between Russia and Persia, exporting large quantities of silk, rice and cotton, while the Russians supply iron and naphtha. It has excellent bazaars, numerous caravanserais, and several Mohammedan colleges. The population is generally stated at 50,000, but some put it as low as 10,000.

**Bali**, an island of the Indian Archipelago E. of Java, belonging to Holland; greatest length, 85 miles, greatest breadth, 55 miles; area, about 2,260 square miles. It consists chiefly of a series of volcanic mountains, of which the loftiest, Agoong (11,326 feet), became active in 1843, after a long period of quiescence. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mostly Brahmans in religion. It is divided into eight provinces under native rajahs, and forms one colony with Lombok, the united population being estimated, in 1897, at 1,044,757.

## Balista

**Baliol**, or **Balliol**, **John**, of Barnard Castle, Northumberland, father of King John Baliol, a great English (or Norman) baron in the reign of Henry III., to whose cause he strongly attached himself in his struggles with the barons. In 1263, he laid the foundation of Baliol College, Oxford, which was completed by his widow, Devorguila or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, by Margaret, eldest daughter of David, Earl of Huntingdon, brother of William the Lion. It was on the strength of this genealogy that his son John Baliol became temporary King of Scotland. He died in 1269.

**Baliol**, or **Balliol**, **John**, King of Scotland; born about 1249. On the death of Margaret, the Maiden of Norway, and grandchild of Alexander III., Baliol claimed the vacant throne by virtue of his descent from David, Earl of Huntingdon, brother to William the Lion, King of Scotland. Robert Bruce (grandfather of the King) opposed Baliol; but Edward I.'s decision was in favor of Baliol, who did homage to him for the kingdom, Nov. 20, 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but, after the defeat at Dunbar he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but, by the intercession of the Pope, in 1297, obtained liberty to retire to his Norman estates, where he died in 1315. His son, Edward, in 1332, landed in Fife with an armed force, and having defeated a large army under the Regent Mar (who was killed), got himself crowned King, but was driven out in three months.

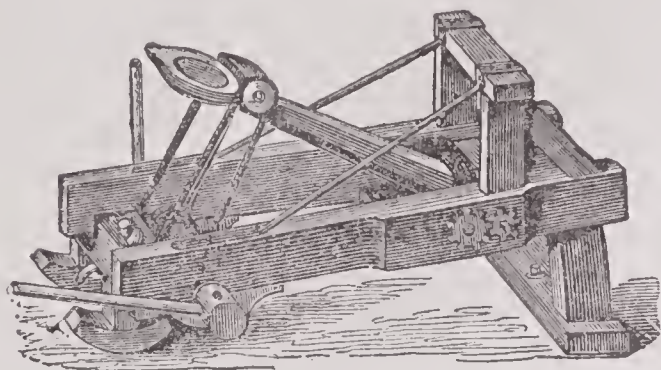
**Baliol College**, Oxford, founded between 1263 and 1268 by John de Baliol, father of John Baliol, King of Scotland. The original foundation consisted of 16 poor scholars, and the revenue for their maintenance amounted for many years to only 8s. per week for each. From 1340 to 1830 the college was greatly enriched by various benefactions. The society consists of a master, 13 fellows, and 24 scholars. The number of members on the books is about 600. The master and fellows enjoy the privilege of electing their own visitor. John Wyclif was master of this college in 1361; among its scholars have been John Evelyn and Bradley the astronomer. The Snell Exhibitions for students of Glasgow University attract annually to this college a few distinguished Scottish students. Among these have been Sir William Hamilton, J. G. Lockhart, and Dr. Tait, Archbishop of Canterbury.

**Balista**, or **Ballista**, a machine used in military operations by the ancients for hurling heavy missiles, thus serving in some



## Balistes

degree the purpose of the modern cannon. The motive power appears to have been obtained by the torsion of ropes, fibers, catgut, or hair. They are said to have sometimes had an effective range of a quarter of a mile, and to have thrown stones weighing as much as 300 lbs. The balistæ differed from the catapultæ, in that the latter were used for throwing darts. A balistic pen-



A BALISTA.

dulum is an apparatus for ascertaining the velocity of military projectiles, and consequently the force of fired gunpowder. A piece of ordnance is fired against bags of sand supported in a strong case or frame suspended so as to swing like a pendulum. The arc through which it vibrates is shown by an index, and the amount of vibration forms a measure of the force or velocity of the ball.

**Balistes**, or **File Fish**, a genus of bony fishes, the type of a large family, *balistidæ*, the species of which are almost all inhabitants of tropical and subtropical seas, frequenting rocky coasts and coral reefs. One species has been occasionally found on British coasts. Their colors are generally brilliant. The skeleton is in part gristly or cartilaginous, consisting, in some of the genera, of bony plates, disposed in regular rows, and not overlapping; in others, of very small rough scales, with stiff bristles. The snout protrudes slightly, and the teeth are few, but well developed. But the most interesting thing in connection with these fishes, is the provision for fixing the first dorsal spine in an erect position, or lowering it at the will of the animal. The spine is articulated by ring and bolt to a broad bony plate in connection with the backbone. "When the spine is raised, a depression at the back part of its base receives a corresponding projection from the contiguous base of the second ray, and it cannot be let down until the small spine has been depressed; it is then received into a groove on the supporting plate, and offers no impediment to the progress of the fish through the water. This trigger-like fixing of the spine takes place also in the dead fish; and, when a balistes is removed from the bottle for examination, it is generally necessary to release the spine by pressing on the small trigger-ray." The first spine is roughened

with enamel projections, whence the name file-fish. The flesh is unwholesome.

**Balize.** See BELIZE.

**Balkan Peninsula**, the usual name for the peninsula in Southeastern Europe running southward between the Adriatic and the Ægean. The most convenient northern boundary is the Save and the Lower Danube; though historically and politically Rumania and some parts of the Austrian dominions are closely associated with the regions S. of the Danube. Greece is a peninsula upon a peninsula, but is not usually accounted one of the Balkan States.

*Topography.*—In a general way the Balkan Peninsula and Balkan States cover the area of Turkey in Europe and the non-Turkish States either now or lately under Turkish suzerainty, with the exception of Rumania and Greece. By its physical relief and general slope, the peninsula may be said to turn its back upon Europe. Its greatest elevations are found in the W. and N. W., and all its waters, flowing N. E., and S., finally empty into the Black Sea or into the Ægean. The mountain chains and masses of the peninsula in no place form a regular system; spreading out from an apparent nucleus in the Etropol Balkans S. E. of Sofia, in every direction, they are notable for their great variety of shape and richness of contour. The Balkans proper (ancient Hæmus) form the boundary between Bulgaria and Eastern Rumelia. They are highest in the W., where the mean height is 6,500 feet. The ridge is crossed by some 30 passes, of which the Shipka, between Kezanlik and Tirnova, and 4,290 feet high, is the most noted in history—especially as the scene of severe fighting in the Russo-Turkish War of 1877–1878. The mountain chains in the W. of the peninsula have a trend parallel to the shores of the Adriatic and Ionian Seas, while, in the E., the chief ranges run at right angles to the Black Sea. The small though well defined chain of the Rhodope (Despoto-Dagh) has a mean elevation of 5,500 feet, and forms the water-parting between the Maritza Valley on the N. and the Ægean on the S. Muss-alla (9,500 feet), in the northern extremity of this range, is the culminating point of the northern portion of the peninsula, but the highest peak is Mt. Olympus (9,750 feet), N. E. of the plain of Thessaly. There are several other ranges—the Dinaric Alps in the N. W., Pindus, between Albania and Thessaly, and the Little Balkans in Bulgaria, running N. E. from the main chain; and peaks of from 5,000 to 9,000 feet occur in nearly every part of the peninsula.

The first place in the hydrographic systems of the peninsula must, of course, be given to the Danube. The Sea of Marmora receives only a few mountain torrents, but



the drainage area of the Ægean, or Archipelago, comprises the most important river system of Turkey. The chief rivers—the Maritza, the Kara Su, the Vardar, the Indje—flow from the southern slopes of the Balkans and the crystalline masses of the Rhodope system. Lake Scutari and Lake Ochrida (the latter 2,300 feet above sea level) are the only ones of any size in the peninsula.

*Ethnography.*—The great highway of western emigration, the Balkan Peninsula, still retains a great diversity of races. The oldest inhabitants of the peninsula—the Illyrians—have their representatives in the modern Albanians (Skipetar); the Greeks are there, and have kept their language; the Dacians, who adopted the Roman tongue, are the Rumans or Rumanians of to-day. The Slavonic peoples are, of course, a large and important section of the population. Of the Turanian settlers, the Bulgars have become a thoroughly Slavonized people; and the Ottoman Turks, who first gained a footing in 1355, conquered nearly the whole of the peninsula before the close of the same century, reduced Greece to subjection between 1455 and 1473, and remained masters to the present century.

According to Reclus, the present territory of the peninsula may be divided into four ethnological zones: (1) Crete and the islands of the Archipelago, the seaboard of the Ægean, the eastern slope of Pindus and of Olympus, are peopled by Greeks; (2) the space comprised between the Adriatic and Pindus is the country of the Albanians (Skipetar); (3) on the N. W. the region of the Illyrian Alps is occupied by Slavs, known under the different names of Serbs, Croats, Bosnians, Herzegovinians, and Chervagorans (Montenegrins); and, (4) the two slopes of the Balkans proper, the Despot-Dagh, and the plains of Eastern Turkey, belong to the Bulgarians—a Slavonized Turanian people, now practically Slavs. The Turks themselves are scattered here and there in more or less considerable groups, chiefly round the cities and strongholds; but the only extensive tract of country of which they are, ethnologically speaking, the possessors, is the S. E. angle of the peninsula. As to the relative numbers of these varied elements, there is considerable diversity of statement—each stock trying to prove its ethnical predominance in debatable ground. In 1885 the statistical bureau in Belgrade reckoned that in European Turkey (without Rumania, Servia or Montenegro) there were 1,362,000 Turks—not pure Osmanli, but largely descended from renegade Greeks and Bulgarians; 1,137,000 Greeks; 1,011,000 Albanians, of whom 723,000 were Mohammedans; 200,000 Wallachians; 1,388,000 Serbs; 2,877,000 Bulgarians, of whom 860,000 were

Mohammedans; 100,000 Armenians; 70,000 Jews; 104,000 Gipsies; and 144,000 Circassian immigrants.

The home of so many diverse races, the peninsula has long been a hotbed of warring interests, intertribal jealousy and intrigue, political tyranny and disturbance, and mutual maltreatment. The Turk's hand may summarily be said to be against every man's hand, and every other against the Turk. Greeks and Bulgarians intrigue each against the other with Russia, and look on the inheritance of the peninsula as exclusively theirs by right. Bulgarian and Serb, though cherishing the Slavonic name, met in the bloody campaign of 1885–1886. Macedonia in especial is demanded alike by Greek, Bulgar and Serb. And the case is further complicated by the hostile faiths—Latin Christianity, Greek Church, both Orthodox and United, and Mohammedanism. Hence it is easy to infer the last degree of unstable equilibrium in the political sphere, and to understand why the peninsula is a perpetual focus of the insoluble Eastern Question, and a cause of disquietude to all the powers of Europe. Russia wars with Turkey; Austria and Russia have diametrically opposed interests as regards the Lower Danube, and, in Austria itself, Hungarian and Slav take opposite sides as to the Southern Slavs; France and England are frequently in rivalry at the Porte; and the mutual suspicions of Russia and England are constant and notorious. A recent feature is the determination of Bulgaria not to become the dependant of Russia. The area and population of the Balkan States are as follows:

| Political Divisions.  | Area in English sq. miles. | Population. |
|---|----------------------------|-------------|
| Immediate possessions of Turkey }<br>in Europe .....              | 65,000                     | 4,500,000   |
| Bulgaria, with Eastern Rumelia }<br>(tributary principality)..... | 37,860                     | 3,154,375   |
| Bosnia and Herzegovina }<br>(in the occupation of Austria-Hung'y) | 23,570                     | 1,504,001   |
| Total, Turkey in Europe.....                                      | 126,430                    | 9,158,376   |
| Servia (kingdom) .....  | 19,050                     | 2,226,741   |
| Montenegro (principality).....                                    | 3,630                      | 200,000     |
| Total, Balkan Peninsula.....                                      | 149,110                    | 11,585,117  |

Greece, with the aid of the Great Powers, obtained her independence in 1836, as also did Servia in 1830–1867. Wallachia and Moldavia (now united in the kingdom of Rumania) were made tributary principalities by the Peace of Paris, 1856. Rumania and Servia obtained their complete independence by the Berlin Treaty of 1878—the former receiving the Dobrudja in exchange for a portion of Bessarabia, which was restored to Russia; the latter having its area enlarged. The same treaty handed over to Austria-Hungary the administration of Bosnia and Herzegovina and established the principality of Montenegro, the principality of Bulgaria, and the province of



## Balkh

Eastern Rumelia, which was united with Bulgaria in 1886.

**Balkh** (bālg), a district of Afghan Turkestan, the most northerly province of Afghanistan. It was for some time subject to the Khan of Bokhara. It corresponds to ancient Bactria, and lies between about 35° and 37° N. lat., and about 64° and 69° E. long. It is bounded on the N. by the river Oxus, on the E. by Badakhshan, on the S. by the Hindu Kush, and on the W. by the desert. Offsets of the Hindu Kush traverse it in a N. W. direction, and slope down to the low steppes of Bokhara. Its length is 250 miles; its breadth, 120. Its situation was once important during the overland commerce between India and Eastern Europe before the sea route by the Cape of Good Hope was followed. The soil has the general characteristics of a desert land; only a few parts are made fertile by artificial irrigation; and such are the vicissitudes of climate, that where grapes and apricots ripen in summer, and the mulberry-tree permits the cultivation of silk, in winter the frost is intense, and the snow lies deep on the ground. The natives are Uzbeks, whose character differs in different districts.

**BALKH**, long the chief town, situated in a district intersected by canals and ditches, by means of which the waters of the Balkh-ab, or Dehās, are dissipated and prevented from flowing toward the Amu-Daria, only 45 miles distant. It is surrounded by a mud wall; but though bearing the imposing title of "Mother of Cities," it has not in recent times had any of the grandeur of ancient Bactra, on the site of which it is built. It was twice destroyed by Genghis Khan and Timur. A terrible outbreak of cholera in 1877 caused the capital of Afghan Turkestan to be transferred to Mazar, W. of Balkh; since which Balkh has been an insignificant village. W. of Balkh are the petty Uzbek States of Maimana, Andkhai, Akeha, and Shibarghan, all absolutely ruled by Kabul, except Andkhai; E. of Balkh, between it and Badakhshan proper, are the towns and khanates of Kunduz and Khulm. All these Uzbek khanates are in the basin of the Amu-Daria, and together with Wakhan, E. of Badakhshan, constitute Afghan Turkestan.

**Balkhash** (bālg-ash'), (Kirghiz Tengis; Chinese Sihai), a great inland lake, near the E. border of Russian Central Asia, between 44° and 47° N. lat., and 73° and 79° E. long. Lying about 780 feet above sea level, it extends 323 miles W. S. W.; its breadth at the W. end is 50 miles; at the E. from 9 to 4 miles; the area is 8,400 square miles. The water is clear, but intensely salty. Its principal feeder is the river Ili. It has no outlet. The N. edge is well defined; but the S. shores of the lake are labyrinths of

## Ballad

islands, peninsulas, low sandhills, and strips of shallow water. Here grow masses of enormously tall reeds, in which wild swine shelter. To the S., stretching toward the base of the Ala-tau Mountains, is a vast steppe, almost devoid of vegetation. Balkhash seems to have at one time included in its immense area the smaller lakes Sossik-kul and Ala-kul, now far to the S. E.

**Balkis**, the Arabian name of the Queen of Sheba, who visited Solomon. She is the central figure of innumerable Eastern legends and tales.

**Ball, Ephraim**, an American inventor, born in Greentown, O., Aug. 12, 1812; was brought up in the carpenter's trade; in 1840 established a foundry for making plow castings; invented a plow, a turn-top stove, the Ohio mower, the World mower and reaper, the Buckeye machine, and the New American harvester; and for many years before his death had an extensive manufacturing plant at Canton. He died in Canton, O., Jan. 1, 1872.

**Ball, John**, a priest, who was one of the leaders in the rebellion of Wat Tyler, and was in several respects a precursor of Wyclif, having been repeatedly in trouble for heresy from 1366. He was hanged, drawn, and quartered in 1381.

**Ball, Sir Robert Stawell**, an English astronomer, born in Dublin, July 1, 1840; studied at Trinity College. He was appointed Lord Rosse's astronomer at Parsonstown in 1865; Professor of Applied Mathematics and Mechanics at the Royal Irish College of Science in 1873; and in 1874, Professor of Astronomy at Dublin, and Astronomer Royal for Ireland. He has published works on mechanics and astronomy, of which the best known is "The Story of the Heavens," besides many magazine articles, and is well known as a lecturer. He was knighted Jan. 25, 1886.

**Ball, Thomas**, an American sculptor, born in Charlestown, Mass., June 3, 1819; studied in Italy; was engaged in painting in 1840-1852; adopted sculpture exclusively in 1851; resided in Florence, Italy, in 1865-1897, and afterward in Montclair, N. J. His best known works are the equestrian statue of Washington, in Boston; the Webster statue in Central Park, New York, and "Emancipation," in Washington, D. C. He published "My Three Score Years and Ten, an Autobiography" (1891).

**Ballad**, a narrative song, from the French *ballade*, Italian *ballata*, an old kind of song of a lyric nature. *Ballata* is derived from *ballare*, to dance, and that from Late Latin *ballare*, from Greek *ballizein*, to dance. Though the name came from Italy, the species of poetry which we understand under the word ballad is by no means peculiarly of Italian or Romance origin, poems of



this kind being produced by many nations, and being apparently the natural outcome of a certain condition of society, a certain intellectual and moral stage of development in the history of a people. The word *ballata* passed from the Italians to the French, and the Normans carried it to England, where it was applied to short metrical narratives, particularly to the most popular ones, which were tales in verse describing the deeds of heroes, the adventures of lovers, etc. All the Scandinavian nations anciently delighted in songs celebrating the deeds of heroes, or describing the passions and adventures of lovers; and the three great divisions or cycles of the Teutonic poetry of the Middle Ages—the stories of the “Nibelungen,” those of Charlemagne (particularly such as relate to his war against the Arabians, and the battle of Roncevaux), and the tales of King Arthur’s “Round Table”—were long made widely familiar to the people in the form of ballads.

The true home of the English ballad—whatever the explanation of the fact may be—is the N. part of England (the North Country), and the S. part of Scotland. The earliest of the English ballads which have been preserved cannot be considered as antecedent to the 13th or 14th century; and few of them appeared before the 15th. How long many of them may have been current in the mouths of the people before that time is quite unknown. Of course as regards historical ballads though we may know nothing of their author, or when they arose, we are sure that their date is at least not earlier than that of the event or events they deal with. As a rule the genuine popular ballad poetry of a people is anonymous, and may have been handed down for centuries before being committed to writing, the different pieces being modified in various ways as they were transmitted to generation after generation. The first work to draw general attention to the ballad literature of England and Scotland was Bishop Percy’s “Reliques of Ancient English Poetry,” published in 1765; “consisting of old heroic ballads, songs, and other pieces of our earlier poets (chiefly of the lyric kind) together with some few of later date.” The foundation of the “Reliques” was a manuscript collection in a hand-writing belonging to the early part of the 17th century; and in this collection were included such old favorites as “Chevy Chase”; “Adam Bell”; “Clym of the Clough”; “William of Cloudeslee”; “The Heir of Linn”; “The Child of Elle”; ballads of Robin Hood, etc. The publication of Percy’s work formed an epoch in the history of English literature, and had an important influence on the subsequent development of our poetry.

No less famous and perhaps even more influential was Sir Walter Scott’s great collection—“Minstrelsy of the Scottish Bor-

der: consisting of Historical and Romantic ballads collected in the Southern Counties of Scotland” (1802–1803, 3 vols.). A few years later (namely in 1806) appeared Robert Jamieson’s “Popular Ballads and Songs . . . with Translations of Similar Pieces from the Ancient Danish Language”—a valuable collection, which, to use Sir Walter Scott’s words, “opened a new discovery respecting the original source of the Scottish ballads. Mr. Jamieson’s extensive acquaintance with the Scandinavian literature enabled him to detect not only a general similarity between these and the Danish ballads preserved in the ‘Kiempe Viser,’ an early collection of heroic ballads in that language, but to demonstrate that, in many cases, the stories and songs were distinctly the same, a circumstance which no antiquary had hitherto so much as suspected.” Since that time the ballad literature of almost all countries possessed of such has received a great amount of attention, and the various collections that have been made have enabled investigators to study the whole subject on the comparative method; the result being that a surprising similarity of features has been discovered to exist in the ballads of countries as widely separated and apparently unconnected as Scotland, Sicily, Greece, and Russia. In this respect ballads quite resemble popular tales—“folk-tales,” that is to say, such as those in the collection of the brothers Grimm, or those translated by Dasent from Asbjörnson’s Norwegian collection, in which class of stories, as is now well known, incidents that are essentially the same crop up over and over again, though they are more or less colored by unessential details and surroundings.

The attention drawn to the ballads of England and Scotland led not only to modern imitations of them in their own native country, but especially to such in Germany, where eminent writers such as Bürger, Goethe, Schiller, Uhland, and Heine successfully practised the writing of such pieces. Though a ballad as now usually understood is a moderately short narrative poem in a series of short stanzas, the word has been applied at different times to pieces of the most varied character, and we find Shakespeare, for instance, speaking of a “woeful ballad,” made by a lover “to his mistress’ eyebrow.” It is said that the majority of the old English ballad tunes are dance tunes, so that we are thus reminded of the Italian origin of the word, though ballads and dancing have certainly been long enough dissociated in most countries. “At the present time,” says a writer in Grove’s “Dictionary of Music,” “a ballad in music is generally understood to be a sentimental or romantic composition of a simple and unpretentious character, having two or more verses of poetry, but with the melody or tune complete in the first, and re-



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peated for each succeeding verse." From this is to be distinguished the *ballade* (a term recently adopted from the French), a short poem which, in its normal form, appears to consist of three stanzas of eight lines each, with an envoy of four lines, the rhymes throughout being not more than three. See BEAST FABLES; FOLKLORE.

**Ballanche, Pierre Simon** (bal-änsh'), a French philosopher, born at Lyons, Aug. 4, 1776; settled at Paris in 1814, having attracted some notice by his essays and a prize poem, "Antigone." His great work is the "Palingénésie Sociale" (1828), in which he seeks to illustrate the workings of God in history. He died June 12, 1847.

**Ballantine, James**, a Scottish artist and poet, born in Edinburgh, June 11, 1808; was brought up as a house painter, but afterward learned drawing under Sir William Allen, and was one of the first to revive the art of glass painting. He was commissioned to execute the stained glass windows for the House of Lords, and in 1845 published a treatise on "Glass Staining," which was translated into German. Two prose volumes, "The Gaberlunzie's Wallet" (1843), and "Miller of Deanhaugh" (1845), contain some of his best known songs and ballads. He was author of "Poems" (1856 and 1865); "One Hundred Songs with Music" (1865); "Life of David Roberts, R. A." (1866). He died Dec. 18, 1877.

**Ballantine, William Gay**, an American educator, born in Washington, D. C., Dec. 7, 1848; was graduated at Marietta College in 1868, and at the Union Theological Seminary in 1872; spent a year in study in Leipsic; was attached to the American Palestine Exploring Expedition of 1873; professor of chemistry and natural science in Ripon College in 1874-1876; professor of Greek and Hebrew in the University of Indiana in 1878-1881; professor of Old Testament language and literature at Oberlin Theological Seminary in 1881-1891; and president of Oberlin College in 1891-1896. Dr. Ballantine was one of the editors of the "Bibliotheca Sacra," in 1884-1891.

**Ballantyne, Robert Michael**, a Scotch writer, born in Edinburgh, in 1825; spent his youth in Canada in the service of the Hudson Bay Company. In 1856 he adopted literature as a profession. He became very popular in England as a writer of stories for boys. Among the best known are "Deep Down," "Coral Island," "The World of Ice," "Ungava," "The Dog Crusoe," and others. He died in Rome, Italy, Feb. 8, 1894.

**Ballarat**, or **Ballaarat**, an Australian town, in Victoria, chief center of the gold mining industry of the colony, and next in

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importance to Melbourne, from which it is distant W. N. W. about 60 miles direct. It consists of two distinct municipalities, Ballarat West and Ballarat East, separated by the Yarrowee creek, and has many handsome buildings, and all the institutions of a progressive and flourishing city, including hospital, mechanics' institute and library, free public library, Anglican and Roman Catholic cathedrals, etc. Gold was first discovered in 1851, and the extraordinary richness of the field soon attracted hosts of miners. The surface diggings having been exhausted, the precious metal is now got from greater depths, and there are mines as deep as some coal-pits, the gold being obtained by crushing the auriferous quartz. The mines give employment to over 6,000 men. There are also foundries, woolen mills, flour mills, breweries and distilleries, etc. Pop. (1897) 46,137; (1905) 49,648.

**Ballard**, a city of Washington, situated on Salmon bay, a natural harbor on Puget Sound, about 5 miles N. by W. of Seattle, the municipal limits of which adjoin its own, and with which it is connected by two street car lines and the Great Northern and Northern Pacific railroads. The land upon which the city is built slopes gradually towards the northern municipal limits, thus affording excellent drainage. The public buildings include a city hall, 3 school buildings, and a public library built with funds donated by Andrew Carnegie. There are 16 churches of various denominations. Several of the fraternal orders represented have halls of their own, that of the Elks being considered the finest. The public school system includes a high school, whose graduates are admitted to the State University. A convent and school with accommodations for 350 pupils are being built by the Sisters of the Good Shepherd at a cost of \$150,000. The manufacturing of lumber is the leading industry, and there are also planing mills, iron and brass foundries and machine shops, boiler works, wood pipe works, and ship-yards where big ocean-going lumber schooners are built. Fishing is also an important industry. There are two electric light companies and one gas company. An appropriation of \$285,000 has been made by Congress for deepening and widening the harbor, so as to admit the largest vessels. Pop. (1900) 4,568; (1907, local est.) 16,000.

**Ballast**, a term applied (1) to heavy matter, as stone, sand, iron, or water, placed in the bottom of a ship or other vessel, to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aeronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the



rails on a railway to make it firm and solid.

**Ballentyne**, or **Bellenden, John**, a Scottish poet, and the translator of Boece's Latin "History" and of the first five books of Livy into the vernacular language of his time, was a native of Lothian, and appears to have been born toward the close of the fifteenth century. He was in the service of James V., at whose request he translated (1533) Boece's "Historia Scotorum." He was made Archdeacon of Moray and a canon of Ross, was an opponent of the Reformation, and is said to have died at Rome in 1550.

**Balleny Islands**, a group of five small volcanic islands, discovered in the Antarctic Ocean, in 1839, nearly on the Antarctic Circle, and in longitude 164° E. One contains a very lofty mountain.

**Ballet** (from *bal*; from the French *baller*, and the Italian *ballare*, to dance), musical pieces, the object of which is to represent, by mimic movements and dances, actions, characters, sentiments, passions, and feelings, in which several dancers perform together. According to the analogy of lyrical poetry, those which rather represent feelings may be called lyrical ballets; those which imitate actions, dramatic ballets. The lyrical and dramatic ballets, together, constitute the higher art of dancing, in opposition to the lower, the aim of which is only social pleasure. The ballet is an invention of modern times. Baltazarini, director of music to Catharine de Medici, probably gave its form to the regular ballet, though pantomimic dances were not unknown to the ancients. The ballet owes much to the French, and particularly to Noverre (from 1749 onward). The dances introduced into operas seldom deserve the name.

**Ballinger, Richard Achilles**, an American lawyer; born in Boonesboro, Ia., July 9, 1858; received a collegiate education; was admitted to the bar in 1886; practiced in Illinois, Alabama, and Washington (State); was judge of the Superior Court of Jefferson county, Wash., in 1894-1897; mayor of Seattle in 1904-1906; Commissioner of the General Land Office in 1907-1909; and in the latter year became Secretary of the Interior. His controversy with Gifford Pinchot, chief of the Forestry Service, led to disclosures concerning conservation interests in Alaska, which became the basis of a heated Congressional investigation in 1910.

**Ballistics.** See GUN.

**Balloon**, a spherical or elongated envelope of silk, or other suitable material, which, when inflated with some gas lighter than the air, will rise from and float above the surface of the earth.

The balloon is the typical "lighter-than-

air" flying machine, and, until very recently was the sole means of navigating the air at the disposal of man. It seems also a logical method, for, in point of theory, the balloon is strictly analogous to a ship floating on water, the support of each in its proper element being explained by the fact that its weight is less than the cubic bulk of that element displaced. In other words, the balloon's weight is less in proportion to its bulk than the air it displaces.

The principle of the balloon was foreshadowed in the seventeenth century by an Italian priest, Francis Lana, who proposed constructing a levitating apparatus, consisting of a boat-shaped car or basket, to be raised by four hollow globes of thin copper from which the air had been exhausted. Could such vacuous globes be constructed of a material sufficiently strong to resist the pressure of the outside air, which would tend to collapse them, such an apparatus might be practicable. Because, however, no such material is known to science, a light and expansive gas must be substituted for a vacuum, although, obviously, a vacuum must be lighter than any gas. The unscientific mind may find it difficult to grasp the fact that air has weight, but a simple experiment may be made to prove it. Carefully weigh a bottle containing air; exhaust the air from it by means of an air pump; and on weighing it again it will be found to be lighter. The difference in weight will of course be the weight of that particular volume of air. Under ordinary circumstances (60° F.) air will be found to weigh .3 grain per cubic inch, or .076 pound per cubic foot. But other gases have different weights, and Cavendish, in 1766, first found that hydrogen weighed considerably less—as a matter of fact its specific gravity is .07 (air being as 1). If we therefore took a vessel containing 1,000 cubic feet, the air contained in it, or, what is the same thing, the air displaced by it, would weigh 76 pounds. But if the vessel were filled with hydrogen, the latter would only weigh .07 of 76 pounds, that is 5.32 pounds. The vessel would therefore be capable of raising about 70 pounds. This fact was well understood by Dr. Black of Edinburgh, who, about 1767, stated in a lecture that "if a sufficiently thin and light bladder were filled with inflammable air (hydrogen), the bladder and air in it would necessarily form a mass lighter than the same bulk of atmospheric air, and which would rise in it." He tried the experiment, but unfortunately was unable to get a bladder sufficiently light. Mr. Cavallo, who wrote one of the earliest books on aërostation, tried, early in 1782, inflating soap bubbles with hydrogen, which successfully mounted to the ceiling.

It is well known that all bodies increase in volume when warmed. If we again take



our bottle of air, and, after weighing it, apply heat to it, the volume of air will be increased, and as a consequence some of it will be expelled from the bottle—that which remains will naturally weigh less. That is to say, warm air is lighter than cold. Hence the exact weight of a given volume of air will depend upon its temperature. So also warm air will ascend, and that is why smoke, which denotes warm air, rises.

It is probable that the hot-air, or fire, balloon was known to the Chinese many centuries ago. It will rise and remain in the air so long as the heat continues sufficient to keep the contained air rarefied. Principally for the reason that constant heat is essential, the fire balloon is inferior to the gas balloon inflated with hydrogen or coal gas, either of which possesses the necessary lightness at normal temperature. It has been estimated that the weight of a passenger-carrying balloon may be safely as low as eight or ten pounds less than the atmosphere it displaces; although if it is intended to ascend to a considerable height practical considerations demand that it shall be considerably lighter, in order to make possible a safe descent. Thus, on account of the tendency of gas to expand in the higher strata of the atmosphere, where the pressures are smaller than at sea level, a balloon is never fully inflated. Were this precaution not observed, the tendency to burst a mile or so above the earth, on account of the expansion of the gas under reduced atmospheric pressure, would be greatly increased. When desiring to descend, the aeronaut opens the valve in the top of his balloon, permitting some of the gas to escape. Higher ascents may be accomplished by heaving out ballast, usually sand carried in bags. Too rapid a descent, due to escape of gas, may also be checked by the same means.

A balloon will continue to ascend until it reaches a level at which the weight of the balloon with its contained gas, gas bag, ear and passengers, equals the weight of the air displaced. It can then rise no higher, being free to move only horizontally under impulse from air currents.

Until the appearance of the dirigible balloon, the prevailing form was spherical or pear-shaped, because this shape gives the greatest volume for its surface, or in other words, it requires the smallest amount of material to contain a given volume of gas. At the top is placed the valve for letting out gas when required; at the lower end the shape is usually drawn out to form a funnel open at the bottom for the automatic escape of gas when the pressure becomes great. The material of the best balloons used to be silk, varnished with a composition chiefly consisting of boiled linseed oil, frequently containing other ingredients, such as india-rubber. But cambric is now

much more often used, as being cheaper, and quite strong enough for ordinary purposes. Of late years methods have been discovered of sticking together numerous pieces of thin skin, usually the intestines of an ox, known as goldbeater's skin. When these are attached together, and layers added till five to seven or eight layers are formed, the resulting envelope is both strong, light, and very gas-tight. The expense of this process, however, limits its use to only very special balloons, such as those used for military purposes. In order to bear the weight of the car and passengers, the balloon is covered with a network of string, cords from the lower part of which are connected to a hoop, and from this the basket ear is suspended by six or eight ropes. As for the management of the balloon, the balloon is spread out on the ground, the neck being below and the valve on top, and the netting laid on it and fastened round the valve. A tube is connected with the neck, by which the gas is introduced, and bags of sand are placed all round, and hooked on to the netting, to prevent the balloon rising too soon. As the envelope fills out and lifts up the bags, these are one by one hooked to lower meshes of the net; finally the ear is attached, and all ballast bags taken off the netting and put in the car. When all is ready, the aeronauts get into the ear, and ballast is discharged till the requisite amount of "lift" is obtained. The valve line, leading down inside the balloon from the valve to the car, is seen to be right, the grapnel and its cable placed in position, the latter being secured to the hoop. Usually some 60-100 pounds of sand ballast is taken in small sacks. On being released the balloon ascends to a given height, depending not only on the volume of gas, but upon the temperature and pressure of the air and other minor considerations. When the balloon tends to descend ballast is discharged, which causes it to rise, and when it is desirable to effect a landing the valve line is pulled and gas let out. When close to the ground the grapnel is lowered, which should catch in some tree or in soft ground, and the balloon thus anchored. The guide rope, a long and heavy rope trailing over the ground, the invention of Green, is sometimes used, when the country is such that no serious damage will be caused by its trailing. The principle of this device is that as the balloon tends to rise it must lift more of the rope off the ground, while, when the balloon sinks, it will be relieved of so much weight, and thus the balloon will tend to float at one level above the ground.

The invention of the balloon in modern times dates from the brothers Montgolfier, Stephen and Joseph, sons of a wealthy paper manufacturer of Annonay, France, who in



1782 began experiments in levitating paper spheres filled with smoke. In June, 1783, they made their first public demonstration of the new invention, sending a paper balloon of 700 cubic feet capacity to the height of 2,200 yards. In September of the same year they repeated their success in Paris, where a hot-air balloon of waterproof linen having a capacity of 52,000 cubic feet was sent up in the presence of a large crowd. The King, delighted with the result, conferred pensions and decorations on the brothers and ennobled their father.

Some accounts state that the Montgolfiers also experimented with hydrogen gas, but abandoned it because they knew of no way to keep it from escaping through the pores of their paper bag. However this may be, the credit for the first successful gas balloon is generally accorded to a certain Professor Charles, of Paris, who availed himself of the newly discovered method of dissolving rubber to obtain an impervious varnish for his silk envelope.

With the successful solution of the problem of proper construction for gas balloons, numerous ascents were made, both in France and other countries. Signor Vincent Lunardi, secretary of the Neapolitan embassy in London, was the first man to ascend in England, though it is said that one James Tytler had previously made a short ascent in Scotland. Lunardi made his first ascent from the Artillery Ground, Finsbury, Sept. 15, 1784, and published a most interesting account of this and other subsequent ascents. Sadler ascended about a month later from Oxford. In January, 1785, Blanchard and Dr. Jeffries ascended at Dover with the intention of crossing the Channel. This they succeeded in accomplishing, though it became necessary for them to discharge everything of weight in the car, including provisions and even clothes. They descended, however, safely in the forest of Guines. This feat was at the time naturally looked upon as one of the greatest importance, and Pilâtre de Rozier decided to attempt the passage from the French coast in a new kind of balloon. He came to the conclusion that, by uniting the two principles of aerial ascension, that is, by having both hot air and hydrogen, he would possess an *aërostat* more buoyant than the ordinary "*Montgolfière*"; and yet retaining its advantage of being more manageable. He was very unfortunate, however; the balloon cost much more than he had estimated; the wind continued adverse, and the ascent was again and again postponed; but on June 15, 1785, he, accompanied by one Romain, started off. As soon as the balloon had risen a good height, the gas, as might have been anticipated, caught fire, the apparatus was dashed to earth, and the first two victims to ballooning were extricated from the wreckage.

Many interesting balloon journeys were accomplished during the next few years. Blanchard, who may perhaps be considered the first professional *aéronaut*, made altogether some sixty ascents. Garnerin also made a name for himself, he being the first man to descend from a balloon in a parachute. Gay-Lussac and Biot made, in 1804, some of the first ascents for purely scientific purposes, the former ascending on one occasion to 23,000 feet. He found no alteration in the magnetic force, and the air which he brought down for analysis was found to have the same composition as that at the surface of the earth. Sadler made a number of ascents, during one of which he crossed from Ireland to England. Charles Green made a great many excursions between 1821 and 1850. He was the first to use ordinary coal gas instead of hydrogen for inflation, the former gas, though considerably heavier, being much cheaper and easier to obtain. Mr. Rush accompanied Green on sixteen occasions for the purpose of making scientific observations. In 1836 Messrs. Holland, Monk Mason, and Green made a journey from London to Nassau, spending a night in the air. MM. Barral and Bixio in France, and Mr. Welsh in England, made several scientific ascents, but the most numerous, systematic, and best appointed ascents for scientific observation were those of Mr. Glaisher, in 1862-1866. Twenty-eight ascents were made with Mr. Coxwell as *aéronaut*, the greatest height attained being estimated at 37,000 feet, or seven miles. At this great elevation Mr. Glaisher became insensible owing to the rarefaction of the air, and Mr. Coxwell temporarily lost the use of his hands. Many important results were arrived at which were published in Mr. Glaisher's interesting book "*Travels in the Air*."

Such an apparatus enabling a man to rise readily to such a height as to obtain an extensive bird's-eye view over the surrounding country, naturally soon suggested itself as most applicable to military purposes, and during the wars which were then being conducted it was put to the test. In 1793 the French government instituted experiments, and a corps of "*aërostiers*" was formed. Balloons were made use of during the campaign on the Rhine, at Maubeuge, and at the battle of Fleurus, with much success.

Balloons were employed by the Federal government during the Civil War in the United States with considerable success, and one was also used in the Santiago campaign in Cuba in 1898. During the siege of Paris, during the Franco-Prussian War, they became a regular means of communication with the outside world. Sixty-four balloons left the city with dispatches and with carrier pigeons. An ascent for the purpose of scientific research at great



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heights took place in France in 1875, but ended most disastrously, for out of the three aëronauts, MM. Crocé-Spinelli, Sivel, and Gaston Tissandier, the two former were asphyxiated in the rarefied air, and the latter rendered temporarily insensible. In 1878 the largest balloon ever constructed was used as a captive balloon at the Paris exhibition. This contained no less than 882,000 cubic feet of hydrogen, and could take up 52 people at a time. M. Hervé, in 1886, made a journey lasting 24½ hours, and M. Mallet, in 1892, is said to have remained in the air for 36 hours. Probably the most remarkable balloon journey ever made was that of Herr Andrée, who, with two companions, Strindberg and Fränkel, ascended, on July 11, 1897, from Spitzbergen in a balloon of 170,000 cubic feet, with the object of reaching the North Pole. Up to the present time, however, with the exception of a pigeon message supposed to have been sent two days after the start, nothing whatever has been heard of the bold adventurers. See ANDRÉE, SOLOMON AUGUSTE.

Until within a very few years balloons have been capable of no horizontal motion, except under impulse from the winds. By taking advantage of opportunities, however, aëronauts have been able to make extensive journeys. In America one of the earliest of these was John Wise, who in 1859 made an ascension at St. Louis, Mo., with the hope of reaching New York. He succeeded in sailing 1,100 miles in less than 20 hours. Encouraged by this and other successes, he built in 1873 a balloon of 300,000 cubic feet capacity, with the intention of crossing the Atlantic ocean. The balloon burst, however, preventing the consummation of his plans.

The first successful attempt to provide a balloon with some means of traveling in any desired direction was made by Henry Giffard, a French engineer, in 1852. He built an airship 150 feet long, 40 feet in diameter, containing 88,000 cubic feet of coal gas. It was propelled through the air by means of a screw driven by a 3 h.p. steam engine weighing 300 pounds. The experiment caused immense enthusiasm, but was not continued on account of the small power developed by the engine, per pound of weight. Through this experiment the attention of aëronauts and inventors was called to the solution of the problem of forward motion in the air.

In 1872 a French naval engineer, Dupuy de Lome, constructed a balloon of 125,000 cubic feet capacity, propelled at a speed of 8 feet per second by the strength of 8 men. Its propeller was 29 feet in diameter. This balloon contained within the gas bag an inner, smaller balloon filled with air, intended to preserve the shape of the outer envelope

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after loss of gas. In 1883-1884 the brothers Tissandier, Albert and Gaston, built an airship of 37,000 cubic feet capacity propelled by a two-bladed screw. It was driven by an electric-motor which was emerged from a battery of bichromate cells. It made several trips, one in September, 1884, of several hours at an average speed of 13 feet per second. It was not completely successful, however, owing largely to the limited source of its propelling power.

On the 9th of August, 1884, for the first time in the history of the world, an airship driven by motors departed in one direction and returned in 23 minutes to its starting point after having covered 5 miles. Captains Krebs and Renard, of the French army, were the builders and designers of this balloon, which was club-shaped, 152 feet long, 26 feet in diameter and 58,000 cubic feet capacity. The "ear" was 134 feet long, 6½ feet high and hung suspended 12 feet below the gas bag. The two-bladed propeller was at the front, and driven by a 9 h.p. electric-motor, giving to the airship a speed of 20 feet per second. Like the Tissandier balloon, the only drawback to practical, commercial use was the small amount of motive power capable of being stored in the battery. With smaller dirigible balloons of the flexible type, Santos Dumont and Lebaudy have been most successful. The former, a rich Brazilian, captured, on October 29, 1901, the Deutsch prize of \$100,000 by circumnavigating the Eiffel tower at a specified distance and height within half an hour. He built a number of models before he succeeded in fulfilling all expectations. His first cigar-shaped airship was finished in 1898. Three others followed in quick succession. With the fourth he started one day from the Aërostation Park in Paris, crossed the Seine, the Bois de Boulogne, and the race course. He then traversed the field of Longchamps ten miles, went to Puteaux, thence to the Trocadero, circled the Eiffel tower, returned to Longchamps, recrossed the Seine and landed at his starting place. Before he could repeat the experiment before the official committee, the balloon was destroyed by an accident. Santos Dumont at once built another (No. 6), with which he fulfilled all conditions, completing the circuit in 29 minutes, 30 seconds. Lebaudy's airship was accepted on July 7th, 1905, by the Government of France, after a number of rigid tests. His balloon was provided with a 40 h.p. Daimler motor and showed a speed of fully 35 feet per second. On the last trial trip he was required to fly from Moisson via Meaux and Sept-Sorts to the military camp at Chalons and there to land in a specified place. Lebaudy not only fulfilled these conditions, but made the whole trip of 150 miles in 6 hours and 45 minutes, or at



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an average speed of 23 miles per hour, part of the time against a strong head wind.

PRINCIPAL DIRIGIBLES OF FRANCE, GERMANY AND ITALY.

| Name.          | Volume,<br>cu. ft. | Length,<br>feet. | Diameter,<br>feet. | Shape.              | Lifting<br>power,<br>pounds. | Motor<br>horse-<br>power. |
|----------------|--------------------|------------------|--------------------|---------------------|------------------------------|---------------------------|
| Lebaudy ....   | 104,176            | 187              | 32                 | cigar               | 7,790                        | 40                        |
| La Patrie....  | 111,240            | 197              | 34                 | "                   | 8,177                        | 70                        |
| Parseval ....  | 81,200             | 157              | 28                 | conical             | 5,720                        | 90                        |
| Italia.....    | 42,659             | 128              | 20                 | cylindrical         | 3,300                        | 40                        |
| Ville de Paris | 113,000            | 203              | 34                 | conical<br>cylinder | 8,272                        | 70                        |

Perhaps the most famous investigator of the science of ballooning in recent years is Count Zeppelin of Germany. In 1900 he constructed an elongated cylindrical airship 420 feet long and 39 feet in diameter, on the entirely new principle of placing a number of flexible gas envelopes inside of a self-supporting framework. Beneath this cylinder, which contained seventeen gas bags and was pointed at both ends, were hung two aluminum ears for the operators and passengers. Motion was produced through the agency of screw propellers driven by Daimler engines, each weighing 715 pounds and delivering 16 h.p. changes in the horizontal direction well effected by means of rudders—one at each end of the airship; changes in elevation by means of a sliding weight, which caused the bow to incline upward or downward, according as the weight was placed at the rear or front of the machine, while a horizontal position was maintained by keeping the weight in its mid-position.

The first trip was made July 2, 1900, and proved remarkably successful. The airship rose to an altitude of 1,300 feet and sailing over Lake Constance traveled 3.75 miles in 17 minutes. At all times it was under perfect control, and were it not for a slight accident to the sliding weight and part of the steering apparatus necessitating a descent for repairs, the flight might have been of much greater duration. At a second trial made the 17th of October of the same year, the airship remained in the air for over an hour, during which time it tacked backward and forward, described a circle six miles in circumference and made good headway in the face of a wind blowing at the rate of seven miles per hour. Zeppelin then devoted his efforts toward reducing the weight of the various parts of his invention, while at the same time the efficiency of his motors was increased. In his next machine, the total weight of the machinery did not exceed 880 pounds, while the total weight to be supported was 2,200 pounds less than in the case of the earlier machines. This machine was in many respects similar to the others, but was somewhat smaller in size, and had one less in-

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ternal gas chamber. Liquid ballast was employed as well as extra vanes or wings for assistance in steering. The airship known as the "Deutschland" (Zeppelin VII) was one of the most wonderful aircrafts thus far constructed. Its length was 490 feet and its capacity, 24,700 cubic yards. The compartment for passenger service consisted of an aluminum frame elegantly appointed. Its length was 35 feet and its breadth 7 feet, 6 inches and with all appliances it weighed complete about 1,600 pounds.

With the "Deutschland" it was proposed to inaugurate aerial transportation, and on the first regular trip 24 persons engaged passage at the rate of \$50.00 each. Starting from Friedrichshafen at 3 A.M. they reached Düsseldorf at 3 P.M., attaining on some parts of the trip a speed rivaling that of express trains. The departure from Düsseldorf was made at 8.30 A.M. the next morning and the remainder of the trip completed without mishap. On June 29th, with a passenger list of seventeen representatives of the press, a second voyage was attempted. Before the trip was completed a violent storm was encountered, the fuel became nearly exhausted and the ship ascended until an altitude of 5,000 feet was reached. In the rarefied atmosphere much of the gas was lost, the rain soaked the envelope, adding a great deal of weight and the airship fell rapidly to the earth. Fortunately, the landing occurred in a forest where the trees supported the wreck and broke the fall, thus saving the lives of all the passengers. The machine was almost completely wrecked, although considerable of the material could be used again. The Zeppelin VIII also met with an accident, while the latest attempt, the Zeppelin IX, is now (1911) under construction, being nearly completed. Compared with its predecessors it is considerably smaller, being about 330 feet in length.

Among American aeronauts who have experimented with dirigible balloons may be mentioned Baldwin, R. Knabensehuh and Stevens, each of whom have made various successful flights, but only where the conditions of the atmosphere were propitious.

The latest exploit of a dirigible balloon in America which attracted world-wide attention was that of Walter Wellman and a party in an attempt to cross the Atlantic ocean in the airship "America." When some miles from the shore, gales blew the ship out of its course and to the southeast, while the waves so agitated the fuel tanks which were towed over the water by the airship for the double purpose of fuel supply and to act as an equilibrator to steady the craft that the airship had to be deserted.

Considering the accidents which have invariably attended the operation of dirigible balloons, it would seem a vain hope to expect such a type of craft eventually to at-



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tain success. However, these disasters, particularly in the case of the Zeppelins, can in almost every case be traced to carelessness or an unfortunate series of unforeseen occurrences. Lessons have been learned from these misfortunes.

One consideration of importance in the construction of a dirigible balloon relates to devices for maintaining equilibrium. With the old-fashioned globular, or pear-shaped balloon, no such need emerged, since the buoyancy of the gas maintained the gas-bag and car in one vertical line. The elongated envelope of the dirigible, however, is, as it were, suspended on a horizontal axis passing through a point midway in its length. The constant tendency, under the thrust of the propeller and the pressure of head winds, is to assume a position in which its longest axis is vertical to the earth's surface. According to Renard, the perturbative forces acting on a balloon are in direct ratio to its diameter, its inclination from the horizontal and to the speed of its motor, while the effect of any stabilizing or equilibrating agent depends only on the balloon's diameter and its inclination. While various devices have been adopted to produce a stabilizing effect, such as that of making the envelope cigar-shaped with the larger end in front, the best European practice favors what the French call "em-pennage," or "feathering." Thus on the great airship "Patrie," four rigid planes, arranged in form of a cross, were attached at the rear of the gas bag. A superior method of achieving the same result is by the use of small auxiliary "ballonnets," sausage-shaped or conical, attached to the rear of the main gas bag.

The Santos Dumont type of ship of ten years ago, owing to their small size and general frailty, are considered useless for practical purposes, but on the other hand the expense of constructing airships having sufficient displacement and speed to be at all practical is a matter of involving so much expense that only governments or persons of very extensive means have been able to build them. The "Parseval" and the "Zeppelin" types to-day mark the extremes in airship construction, and in each the attempt has been made to achieve a certain end. A craft of the "Parseval" type is comparatively small, but is easily maneuvered and can travel at a high speed, although its sphere of activity is confined to a comparatively limited radius.

J. E. HOMANS.

**Ballot.** Voting may be done either openly or secretly. Open voting is effected either by a show of hands or by a *viva voce* declaration of the voter's choice. Secret voting requires that while the collective result of the election may be readily ascer-

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tained, it shall not be known who cast the individual votes. The advantage of the former system is certainty in the count of votes; that of the latter, liberty of choice on the voter's part, and security against corruption, because it is hardly worth while to intimidate or bribe a voter, if it cannot be known whether or not he votes as desired. Secret voting has obtained from early times. At Athens the dikasts (a body combining to some extent the functions of both judges and jury) used balls of stone or of metal in giving their verdict; and the citizens, when assembled to decide on the exile of too prominent citizens, or other questions, wrote their choice upon tablets of pottery, known as *ostraka*. In Syracuse, olive leaves were used for a similar purpose. At Rome wooden writing tables (*tabellæ*) were used in the courts of justice, and also in the *comitia* on the election of a magistrate or in deciding on the adoption of laws. The *Lex Gabinia*, B. C. 139, regulated secret voting, but it had already been in use.

The word "ballot" is an Anglicizing of the French word "*ballotte*" (Italian, "*ballotta*"), the diminutive of "*balle*," and means literally "a little ball." The French and Italian words signified the little balls which were used in the Middle Ages in voting, as in the election of a Pope by the College of Cardinals. In Greece similar balls are still used at elections. While the ball has given place almost everywhere to the written or printed paper, except in the election of members of private clubs, the word "ballot" has been retained without regard to the particular means by which a voter's choice is secretly expressed. Paper ballots were used to a certain extent on the continent of Europe before the 17th century (*e. g.*, in the Venetian Senate), and the sojourn in Holland of some of the original settlers of New England is thought to explain the use of paper ballots in the northern colonies of America from the first. Their first recorded use in Great Britain was in the Scottish Parliament after the Restoration, in effecting the banishment of prominent persons opposed to the party of the King. The use of paper ballots in the northern colonies led gradually to their adoption in nearly all of the United States, though Virginia, Kentucky, and some other Southern States long retained *viva voce* elections. Originally, each voter provided his own ballot, writing upon it the names of the candidates of his choice, but ultimately printed ballots came into use, being supplied to the voters by the respective political organizations. These paper ballots were generally supposed to effect secrecy, and they would do so in a community composed exclusively of honorable men; but the system was very defective. As any number of ballots could be printed, the election officers



might control the election by fraudulently placing ballots in the box, either in place of or in addition to those properly cast; and the ballot was not really secret, because even if a voter did not display the face of his ballot, it could be usually seen from which party representative he obtained it. With an electorate containing many persons who could be influenced either by corruption or fear, voting by ballots of this character was very little more secret than if done *viva voce*, while it lacked altogether the great security of the latter method, viz., the fact that it is impossible to falsify the return of votes given *viva voce*. The bribery, intimidation and disorder often attending *viva voce* elections were fully counterbalanced by the frauds which the ballot made possible.

In 1851 Mr. Francis S. Dutton, of South Australia, proposed a ballot system which could be really secret *if properly administered*, and which was adopted in that colony in 1857, in the other Australian colonies about the same time, and ultimately throughout the British dominions generally, being made obligatory in England in 1872. By this system nominations can be effected by compliance with very simple regulations—*e. g.*, by the written request of a few voters, accompanied, under some laws, by a money deposit which is refunded if the candidate polls a certain percentage of the votes. Ballots are printed exclusively by the local or general government, and one ballot only is given to each voter, and only in the voting room, after he has established his right to vote. As printed, all the ballots are alike, containing the names of all the candidates for each office (usually with their occupations and addresses, and sometimes with the names of the political parties they represent) grouped under the titles of the respective offices. The voter's choice is indicated by a cross-mark against the name of each candidate for whom he desires to vote. The ballot contains blank spaces for the insertion of other names. Each voter is required to mark his own ballot alone, at a screened desk, and to deposit it folded in the box, the display of its contents to anyone being made a penal offence. To insure a voter using the precise ballot which he receives, the number of ballots printed is strictly limited, and they are usually consecutively numbered, together with the stubs from which they are detached, great care being taken to prevent the numbers from being used as a means of identifying the voter after the ballot is opened. For public information, sample ballots on colored paper can be obtained at the door of the voting place on election day, but cannot be used in voting. Candidates or their representatives and, under some laws, any of the public, may be present during the count, to insure

that it is fairly and accurately made, such persons being so placed that they cannot touch the ballots themselves. This is the true Australian system, some features of which have been adopted in Belgium, Luxemburg, Italy, Austria and Norway. It has been adopted with substantial entirety in Alabama, Arkansas, California (but recently repealed by a statute of doubtful constitutionality), Florida, Idaho, Kansas, Maryland, Massachusetts, Mississippi, Nevada, North Dakota, Oregon, Rhode Island, Tennessee and Virginia, but the so-called "Australian ballot laws" of the other States contain provisions which nullify many, if not all, of the advantages of the system. Among such provisions are the following:

1. Needlessly burdensome restrictions (*e. g.*, requiring a great number of signatures) for all nominations not made by the leading party organizations. The effect is to give them practically a monopoly of nominations and to discourage independent movements.

2. Every candidate of the same political party may be voted for by a single cross-mark against the party name. This provision was proposed as a convenience to voters, though there had never been any real complaint that it was inconvenient to mark each candidate's name separately. The practical effect is to encourage voting a "straight ticket" by making that the easiest thing to do, and to deter voters from picking out those whom they think the best candidates for the respective offices, without regard to party, that method of voting requiring more trouble. Under this provision candidates of the leading political parties, which usually make nominations for every office, can be voted for more easily than independent candidates, not on any complete ticket. For this reason the Supreme Court of California held it unconstitutional in that State in 1892. (*Eaton v. Brown*, 96 Cal. 371.)

3. Illiterates are allowed the privilege (properly accorded only in cases of physical disability) of being helped to mark their ballots. This concession to illiteracy destroys secrecy and in some communities is extensively used for corrupt purposes.

The only public offices which should be filled by election are those which the majority of citizens take a real interest in, viz., the legislative and the leading executive offices. In the United States, however, many minor offices, in the filling of which the public takes no active interest, are elective, and hence there are a great many candidates, for a number of different offices, to be voted for at the same time. This is of itself a serious strain on any voting system, and where all the candidates are on one ballot it becomes inconveniently large. A separate ballot for Presidential electors is therefore



desirable in the larger States, but the only real remedy is in making all minor offices appointive, and reserving elections for those of greater importance. No form of ballot can secure honest elections unless the votes are honestly counted. The counting ought to be done by reliable persons in a manner sufficiently public to insure detection of all attempts at illegality. Many American ballot laws are very defective on this point, and in the slum districts of some cities the counting is often in the hands of men of the criminal class, who are left practically free to make such return of votes as they choose. During the past few years "ballot machines" have come somewhat into use. The candidates' names appear on the face of such a machine, arranged as on a ballot, with a button next each name. In the back part of the machine, covered by a locked door, is an identical table of names, but with a register for each. The voter, screened from observation, votes by pressing the buttons, and thereby advancing the dials by one number in the registers of the candidates voted for. All buttons pressed down remain so until the voter has finished, when they are all released by the movement of a crank. The pressing of a button for any name prevents the movement of the buttons next the names of other candidates for the same office. When the polls close the door is unlocked, and the total vote for each candidate stands recorded. These machines have the advantage of allowing the result to be announced almost at once, and if care be taken to insure their not having been tampered with before the voting begins, and that the vote reported is really what they indicate, they give an honest count. See ELECTION: REGISTRATION OF VOTERS.

CHARLES C. BINNEY.

**Ballou, Hosea** (ba-lö'), an American Universalist clergyman, journalist, and historian, born at Halifax, Vt., Oct. 18, 1796; was the first President of Tufts College (1854-1861), and was very successful as editor of the "Universalist Magazine." He wrote "Ancient History of Universalism" (1829) and a hymn book (1837). He died at Somerville, Mass., May 27, 1861.

**Ballou, Maturin Murray**, an American journalist, son of Hosea Ballou, born in Boston, April 14, 1820. Besides editing "Ballou's Pictorial," "The Flag of Our Union," "Ballou's Monthly," etc., and making a valuable compilation of quotations, he wrote "History of Cuba" (1854); "Biography of Hosea Ballou," "Life Work of Hosea Ballou." Becoming in later life an extensive traveler, he wrote a number of books of travel, including "Due West," "Due South" (1885); "Due North," "Under the Southern Cross," "Footprints of Travel," etc. In 1872 he became one of the founders and the editor-in-chief of the

Boston "Globe." He died in Cairo, Egypt, March 27, 1895.

**Ball's Bluff**, a spot on the right bank of the Potomac river, in Loudon county, Va., about 33 miles N. W. of Washington; where the bank rises about 150 feet above the level of the river. It is noted as the scene of a battle between a Union force under Col. Edward D. Baker, and a Confederate force under the command of General Evans, Oct. 21, 1861. The battle resulted in the serious defeat of the Union force and the instantaneous death of Colonel Baker.

**Ballston Spa**, a village in the towns of Ballston and Milton; county-seat of Saratoga co., N. Y., on the Delaware and Hudson railroad; 7 miles S. of Saratoga Springs. It is noted for its mineral springs, which rank among the best acidulous chalybeate springs in the country, and was formerly a popular summer resort, but is now most important for its manufactories, which include one of the largest tanneries in the world; extensive pulp and paper mills, and agricultural implement factories. It has 2 National banks, several churches, public high school, and daily and weekly newspapers. Pop. (1900) 3,923; (1910) 4,138.

**Balm.** (a) A tree, *balsamodendron gileadense*, the specific name being given because it was once supposed to be the Scriptural "Balm of Gilead" — an opinion probably erroneous, for it does not at present grow in Gilead, either wild or in gardens, nor has it been satisfactorily proved that it ever did. It is called also *B. opobalsamum*. It is a shrub or small spreading spineless tree, 10 to 12 feet high, with trifoliate leaves in fascicles of 2-6, and reddish flowers having four petals. It is found S. of 22° N. lat. on both sides of the Red Sea, in Arabia, Abyssinia, and Nubia. It does not occur in Palestine.

(b) Its gum: This is obtained from the trees by incision. It is called also Balm of Mecca and *opobalsamum*. Two other kinds of gum are obtained from the same tree, the first (*xylobalsamum*) by boiling the branches and skimming off the resin, which rises to the surface of the water; and the second (*carpobalsamum*) by pressure upon the fruit.

**Balm of Gilead Fir**, a tree (*abies balsamea*), which furnishes a turpentine-like gum. It is a North American fir, having no geographical connection with Gilead.

**Balmaceda, Jose Manuel**, a Chilean statesman, born in 1840; early distinguished as a political orator; advocated in Congress separation of Church and State; as Premier, in 1884, introduced civil marriage; elected President in 1886. A conflict with the Congressional Party, provoked by his alleged cruelties and official dishonesty, and advo-



## Balmerino

cacy of the claim of Signor Vicuna as his legally elected successor, resulted in Balma-ceda's overthrow and suicide in 1891.

**Balmerino, Arthur Elphinstone, Lord**, a Scottish Jacobite, born in 1688. He took part in the Jacobite rebellion of 1715, and fought at Sheriffmuir. Having joined the young Pretender in 1745, he was taken prisoner at Culloden, tried at Westminster, found guilty, and beheaded in 1746. His title was from Balmerino, in Fife.

**Balmez** (bal'māth), or **Balmes, Jaime Luciano**, a Spanish priest and author, born in Catalonia, Aug. 28, 1810. His works include "Protestantism Compared with Catholicism in its Relation to European Civilization" (3 vols., 1848); "Filosofia Fundamental," etc. He died in Vich, July 9, 1848.

**Balmoral Castle**, the Highland residence of Queen Victoria, beautifully situated on the S. bank of the Dee, in the county of, and 45 miles W. of Aberdeen. It stands in the midst of fine and varied mountain scenery, is built of granite in the Scottish baronial style, was enlarged in 1888, and has a massive and imposing appearance. The estate, which is the Queen's private property, comprises 25,000 acres, mostly deer forest.

**Balnaves, Henry**, of Halhill, a Scottish reformer, was born in Kirkcaldy, educated at St. Andrews, and became a Lord of Session and a member of the Scottish Parliament in 1538. He was one of the commissioners appointed in 1543 to treat of the proposed marriage between Edward VI. and Mary. In 1547 he was one of the prisoners taken in the Castle of St. Andrews and exiled to France. Recalled in 1554, he busily engaged in the establishment of the Reformed Faith; assisted in revising the "Book of Discipline," and accompanied Murray to England in connection with Darnley's murder. He died in 1579.

**Balolo**, a large Bantu nation in the Equatorial Province of the Kongo Free State. They inhabit the forests on the banks of the Chuapa, Bussera, and Lomami, and their settlements are interspersed with the villages of the Batwa dwarfs. The principal tribes of the Balolo are the Boruki, Bangombe, Dulingo, Imballa, and Kimoma. Agriculture exists among them to a certain extent, but they follow no pastoral pursuits. According to V. François, all Balolo tribes are addicted to cannibalism. The territories inhabited by the Balolo belong to the most promising of Equatorial Africa, especially as the climate is more favorable to Europeans than it is in many other parts of the Kongo Free State.

**Balsa**, a kind of raft or float used on the coasts and rivers of Peru and other parts of South America for fishing, for landing goods and passengers through a heavy surf, and for other purposes where buoyancy is chiefly

## Baltic and North Sea Canal

wanted. It is formed generally of two inflated sealskins, connected by a sort of platform on which the fisherman, passengers or goods are placed.

**Balsam**, the common name of succulent plants of the genus *impatiens*, family *balsaminaceæ*, having beautiful irregular flowers, cultivated in gardens and greenhouses. *Impatiens balsamina*, a native of the East Indies, is a common cultivated species. *Impatiens noli-me-tangere*, grows wild in Great Britain, but is not native.

**Balsam**, an aromatic, resinous substance, flowing spontaneously or by incision from certain plants. A great variety of substances pass under this name. But in chemistry the term is confined to such vegetable juices as consist of resins mixed with volatile oils, and yield the volatile oil on distillation. The resins are produced from the oils by oxidation. A balsam is thus intermediate between a volatile oil and a resin. It is soluble in alcohol and ether, and capable of yielding benzoic acid. The balsams are either liquid or more or less solid; as, for example, the Balm of Gilead, and the balsams of copaiba, Peru, and Tolu. Benzoin, dragon's blood, and storax are not true balsams, though sometimes called so. The balsams are used in perfumery, medicine, and the arts.

**Balsamodendron**, a genus of trees or bushes, order *amyridaceæ*, species of which yield such balsamic or resinous substances as Balm of Gilead, bdellium, myrrh, etc.

**Balta, Jose**, a Peruvian statesman, born in Lima, in 1816; retired from the army with the rank of Colonel in 1855; Minister of War in 1865; one of the leaders in the insurrection which overthrew the unconstitutional President, Prado, in 1868; and was President of Peru, in 1868-1872. He was murdered in a military mutiny in Lima, July 26, 1872.

**Baltard, Louis Pierre** (bäl-tär'), a French architect and engraver, born in Paris, July 9, 1765; widely known by his skill in engraving, specimens of which are found in "Paris and Its Monuments," Denon's "Egypt," and illustrations of Napoleon's wars in "La Colonne de la Grande Armée." He died Jan. 22, 1846.

**Baltard, Victor**, a French architect, born in Paris, June 19, 1805; son of Louis Pierre Baltard; became government architect of France, and a member of the Academy of Fine Arts. He built the Church of St. Augustine and other beautiful edifices, and was author of "Monographie de la Villa Medius" (1847), etc. He died Jan. 14, 1874.

**Baltic and North Sea Canal**, a German ship canal, starting at Holtenau, on the Bay of Kiel, and joining the river Elbe 15 miles from its mouth; called by the Germans the Kaiser Wilhelm Canal. The Em-



## Baltic

peror William I. commenced the works on June 6, 1887, so far as laying the foundation of the Holtenau locks was concerned, while William II. opened the canal gates in 1895. The work was thus actually completed in the estimated time, eight years, and the estimate of cost, \$40,000,000, had not been exceeded on the day of the international ceremony. The waterway is 98,600 meters long (meter = 1.093 yards), breadth on surface, 60 meters, at bottom, 22 meters, and depth, 9 meters. There are entrance and exit locks at each end, Holtenau and Brunsbüttel, each 150 meters long, 25 broad, and  $9\frac{1}{2}$  deep, while at different points the canal is crossed by four railway bridges and five highways. Two of the former are fixed bridges—the Grunthal and Levenson—of fine construction, each being 42 meters high, with a span of 156 meters. The other two are turning bridges, while the highways are in the shape of ferries. The official returns for the first working year were as follows: 7,531 steamers, of which 642 belonged to regular lines, passed through, besides 266 German and two foreign war ships; there were 9,303 sailing vessels, of which 8,477 were German. Danish ships were the next highest in number for steamers, and Dutch vessels for sailers. Receipts for steamships amounted to 680,825 marks, and for sailing vessels, 216,626 marks, a total of 897,451 marks, against the presupposed annual revenue of 5,000,000 marks.

**Baltic, Battle of the**, a very spirited lyric by Thomas Campbell, celebrating the victory of Lord Nelson over the Danish fleet, April 2, 1801. In history, this battle is generally known as the battle of Copenhagen.

**Baltic Lake Plateau**, a low plateau in North Germany, parallel to the S. coast of the Baltic Sea; 750 miles in length, extending from East Prussia to Schleswig-Holstein and Jutland. Its E. parts form broad elevations, the highest points being the Thurmberg, near Dantzic (1,086 feet), and the Kernsdorf Mountain (1,027 feet); more to the W., in Mecklenburg and Schleswig-Holstein, the altitudes decrease and the elevations become less defined, but even the last offshoots of the plateau in Schleswig and Jutland are of importance, as they form the watershed between the basins of the Baltic and North Sea. A characteristic feature of the region is the large number of lakes and ponds, some with very irregular outlines, others occupying wide basins, or narrow, river-like channels. The largest of these lakes are the Müritz-See (93 square miles), in Mecklenburg, and the Spirding-See (46 square miles), in East Prussia. Many of these lakes (mostly very small) in the E. section (Pomerania and West Prussia) are without visible outlet. According to the most recent investigations, the lake basins date from the glacial period, when

## Baltic Sea

a massive sheet of ice covered North Germany, the ridges and hollows of this plateau being due to the action of the ice.

**Baltic Provinces** (in Russia), a term which, in a wider sense, comprehends the five Russian governments bordering on the Baltic, viz., Courland, Livonia, Esthonia, Petersburg, and Finland; in a restricted sense it often designates the first three. The Baltic provinces once belonged to Sweden, except Courland, which was a dependency of Poland. They came into the possession of Russia partly in the beginning of the 18th century, through the conquests of Peter the Great, partly under Alexander in 1809. No pains have been spared to Russianize them, and, since 1876–1877, they have lost their remaining privileges, and been thoroughly incorporated in the Russian Empire. They form, however, a borderland between the Germanic and Slavonic areas, and have been a frequent cause of difficulty between Germany and Russia. The bulk of the population is composed of Esths and Letts; the Germans number above 200,000, the Russians only 65,000. The five provinces combined have an area of 178,624 square miles, and a population (1908) of 8,327,800.

**Baltic Sea**, the great gulf or inland sea bordered by Denmark, Germany, Russia, and Sweden, and communicating with the Kattegat and North Sea by the Sound and the Great and Little Belts. Its length is from 850 to 900 miles; breadth, from 100 to 200; and area, including the Gulfs of Bothnia and Finland, 184,496 square miles, of which 12,753 are occupied by islands. Its mean depth is 44 fathoms, and the greatest ascertained depth, between Gottland and Courland, 140. Its shallowness and narrowness, its numerous islands and reefs, the shoal coasts of Prussia on the one side, and the rocky coasts of Sweden on the other, and above all, the numerous and sudden changes of wind, accompanied by violent storms, make the navigation of the Baltic very dangerous. The group of the Aland Islands divides the S. part of the sea from the N. part or Gulf of Bothnia. The Gulf of Finland, branching off eastward into Russia, separates Finland from Esthonia. A third gulf is that of Riga or Livonia. The Kurisches Haff and other haffs are not gulfs, but fresh water lakes at the mouths of rivers.

The water of the Baltic is colder and clearer than that of the ocean, and contains only a fourth of the proportion of salt found in the Atlantic. Ice hinders the navigation of the Baltic from three to five months yearly. Rarely, as in 1658 and 1809, the whole surface is frozen over. Tides, as in all inland seas, are little perceptible—at Copenhagen, about a foot; yet the water rises and falls at times, though from other causes, chiefly from the varying quantity of



water in the rivers at different seasons. Upward of 250 rivers flow into this sea, which, through them and its lakes, drains rather less than one-fifth of all Europe, its drainage area being estimated by Dr. W. B. Carpenter as 717,000 square miles. The chief of these rivers are the Oder, Vistula, Niemen, Dwina, Narva, Neva; the waters of Lake Maeler, and those of Wetter and other lakes reach the sea through the river Motala. The principal islands are Zealand, Fünen, Bornholm, Samsöe, and Laaland, belonging to Denmark; the Swedish islands, Gottland, Oland, and Hveen (in the Sound); the Aland Islands, belonging to Russia; and Rügen, to Prussia. Timber, hides, tallow, and grain are the chief exports from the countries bordering on the Baltic. The number of vessels that pass the Sound to or from the Baltic annually is very large.

The Eider Canal, connecting the Baltic near Kiel with the North Sea at Tonningen, facilitates the grain trade in mild winters; and the two seas are also connected by the Gotha Canal, which joins the lakes of South Sweden. These are navigable for boats of light draft only; but a great ship canal from Brunsbüttel, at the mouth of the Elbe, to Holtenau, near Kiel, was constructed in 1887-1895, designed for the largest vessels, especially German war ships. Inaugurated with great ceremony in 1895, it is 61 miles long, 28 feet deep, 66 yards wide at the surface, and 24 at the bottom: and as the voyage round from the Elbe to Kiel represents nearly 600 miles of dangerous sailing, the waterway will be of great value to the German navy. It cost some £8,000,000, and the yearly maintenance is stated at £50,000. The most important harbors in the Baltic are: in Denmark, Copenhagen; in Germany, Kiel, Lübeck, Stralsund, Stettin, Danzig, Königsberg, and Memel; in Russia, Riga, Narva, Cronstadt, and Sveaborg; and in Sweden, Stockholm and Carlskrona. The shores of the Baltic in Prussia and Courland have been long noted for the amber cast ashore by the waves in stormy weather. Another important phenomenon connected with the Baltic is a slow vertical movement of its coasts, downward in the S. of Sweden, but farther N. upward, being there supposed to be at the rate of three feet in a century. Its area is held to be gradually decreasing. The Germanic nations call this sea Ostsee, or East Sea; the name Baltic first appears in the 11th century, in a work by Adam of Bremen.

**Baltimore**, a city of Maryland, the foremost city in the State, and sixth in population in the United States. It is situated at the head of the estuary of the Patapsco river, 14 miles from its mouth in Chesapeake bay, 35 miles N. E. of Washington, and 97 miles S. W. of Philadelphia. Its general outline is that of a rectangle broken

in the S. by the Patapsco river and its branches, which form a forked peninsula. Its extreme width from N. to S. is about  $5\frac{1}{3}$  miles, its extreme length from E. to W. about 6 miles, its area  $31\frac{1}{2}$  square miles, and its population was estimated in 1907 at 561,000. The most populous suburb outside of the municipal limits is Canton, on the E., where the huge grain elevators of the Pennsylvania railroad are situated. Fort McHenry, famous for its historical associations, is situated on Whetstone Point, forming the tip of the E. fork of the above-mentioned peninsula, 3 miles S. E. of the city hall.

*Streams, Harbor, and Tunnels.*—The city is built on a group of low hills pierced by two streams. Flowing through the thinly settled section on the W., and bounding the city on the S. W., is Gwynn's falls, a small stream terminating in an estuary known as the Middle Branch of the Patapsco river. The main portion of the city lies on Jones' falls, a small stream traversing it in a general N. and S. direction, and terminating in another estuary known as the Northwest Branch of the Patapsco. Both of these streams are spanned by numerous stately bridges, and two long bridges span also the Middle Branch. The "Old Town," in which are situated many of the factories, lies E. of Jones' falls. The inundations of this stream were formerly the terror of a considerable section of the city, but its bed is now walled in by stone embankments. Its valley in the N. part of the city is largely occupied by railroad tracks and stations. The principal railroads pass through the city by tunnels. The Pennsylvania railroad crosses from E. to W. through the Union tunnel ( $\frac{3}{4}$  mile) and the Baltimore and Potomac tunnel ( $1\frac{3}{8}$  miles); the open stretch ( $\frac{1}{2}$  mile) between them contains the Union station. The Baltimore and Ohio tunnel ( $1\frac{1}{2}$  miles) runs from Mount Royal station in the center of the city to Camden station in the S., the trains being propelled through it by electricity.

The Northwest Branch of the Patapsco constitutes the main harbor, 3 miles long, and  $\frac{3}{4}$  mile at its widest. It consists of a narrow inner basin, and an outer harbor accessible to the largest vessels. At its entrance, which narrows to  $\frac{1}{4}$  mile, is Fort McHenry. Beyond this is the Patapsco river, a wide estuary, with a deep ship channel.

*Streets.*—The streets are not laid out according to a uniform plan, their direction being determined partly by natural features—river, hill, and hollow—and partly by the original plans of the various distinct settlements that were later merged in the city. Their average width is 60 feet, and their aggregate length about 400 miles. The business center lies W. of Jones' falls and N. of the harbor, the principal business



streets being Baltimore, Lexington, Pratt, and Lombard streets, running E. and W., and Charles, Hanover, Light, Howard, Eutaw, and Calvert streets, running N. and S. The Lexington public market is one of the interesting sights of the city. The vicinity of Hopkins place is the center of the wholesale dry goods trade. Baltimore is a city of homes, there being but few tenement houses. A fine residence section is in the N. W., in the vicinity of Eutaw place, a beautiful park promenade 150 feet in width. North Charles and St. Paul streets and Mount Vernon place are the most fashionable residence sections. The dwellings, generally built in solid rows, have white marble facings. In the new quarters they present a great variety of design and material. Interesting relics of the eighteenth century are the old inns met with in the "Old Town."

*Parks and Cemeteries.*—The excellent public park system covers an area of 1,800 acres, and includes a number of fine public squares and smaller parks in various parts of the city, besides the more extensive ones lying on its outskirts. Federal Hill (8½ acres) and Riverside (17 acres) parks are in South Baltimore, the former commanding a good view of the harbor. Carroll park (184 acres), in the extreme S. W., contains the old Carroll mansion. In the N. is Druid Hill park (671 acres), named from its noble old oaks, and considered one of the most beautiful public parks in the country. Having been a private park for 100 years before its acquisition by the city in 1860, its natural beauties have been carefully preserved. It contains several lakes, the largest being Druid lake, an artificial basin forming a part of the municipal water works system. There are over 16 miles of fine drives, the main avenues having a width of 32 feet. Other features of interest are the old Rogers mansion house, a zoological collection, conservatories and palm houses, a fish hatchery, and statues of Washington, Columbus, and Wallace (the last a replica of the one at Stirling, Scotland). Clifton park (255 acres), in the N. E., contains the Clifton lake and the old Johns Hopkins mansion. It was acquired by the city in 1895. Patterson park (150 acres), on the E. side, contains the earthworks thrown up to defend the city against the British in 1814, fine conservatories, and a small lake.

Adjacent to Clifton park are a number of cemeteries, among which Baltimore cemetery is the largest. Other notable burial places are Greenmount cemetery, to the W. of Baltimore cemetery, containing a monument to John McDonogh, the philanthropist, and the graves of Mme. Patterson Bonaparte (wife of Jerome Bonaparte, whose descendants still live in the city), Junius Brutus Booth, the actor (father of Edwin

Booth), and Johns Hopkins; St. Peter's (R. C.) cemetery, in the W. part of the city; and Mt. Olivet and Loudon Park cemeteries, in the S. W.

*Buildings and Monuments.*—Most of the prominent public buildings are in or near the business district. The city hall, covering over half an acre, is a white marble Renaissance structure, 355 feet long, four stories high, and surmounted by an iron dome 260 feet high. It was erected at a cost of \$2,600,000. The city court house is a magnificent building of white marble, which cost over \$2,000,000. The post office, and the new Federal building erected on the site of the old custom house, are also of white marble. The Maryland Trust, the Baltimore and Ohio office, the "Sun," "American," Continental Trust, Fidelity, Union Trust, and Board of Trade buildings are handsome modern business structures. The Savings Bank of Baltimore is one of the handsomest bank buildings in the country, being somewhat after the design of the Erechtheum at Athens. Among the railway stations, the Mount Royal station of the Baltimore and Ohio railroad deserves notice. Other notable buildings will be mentioned under *Churches and Charities, Education, etc.*

Baltimore has been styled the "Monumental City" from the beautiful monument erected by the State of Maryland in the early part of the nineteenth century to George Washington. This monument, in Mount Vernon place, at the intersection of Charles and Monument streets, was begun in 1816 and completed in 1830, and is the first monument in honor of Washington. It consists of a white marble Doric column 130 feet high, resting on a base 35 feet high, and supporting a colossal figure of Washington. The summit is reached by means of 220 winding steps, and affords a fine view of the city and environs. The monument is surrounded by statues of George Peabody, by W. W. Story; of John Eager Howard, who donated the ground for the monument, by Frémiet; of Chief Justice Taney, by Rinehart; of Severn Teackle Wallis; a figure of Military Courage, by Dubois; and a superb group of bronzes by the French sculptor Barye, representing Peace, War, Force, Order, and a Lion. The Battle monument, fronting the post office on Monument square, was erected in 1815 in memory of the citizens who fell in defense of the city against the British in the preceding year. It is a fine piece of architecture. The Wells and McComas monument, on the east side, is a memorial to two youths who killed General Ross, the British commander, at the battle of North Point (Sept. 12, 1814), and were themselves killed immediately afterwards. The Wilkey monument, also on the east side, facing Jackson



square, is 52 feet high, and commemorates the founder of the Order of Odd Fellows in America. The Ridgely monument in Harlem square, in the W. part of the city, is another monument to a prominent member of this order. The heroes of the Revolution are commemorated by the Sons of the Revolution monument. There is also a monument to Maryland Confederate soldiers and to those who fell in the Mexican War.

*Clubs, Hotels, Theaters.*—The leading social organizations are the Maryland, the University, the Baltimore, and the Baltimore Country clubs. The Maryland Club occupies a magnificent Romanesque edifice of white marble, on Charles and Eager streets. Other prominent clubs with buildings of their own are the Phoenix, Merchants', Catholic, Germania, Athenæum, and Baltimore Athletic. The Masonic Temple is a handsome building of white marble. Among the hotels may be mentioned the Belvedere, Stafford, Rennert, Altamont, and Eutaw House. The theaters include the Academy of Music, Ford's Opera House, the New Maryland, and others. The Lyric is devoted to concerts and public meetings.

*Churches and Charities.*—Baltimore has always been a powerful center of Roman Catholic influence. It is the oldest Roman Catholic see in the United States, having been founded in 1789, and is the seat of an archbishop, who is cardinal and primate of the United States. The Roman Catholic cathedral, designed by B. H. Latrobe, is a massive structure of rough-hewn granite, 190 feet long and 177 feet broad, surmounted by a dome 125 feet high. In its vicinity are several Roman Catholic colleges, convents, and charitable institutions. There are altogether over 75 Roman Catholic churches and chapels, the most notable buildings, besides the cathedral, being those of the St. Alphonsus and Corpus Christi churches. Baltimore is also the seat of a Protestant Episcopal bishop, Maryland being the third diocese of that church organized in the United States, and there are about 200 churches of all the Protestant denominations. The most notable Protestant church buildings are Grace, Christ, St. Michael and All Angels, and St. Peter's (Episcopal); Westminster (with the tomb of Poe in its graveyard), First (with a spire 250 feet high), and Brown Memorial (Presbyterian); the Mount Vernon and First (Methodist Episcopal), and the First Unitarian. The latter is a famous piece of fine architecture. The synagogues of the Baltimore Hebrew and Oheb Shalom congregations are imposing structures.

Foremost among the charitable institutions is the Johns Hopkins Hospital, opened in 1889. It was founded by Johns Hopkins, who bequeathed to it property valued now at over \$3,000,000, and by the terms of the

bequest it serves as a great clinic for the medical school of Johns Hopkins University and as a training school for nurses. It occupies 13 acres on the east side, has 320 beds, and in the completeness of its equipment and excellence of its system ranks with the greatest hospitals in the world. The buildings were erected from the income of the bequest, the principal remaining in its integrity. Other notable hospitals are the Maryland University, the City, and St. Joseph's hospitals. The Sheppard and Enoch Pratt Hospital is one of the best hospitals for nervous disorders in the country. The Spring Grove Insane Asylum, with accommodations for 300 patients, is a State institution, and the Maryland School for the Blind, with a beautiful white marble building accommodating 50 pupils, receives State aid. The city almshouse, known as the Bay View Asylum, has room for 500 inmates. There are also the Church Home; the Day Nursery; the Samuel Ready Asylum for female orphans; the Wilson Fund, affording change of air in the summer to sick children and their mothers at the Wilson Sanatorium, 5 miles from the city, or on the bay; the McDonogh School for destitute children, St. Mary's Industrial School, and the House of Refuge for juvenile offenders.

*Educational Institutions.*—Baltimore is one of the greatest educational centers in the United States. The most famous of its institutions of learning is Johns Hopkins University (*q. v.*), opened in 1876, to which Johns Hopkins bequeathed \$3,500,000. It consists of a school of arts, a graduate department, and a school of medicine. It has been a leader among American universities in the development of graduate study and original research, and has exercised a profound influence through its numerous publications and the large number of its graduates who have become teachers and professors. Towards the opening of the great medical school a "woman's fund" of \$500,000 was raised, the bulk of this having been contributed by Miss Mary E. Garrett, on condition that women students be admitted to the school on equal terms with men. In 1902 the citizens raised an endowment of \$1,000,000, and also made a presentation of attractive grounds, consisting of a beautifully wooded park in the northern part of the city, for a new site. At present the productive funds of the university amount to about \$5,000,000. Its library contains 130,000 volumes and 100,000 pamphlets, and 1,500 periodicals are regularly received. The number of students averages 750, only 200 of whom are in the college proper.

The University of Maryland and Baltimore University have schools of law and medicine, and there is also an independent College of Physicians and Surgeons. There are several schools of pharmacy and dentist-



## Baltimore

ry, the Baltimore College of Dentistry and Surgery, the oldest in the United States, having been chartered as early as 1839. Among the numerous colleges and schools are St. Mary's Seminary (R. C.), opened in 1791; Loyola College (R. C.), opened 1852; Notre Dame of Maryland (R. C.), opened 1873; St. Joseph's Seminary (R. C.), opened 1888; Morgan College (Meth. Epis.), opened 1876; the Woman's College of Baltimore (Meth. Epis.), opened 1888, with a preparatory school attached, a library of 12,000 volumes, and a natural history museum; the Bryn Mawr School, opened 1885; Calvert Hall College; and the Maryland Institute of Art and Design, which has a large and well-equipped building of white marble, erected since the fire. There is a State Normal School, and another institution for training colored teachers. The public school system consists of 118 elementary schools (including 14 for colored pupils) with 1,500 teachers and 80,000 pupils; 3 high schools, including one for colored pupils, with manual training and normal departments; the Baltimore Polytechnic Institute, the Baltimore City College, and the Teachers' Training School. There are also several night schools. The annual public school expenditure is about \$2,000,000. The board of school commissioners consists of 9 members appointed by the mayor for terms of 6 years and serving without pay.

The Peabody Institute for the diffusion of art, science, and general knowledge was founded in 1857 by George Peabody, with an endowment of \$1,500,000. It gives lecture courses, maintains a school of music, art galleries, a reading room, and a library with 160,000 volumes and 18,000 pamphlets. The Enoch Pratt Free Library consists of a central library and several branches, and has some 240,000 volumes. The central library of the latter, as well as the Peabody Institute, is housed in a handsome marble edifice. The New Mercantile Library, founded in 1887, has 75,000 volumes. The Maryland Historical Society has a library of 40,000 volumes and 10,000 pamphlets. Other libraries are: the Archbishop's, the Odd Fellows', the Baltimore Bar, the City, the Baltimore and Ohio Employees' Free Circulating, the Maryland Diocesan (Episcopal), the Maryland Institute, etc. Andrew Carnegie has recently offered to give \$500,000 for buildings for 20 branch libraries to be supported by the city. The Walters Collection, one of the finest private collections of art in America, and particularly rich in modern French masters, is open to the public on stated days, the admission fee going to the poor. The Oriental room contains

## Baltimore

a magnificent collection of Chinese and Japanese art works. The art gallery building is of great dignity and simplicity, in Italian Renaissance style, of white marble, and 120 feet square.

There are published 7 daily newspapers, including 2 in German, besides a number of weeklies and monthlies.

*Industries.*—Among the industries of Baltimore, the manufacture of men's clothing is one of the most important. According to the special United States Census of Manufactures of 1905, this industry employed \$8,947,000 of capital and 8,555 wage-earners, who received \$2,769,000 in wages, used materials valued at \$11,311,000, and turned out a product valued at \$19,565,000. The canning and preserving of fruits and vegetables resulted in a product valued at \$5,982,000, besides the canning of oysters, which is also an important industry; the construction and repair of cars by steam railroads turned out a product valued at \$4,478,000; women's clothing, \$3,065,000; confectionery, \$2,598,000; drugs, \$3,265,000; fertilizers, \$4,657,000; foundry and machine shop products, \$6,573,000; furniture, \$2,854,000; straw hats, \$2,036,000; malt liquors, \$4,185,000; printing and publishing, including newspapers and periodicals, \$4,789,000; shirts, \$5,711,000; slaughtering and meat packing, \$5,037,000; stamped ware, \$2,429,000; tinware, \$5,706,000; tobacco, cigars, and cigarettes, \$4,360,000; bread and bakery products, \$4,483,000. The following industries turned out products valued at over \$1,000,000, but under \$2,000,000: boots and shoes, wooden packing boxes, chemicals, the roasting and grinding of coffee and spice, men's furnishing goods, enameled goods, distilled liquors, lumber and planing mill products, marble and stone work, pianos, patent medicines, canes and umbrellas, and upholstering materials. The industries that turned out products of over \$500,000, but under \$1,000,000, were: baking and yeast powders, linen hose and belting, brick and tile, brooms and brushes, carriages and wagons, manufactured ice, lithographing and engraving, mattresses and spring beds, paints, plumbers' supplies, saddlery and harness, wooden shipbuilding, stoves and furnaces, and structural ironwork. The industrial growth of Baltimore since 1880 is shown in the following:

| Year | Number of Establishments | Capital      | Wage-Earners | Wages        | Cost of Materials Used | Value of Products |
|------|--------------------------|--------------|--------------|--------------|------------------------|-------------------|
| 1880 | 3,680                    | \$38,582,000 | 56,316       | \$15,113,000 | \$47,966,000           | \$78,397,000      |
| 1890 | 5,265                    | 92,724,000   | 76,489       | 29,896,000   | 73,770,000             | 141,724,000       |
| 1900 | 6,359                    | 117,062,000  | 78,738       | 29,220,000   | 87,175,000             | 161,249,000       |



The Census of Manufactures of 1905 was confined to factory industries, to the exclusion of neighborhood and hand trades. Comparing the figures for 1905 with the corresponding figures for 1900, the results are shown in the following table:

| Year               | Number of Establishments | Capital       | Wage-Earners     | Wages        | Cost of Materials Used | Value of Products |
|--------------------|--------------------------|---------------|------------------|--------------|------------------------|-------------------|
| 1900               | 2,273                    | \$107,190,000 | 66,561           | \$23,490,000 | \$75,221,000           | \$135,099,000     |
| 1905               | 2,163                    | 148,764,000   | 65,224           | 25,634,000   | 81,014,000             | 151,547,000       |
| Per cent. increase | 4.7 <sup>1</sup>         | 38.8          | 2.0 <sup>1</sup> | 9.1          | 7.7                    | 12.2              |

<sup>1</sup> Decrease.

In 1905 Baltimore factories constituted 56.2 per cent. of the total number in the State, employed 69.3 per cent. of all the wage-earners, and produced 62.3 per cent. of the total value of products. It should be borne in mind that the great fire (see *History*) occurred shortly before the taking of the 1905 census, so that the figures given do not represent the full strength of the city's normal industrial activity. The decrease in the total number of wage-earners is ascribed to a decrease in the number of women and children employed (10,247 children under 14 in 1900), who were replaced by men receiving higher wages. There are a number of important industries in the vicinity of Baltimore that properly form a part of the city's industrial activity. Thus the cotton-duck mills in its neighborhood are reported to run 150,000 spindles, employ about 3,000 hands, and produce three-fourths of the sail-duck made in the United States. The Maryland Steel Company's works at Sparrow's Point, on the N. bank of the Patapsco river, 9 miles S. of Baltimore, have a daily capacity of 2,000 tons. They were established in 1887 at a cost of \$8,000,000. The ores used are mainly from Cuba, mixed with some from Mediterranean countries, while the coal and coke are derived from Maryland, Pennsylvania, and West Virginia. Besides the building of wooden vessels, mentioned above, there are also in Baltimore two iron and steel shipbuilding plants, of which no statistics have been published, in order not to disclose individual operations. Several vessels of the United States navy have been built here. The Maryland Steel Company also engages in shipbuilding on a large scale, 1,500 men having been employed in 1906 in this branch of its works. Adjacent to Baltimore are the Copper Refining Works and the South Baltimore Car Works, two of the most important Maryland industries.

*Commerce and Transportation.*—The prox-

imity of Baltimore to the Ohio valley and the South, its excellent harbor, and its situation at the head of the magnificent Chesapeake bay, have made it the natural commercial metropolis and outlet for a large section of the country. Its commerce is further facilitated by the Chesapeake and Delaware canal, opened in 1829, across the narrow strip of Delaware, connecting the two greatest bays on the Atlantic coast of the United States, and giving Baltimore a short water route to Wilmington, Del., and Philadelphia. Among the numerous railways entering the city are the Baltimore and Ohio, the Washington, Baltimore, and Annapolis, the Northern Central, and the Philadelphia, Baltimore, and Washington of the Pennsylvania system. The total amount of grain received in 1906 was 39,601,000 bushels; of leaf tobacco, 37,055 hogsheads; of cotton, 28,659 bales; of live stock, 1,329,712 head. Among Atlantic ports, Baltimore ranks next to New York in grain receipts, and leads in the receipts of leaf tobacco and cotton. The domestic shipments of coal by water amounted to 3,414,872 tons in 1906. In the same year the total tonnage movement, both eastward and westward, through the Delaware and Chesapeake canal, amounted to 683,000 tons. The foreign imports rose from \$13,140,000 in 1890 to \$19,045,000 in 1900 and \$30,085,000 in 1906. The exports rose from \$73,984,000 in 1890 to \$115,530,000 in 1900, declined considerably during the succeeding years, but rose again to \$109,925,000 in 1906. As a port of export, Baltimore ranks after New York, Galveston, and New Orleans, leading Boston and Philadelphia. In 1906 the leading imports were: nitrates, valued at \$2,327,000; copper pigs, bars, ingots, etc., \$3,264,000; and iron ores, pigs, and bars, \$7,186,000. Other important imports were china and porcelain, mattings, rice flour and meal, toys, lumber, tin, zinc, manganese ore, sulphur ore, chromate of iron, etc. The leading exports were: copper ingots, bars, and plates, \$27,003,000; cotton, \$9,210,000; corn, \$13,413,000; wheat flour, \$6,877,000; lard, \$7,237,000; cattle, \$5,081,000; and leaf tobacco, \$8,014,000, other important exports being oats, wheat, meat produce, illuminating oil, etc. The tonnage entered from foreign countries amounted in 1906 to 1,549,000 tons, and that cleared, 1,612,000. Over a dozen steamship lines run regularly to and from the leading ports of Europe, including the Norddeutscher Lloyd, the Hamburg-American, and the Red Star Line of Antwerp. Baltimore follows New York and Boston as a point of landing



## Baltimore

for alien immigrants, the number of arrivals having been 62,314 in 1905 and 54,064 in 1906. In the coastwise traffic there are steamship lines to Boston, Providence, New York, Philadelphia, Washington, Norfolk, Richmond, Wilmington, N. C., Charleston, Georgetown, S. C., Savannah, New Orleans, etc. On the bay alone there are nearly a dozen coasting lines. The total tonnage of vessels registered, enrolled, or licensed in the Baltimore customs district, in 1906, was 193,255.

Besides a large number of private and State banks, and loan and trust companies, there were in 1906 18 national banks with a capital aggregating \$12,590,000, surplus and profits, \$8,632,000, and total resources and liabilities, \$98,192,000. The clearing-house transactions increased from \$888,166,000 in 1898 to \$1,432,070,000 in 1906. The security and trust companies have a capital of about \$22,000,000, and a surplus of about \$18,000,000.

*Administration and Public Interests.*—The city is governed by a mayor elected for four years, a bicameral council, and various departments administered by single heads or by boards. The comptroller and surveyor are popularly elected, the register and public printer are appointed by the council, and all the other officials are appointed by the mayor with the consent of the upper branch of the council. The expenditures for 1906 amounted to over \$11,465,500; the funded debt stood at the beginning of 1907 at over \$44,464,000; the productive assets, consisting of the water works (\$8,850,000), electrical subway (\$1,565,000) and sinking funds (\$16,391,671), were valued at over \$26,838,000, leaving a net debt of about \$17,500,000; and the unproductive assets (school houses, parks, jails, police stations, etc.) were estimated at \$20,000,000. The water works were acquired by the city in 1854. The supply is derived from the Gunpowder river, to the N. of the city, and Jones' falls, and is stored in 8 reservoirs with a daily capacity of 300,000,000 gallons, the daily consumption being 175,000,000 gallons. The water from Gunpowder river is conveyed through a tunnel nearly 7 miles long.

At the present time Baltimore is engaged in carrying out one of the most stupendous schemes of municipal improvement ever undertaken on this continent. There has already been appropriated \$10,000,000 for sewers, and as much more may be required; \$1,000,000 towards increasing the efficiency of the fire department; \$1,000,000 for schools; \$2,000,000 for park improvements, including a plan for a boulevard to connect the great parks; \$6,000,000 are being spent on docks, which have been acquired by the city, and on widening the streets around them; and the spending of \$7,000,000 on

## Baltimore

street paving and several millions for electric subways is in progress. The expenditure of \$5,000,000 for an increased water supply is contemplated.

*History and Population.*—In 1608 John Smith explored and mapped Chesapeake bay and its inlets. The first grant of land within the present limits of the city was made, on the S. side of the harbor, to Charles Gorsuch, a Quaker. The first settlement to the N. of the harbor was made in 1682 by David Jones, from whom Jones' falls derives its name. In 1729 a town was laid out by order of the General Assembly to the W. of Jones' falls, and was named Baltimore in honor of the Lords Baltimore, proprietors of Maryland; this is now known as the "New Town," while a later settlement, made in 1732 to the E. of Jones' falls and called Jones Town, is now known as the "Old Town." Another settlement was made in 1729 at Fells Point by William Fells, a ship carpenter and Quaker. Jones Town was annexed to Baltimore in 1745, but even in 1752 there were only 25 houses in the whole town. In 1756 a colony of the deported Acadians settled here, and in 1765 there were 50 houses and about 600 inhabitants. In 1767 Baltimore became the county seat, and in 1773 the first newspaper was published, a stage line to Philadelphia and New York was started, and the first theater performances were given. By 1775 Baltimore contained 564 houses and 6,755 inhabitants, and had become an important port. During the War of the Revolution it was never attacked by the British, though it sent out a large number of privateers, and prospered greatly at the expense of its crippled rivals. During part of the winter of 1776-77 the Continental Congress, which had fled from Philadelphia on the approach of the British, held its sessions here. In 1780 a custom house was established, and in 1781 the first theater was built, which was opened the following year. The population doubled between 1775 and 1790, and in 1792 it was augmented by the settlement of a large body of French refugees from Haiti. In 1796 the Fells Point settlement was joined to Baltimore, which received a city charter. During the wars of the French Revolution and Empire, when a large part of the world's carrying trade was done by Americans, the "Baltimore clippers" became famous. They maintained their reputation during the War of 1812, when they were largely converted into privateers. A British attack by land and sea on Sept. 12, 1814, was repulsed by the valor of the citizens. It was during this attack, while Fort McHenry was being bombarded by the British fleet, that Francis Scott Key, then detained on the British ship "Minden," composed the "Star-Spangled Banner." In 1828 work was begun on the Baltimore and Ohio railroad. In the same



## Baltimore Bird

year the public school system was established. In 1860 the three presidential candidates opposed to Lincoln were nominated here, and in 1864 Lincoln himself was nominated here for a second term. The first blood of the Civil War was shed in the streets of Baltimore on April 19, 1861, when the Union troops on their way through the city were mobbed. On May 13 a Union force under General Butler occupied Federal Hill, and the city remained under martial law to the end of the war.

On Feb. 7 and 8, 1904, the financial and wholesale quarter was devastated by one of the most destructive conflagrations on record. The fire swept away 73 blocks of buildings and 25 isolated sections. The burnt area comprised 140 acres, and the number of buildings burned was 1,343, including 20 banks. The court house, post office, and city hall just escaped, but the Federal building that was being erected on the site of the old custom house was seriously damaged. The total loss was estimated variously at from \$70,000,000 to \$125,000,000. But the citizens were not discouraged by the great calamity. It was announced that no outside aid was needed or wanted. A burnt district improvement loan was issued, and a special commission was appointed to supervise the work of reconstruction. In 1907 the burnt district had been almost completely restored.

The growth of population since the first census has been as follows: 1790, 13,503; 1800, 26,514; 1810, 35,538; 1820, 62,738; 1830, 80,625; 1840, 102,313; 1850, 169,054; 1860, 212,418; 1870, 267,354; 1880, 332,313; 1890, 434,439; 1900, 508,957; 1910 (Fed. census), 558,485. Among the cities of the United States, Baltimore ranked fifth in 1790, third in 1850, seventh in 1890, and sixth in 1900. In the last-mentioned year the population consisted of 243,280 males and 265,677 females. In the ethnical composition of its population, Baltimore is typical of the South rather than of the North. Thus in 1900 the negroes numbered 79,258, constituting 15.6 per cent. of the population, while the foreign born numbered 68,600, constituting only 13.5 per cent. of the population. In the absolute number of its negro inhabitants, Baltimore is second only to Washington, New Orleans following. The most numerous element among the foreign born consisted of 33,208 Germans, followed by 10,493 Russians, 9,690 Irish, 3,832 Austrians, and 3,527 English, Scotch, and Welsh. The death-rate is rather high, averaging about 21 per 1,000, mainly owing to the abnormally high death-rate of the negroes. *Revised by T. J. C. WILLIAMS.*

**Baltimore Bird, Baltimore Oriole, Baltimore Hang-nest, or Baltimore,** a bird of the family *Sturnidæ* (starlings), and the sub-family *Oriolinæ* (orioles). It is the

## Baluchistan

*Oriolus baltimore* of Catesby, now *Icterus baltimorei*. The name Baltimore was applied or attached to this bird not merely because it occurs at the place so called, but, according to Catesby, because its colors, which are black and orange, were the same as those on the coat of arms or livery of the Lord Baltimore who was formerly proprietor of Maryland. The appellation hang-nest, or sometimes hanging bird, is given because it builds a pendulous nest—that is, like a cylindrical pouch, sometimes sewed with horse hair, the curious structure being suspended from the end of a branch or a twig. Another name given to the baltimore is fire bird, because when its bright hue is seen through the green leaves the appearance somewhat resembles a flame of fire. Yet another name is golden robin. It extends from Canada to Mexico, or even to Brazil, migrating to the N. part of this area about May, and to the S. one about the end of August or in September.

**Baltimore, George Calvert, Lord,** an English colonist, born in Yorkshire about 1580; was for some time secretary of state to James I., but this post he resigned in 1624 in consequence of having become a Roman Catholic. Notwithstanding this he retained the confidence of the King, who, in 1625, raised him to the Irish peerage, his title being from Baltimore, a fishing village of Cork. He had previously obtained a grant of land in Newfoundland, but, as this colony was much exposed to the attacks of the French, he left it, and obtained another patent for Maryland. He died (1632) before the charter was completed, and it was granted to his son, Cecil, who deputed the governorship to his brother, Leonard (1606-1647).

**Baltimore, The,** a twin-screw, steel, protected cruiser of the United States Navy; 4,600 tons displacement; length, 372 feet 6 inches; breadth, 48 feet 6 inches; mean draft, 19 feet 7 inches; horse power, 10,064; main battery, four 8-inch and six 6-inch breech-loading rifles; secondary battery, four 6-pounder and two 3-pounder rapid-fire guns, two 1-pounder rapid-fire cannons, four 37-millimeter Hotchkiss revolving cannons and two Gatlings; speed, 20.09 knots; crew, 36 officers and 350 men; cost, \$1,426,504.93. The "Baltimore" conveyed the body of John Ericsson to Sweden in 1889, and took a prominent part in the battle of Manila Bay, May 1, 1898.

**Baltistan, or Little Tibet,** an alpine region through which the Upper Indus flows. It lies below the Karakorum mountains and the Himalayas, with a mean elevation of 11,000 feet, and contains the nameless peak marked K<sup>2</sup>, 28,278 feet high, next to Everest, the highest on the globe.

\***Baluchistan,** a country in Asia, the coast of which is continuous with the N. W. sea-

\* For Map, see PERSIA.



## Balucki

board of India, bounded on the N. by Afghanistan, on the W. by Persia, on the S. by the Arabian Sea, and on the E. by Sind. It has an area of about 160,000 square miles, and a population estimated at 500,000. The general surface of the country is rugged and mountainous, with some extensive intervals of barren, sandy deserts, and there is a general deficiency of water. The country is almost entirely occupied by pastoral tribes under semi-independent sirdars or chiefs. The inhabitants are divided into two great branches, the Baluchis and Brahuïs, differing in their language, figure, and manners. The Baluchi language resembles the modern Persian, the Brahui presents many points of agreement with the Dravidian languages of India. The Baluchis in general have tall figures, long visages, and prominent features; the Brahuïs, on the contrary, have short, thick bones, with round faces and flat lineaments, with hair and beards frequently brown. Both races are zealous Mohammedans, hospitable, brave, and capable of enduring much fatigue. The Khan of Khelat is nominal ruler of the whole land, and in 1877 concluded a treaty with Great Britain, in virtue of which he has become a feudatory of the Empress of India. The right had already been secured of occupying at pleasure the mountain passes between Khelat and Afghanistan; but the new treaty places the whole country at the disposal of the British Government for all military and strategical purposes. Quetta, a town in the N. E., occupying an important position, has been absolutely annexed.

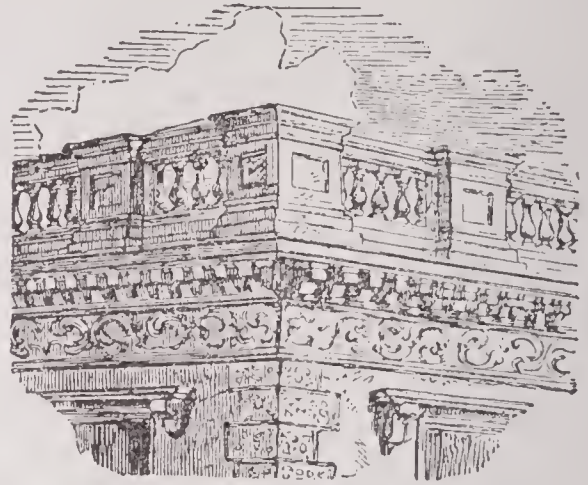
**Balucki, Michael** (bä-löts'kē), a Polish dramatist and novelist, born in Cracow, Sept. 29, 1837. He wrote at first under the pseudonym "Elipidon," and is most popular as a story teller of satirical tendency, ridiculing the shortcomings and prejudices of Polish society. Of his novels may be mentioned "The Awakened" (1864); "The Old and the Young" (1866); "Life Among Ruins" (1870); "The Jewess" (1871); "For Sins not Committed" (1879); "250,000" (1883). The best among his comedies are "The Chase After a Man" (1869); "The Emancipated" (1873); "Amateur Theater" (1879); "The Open House" (1883). He also wrote lyric poetry, and essays on Polish literature.

**Balue, Jean de la** (bäl-ü'), a French Cardinal, born in Poitiers, in 1422; invented an iron cage in which Louis XI. subsequently imprisoned him, for his misdeeds, in 1469-1480. By the influence of Pope Sixtus IV. he was liberated and went to Rome; was sent back to France as legate *a latere*, and, when the Pope died, returned to Rome, where he became Bishop of Orleans and of Præneste. He died in Ancona, in October, 1491.

## Balzac

**Baluster**, a small column or pilaster, of various forms and dimensions, often adorned with moldings, used for balustrades.

**Balustrade**, a range of balusters, together with the cornice or coping which they support, used as a parapet for bridges



BALUSTRADE.

or the roofs of buildings, or as a mere termination to a structure; also serving as a fence or inclosure for altars, balconies, terraces, staircases, etc.

**Baluze, Etienne** (bal-üz), a French historian and miscellaneous writer, born in 1630. For more than 30 years he was librarian to M. de Colbert, and was appointed Professor of Canon Law in the Royal College, but, displeasing Louis XIV. with his "Histoire Générale de la Maison d'Auvergne," he was thrown into prison and his property confiscated. He recovered his liberty in 1713, but did not regain his position, and died in 1718. He left some 1,500 manuscripts in the National Library of Paris, besides 45 printed works, including "Regum Francorum Capitularia" (2 vols.), and "Miscellanea" (7 vols.).

**Balzac, Honoré de** (bälts-ac'), a French author, born at Tours, May 20, 1799. He was educated at the Collège de Vendôme and studied law at the Sorbonne. In opposition to his father's wish that he should become a notary, he left Tours in 1819 to seek his fortune as an author in Paris. From 1819 to 1830 he led a life of frequent privation and incessant industry, producing stories which neither found nor deserved to find readers, and incurring—mainly through unlucky business speculations—a heavy burden of debt, which harassed him to the end of his career. He first tasted success in his 30th year on the publication of "The Last of the Chouans," which was soon afterward followed by "The Magic Skin," a marvellous interweaving of the supernatural into modern life, and the earliest of his great works. After writing several other novels, he formed the design of presenting in the "Human Comedy" a complete picture of modern civilization. All ranks, professions, arts, trades, all phases of manners in town and country,



were to be represented in his imaginary system of things. In attempting to carry out this impossible design, he produced what is almost in itself a literature. The stories composing the "Human Comedy" are classified as "Scenes of Private Life, of Parisian Life, of Political Life, of Military Life," etc. They are connected by a web of intrigue which has the Paris of the Restoration for its center, but which stretches its threads over the provinces. Each of the actors in the brilliant crowded drama is minutely described and clothed with individuality, while the scenes in which they move are set forth with a picturesqueness and verisimilitude hardly to be matched in fiction. Among the masterpieces which form part of Balzac's vast scheme may be mentioned "Lost Illusions," "The Peasants," "The Woman of Thirty," "Poor Relations," "The Quest of the Absolute," and "Eugénie Grandet." The "Droll Stories" (1833) stand by themselves. They are a series of gross stories in the vein of Rabelais, Balzac reproducing with masterly skill the French of the 16th century. Balzac's industry was phenomenal. He represents himself as working regularly for 15 and even 18 hours a day. He wrote 85 novels in 20 years, and he was not a ready writer, being very fastidious in regard to style, and often expending more labor on his proof sheets than he had given to his manuscript. His work did not bring him wealth; his yearly income, even when he was at the height of his fame, is said to have rarely exceeded 12,000 francs. During his later years he lived principally in his villa, Les Jardies, at Sèvres. In 1849, when his health had broken down, he traveled to Poland to visit Madame Hanska, a rich Polish lady, with whom he had corresponded for more than 15 years. In 1850 she became his wife, and three months after the marriage, in August of the same year, Balzac died at Paris. His influence on literature has been deep and many-sided, and novelists with so little in common as Feuillet and Zola alike claim him for their master. He studied character and the machinery of society in a scientific spirit, but he was not content with the photographic reproduction of fact. He was a visionary as well as an analyst, an idealist and a realist in one. The materials acquired by study were shaped and colored by his fiery and teeming imagination. In the "Human Comedy" we see the everyday world reflected in a magic mirror, where the lights are brighter, the shadows darker; where objects stand out in sharper relief, and are sometimes oddly distorted. He strenuously exaggerates in the delineation of character. "Every one in Balzac," says Baudelaire, "down to the very scullions, has genius." His work bears trace of the strain with

which it was produced; it is often coarse, often extravagant, occasionally dull. But few writers give such an impression of intellectual force, and in the power of investing his creations with apparently reality he stands first among novelists. His sister, Laura Surville, whom he loved with a rare affection, and to whom he opened throughout his life all the hopes and sorrows of his heart, wrote his biography (1858). The edition definitive of his works was published in 25 volumes (1869-1875); the last contains his correspondence from 1819 to 1850 (English translation, with memoir, 2 vols., 1879). A supplemental volume is the "History of the Works of Honoré de Balzac," by Lovenjoul (1879). A complete translation was made by Miss K. P. Wormley (1889-1894) and another edition (1899) has been published in Philadelphia.

**Balzac, Jean Louis Guez de**, a noted French essayist and letter writer, born at Angoulême in 1597. His influence upon French prose is usually compared to that of Malherbes upon poetry; the euphony and symmetry of his phraseology, the elegance of his metaphors, served for a long time as models. Under Richelieu he became Royal Councilor, and Historiographer of France, and was one of the most influential members of the Academy from its foundation, likewise a sort of oracle of the Hôtel Rambouillet. Besides his "Letters" (1624), which are elaborate epistles with a definite attempt at style, he wrote "The Prince" (1631), a glorification of absolute monarchy; "The Dotard" (1648); "The Christian Socrates" (1652); and "Aristippus" (1658), the latter intended to portray the ideal statesman. He died on his estate (Balzac), Feb. 18, 1654.

**Bambarra**, one of the Sudan States of Western Africa, lying at the point where 5° W. lon. and 12° N. lat. cross one another. In the E. the country is flat and swampy; but in the W. there are low chains of granite hills. The climate in some parts is intensely hot, but is generally healthy. The land is well watered and fertile. The rainy season is from June to November. Cotton, maize, and yams are raised. The inhabitants, a branch of the Mandigoes, number about 2,000,000, and are superior to their neighbors in intelligence. The principal towns are Sego, Sansandin, Yamina, and Bammako. Many local merchants are very wealthy, and a quite extensive trade is carried on, the natives working articles in gold, ivory, and iron. In 1881 a treaty with the Sultan of Sego opened up the country to French traders.

**Bamberg**, a Bavarian city in Upper Franconia, beautifully situated on the banks of the Regnitz, 3 miles above its confluence with the Main, and 33 miles N.



of Nuremberg by rail. Set in the midst of vineyards, orchards, and hop-gardens, and founded about 769, from 1007 to 1802 it was the seat of independent prince-bishops. The most noteworthy of its 14 churches is the cathedral, a magnificent edifice in the Romanesque style, founded by the Emperor Henry II. in 1004, and thoroughly restored in 1828-1837. It has five towers, and contains, among other monuments, the elaborately carved tomb of the founder and his Empress, Cunigunda. There are several other fine ecclesiastical structures of early date, and opposite the cathedral is the palace (1702) of the former prince-bishops, from one of whose windows Marshal Berthier met his death. St. Michael's Benedictine Abbey (1009) was in 1803 converted into an almshouse. The ruins of the castle of Altenburg, originally the seat of the Counts of Babenberg, and the scene of many important historical events, stand on an eminence  $1\frac{1}{4}$  miles from the town. The educational institutions of Bamberg are numerous. Pop. (1890) 35,815; (1905) 45,483, chiefly engaged in the manufacture of beer which is famous throughout Germany, cotton, cloth, gloves, tobacco, musical instruments, etc. A large export trade in liquorice and garden seeds is carried on. Albrecht Pfister, one of the earliest printers, was practicing his art at Bamberg in 1461.

**Bamberger, Heinrich von**, an Austrian pathologist, born in Prague in 1822; was graduated in medicine in 1847; became Professor of Special Pathology and Therapeutics, first in the University of Würzburg, and, in 1872, in the University of Vienna. Of his numerous publications two have been held in particularly high esteem, "On the Diseases of the Chylopoitic System" (1855), and "Treatise on Diseases of the Heart" (1857). He died in 1888.

**Bambino**, the figure of our Saviour represented as an infant in swaddling clothes. The "Santissimo Bambino" in the Church of Ara Cœli at Rome, a richly decorated figure carved in wood, is believed to have a miraculous virtue in curing diseases.

**Bambocciades** (bäm-böch-äds'), pictures, generally grotesque, of common, rustic, or low life, such as those of Peter Van Laar, a Dutch painter of the 17th century, who, on account of his deformity, was called *bamboccio* (cripple). Teniers is the great master of this style.

**Bamboo**, any species of the botanical genus *bambusa*, and especially the best known one, *bambusa arundinacea*. It is a giant grass, sometimes reaching the height of 40 or more feet, which is found everywhere in the tropics of the Eastern Hemisphere, and has been introduced into the West Indies, the Southern States of

America, and various other regions of the Western world. It has the usual characteristics of a grass—the cylindrical stem, of flinty hardness externally, while soft or even hollow within; the separation of the stem into nodes and internodes; and the inflorescence of a type found in many genera of the order, namely, in great panicles made up of a series of spikes of flowers. In some cases a substance called tabasheer, consisting of pure silica, is found secreted in the nodes.

The uses to which the several species of bamboo are put in the regions where they grow are almost innumerable. In housebuilding they furnish the framework of the sides and roof, with the joists and other parts of the flooring. Villages of such materials are in many cases rendered very difficult of attack by being surrounded by a thick fence of spiny species. Bows, arrows, quivers, the shafts of lances, and other warlike weapons can be made from the stems of bamboo, as can ladders, rustic bridges, the masts of vessels, walking sticks, water pipes, flutes, and many other objects. The leaves are everywhere used for weaving and for packing purposes. Finally, the seeds are eaten by the poorer classes in parts of India; and in the West Indies the tops of the tender shoots are pickled and made to supply the place of asparagus.

**Bambouk**, a country of Senegambia, Western Africa, lying in the angle formed by the Senegal and Faleme rivers. The climate is unhealthful, especially during the rainy season; but the valleys are remarkable for their fertility. Trees common to Western Africa here attain enormous proportions. Vast herds of wild oxen roam the hills, and most of the wild animals of Africa abound. Bambouk has rich iron ore and deposits of gold in its rivers, especially the Faleme. Faranaba and Mandinka are the chief towns. The inhabitants, the Mandingoes, are professedly Mohammedans, but they cling to many pagan superstitions, and are very ferocious.

**Bamian**, a valley and pass of Afghanistan, the latter at an elevation of 8,496 feet, the only known pass over the Hindu Kush for artillery and heavy transport. The valley is one of the chief centers of Buddhist worship, and contains two remarkable colossal statues and other ancient monuments.

**Bammako**. See BAMBARRA.

**Bampton Lectures**, a course of lectures established in 1751 by John Bampton, Canon of Salisbury, who bequeathed certain property to the University of Oxford for the endowment of eight divinity lectures to be annually delivered. The subjects prescribed are mainly connected with the evidences of Christianity, and the lecturer must have taken the degree of M. A. at



Oxford or Cambridge. The first course of lectures was delivered in 1780, and they have been delivered every year since, with the exceptions of 1834, 1835, and 1841. Among the more remarkable lectures were those by Dr. White in 1784, by Dr. Mant in 1812, by Reginald Heber in 1815, Whately in 1822, Milman in 1827, Dr. Hampden in 1832, Mr. Mansel in 1858, and Canon Liddon in 1866. A similar course of lectures, the Hulsean, is annually delivered at Cambridge.

**Ban, Bann, Banne, Bain, or Bane**, a proclamation, public notice, or edict respecting a person or thing.

I. Military and feudal: A proclamation in time of war.

II. Historical. The ban of the empire: A penalty occasionally put in force under the old German Empire against a prince who had given some cause of offense to the supreme authority. Arnulf, Duke of Bavaria, in the 11th century, and Otho, of Wittelsbach, in the 12th century, were thus put under the ban of the empire.

III. Law, etc. Banns (plural): The publication of intended marriages in the Church of England; proclamation that certain parties named intend to proceed to marriage, unless any impediment to their union be proved to exist. Banns of marriage have to be published for three Sundays before the event in the church or chapel where the ceremony is to take place, unless a license is obtained. Marriages may now be solemnized in nonconformist chapels or at the office of the registrar.

**Ban**, in Austro-Hungary: (1) Formerly: A title belonging to the warden of the Eastern Marshes of Hungary. (2) Now: The Viceroy of Temesvar, generally called the Ban of Croatia. The territory he rules over is called a banat or banate.

The name ban in this latter sense was brought prominently before the English public during the war of independence waged by the Magyars of Hungary against Austria in 1849. In that struggle the Slavonians, who constituted nearly half the population of the Austrian Empire, sided with the Germans against the Magyars, one of the most prominent supporters of the Vienna government being the Ban Jellachich of Croatia. His name impressed the English public with a certain measure of awe, for people had but vague conceptions as what a ban might mean, and none but the most audacious ventured to pronounce the word Jellachich.

**Banana**, a fruit originally East Indian, but much cultivated in warm countries over the whole globe. It is now generally regarded as a mere variety of the plantain, although they were formerly ranked by botanists as distinct species, the plantain under the name of *musa paradisica*, and

the banana of *M. sapientum*. The names plantain and banana are somewhat vaguely used in their application to different cultivated varieties, which are very numerous; those called banana have, generally, dark purple stripes and spots on their stems, and the fruit is smaller, less curved, and of a more delicate taste than the plantain, with a soft and luscious pulp. Each fruit is generally about four or five inches long. The banana is always used in a ripe state, and never, like the plantain, as a substitute for bread, unless when the pulp is squeezed through a fine sieve and formed into small loaves, which, when dried, may be kept for a length of time, but which are saccharine, and not farinaceous.

**Banana**, an island in West Africa, N. of the mouth of the Kongo; also a seaport of the Kongo Free State on the island. A few years ago the town was an important commercial station, but after the building of the railroad from Matadi, and the establishment of an ocean steamship line direct to that place, Banana began to decline, and, at last lost all its trading importance when the extensive Dutch firms formerly established there removed their headquarters to Kabinda and Kisanga, in Portuguese territory.

**Banana-Bird**, a bird, *xanthornus icterus*, belonging to the family *sturnidæ* (starlings), and the sub-family *oriolinæ*, or orioles. It is tawny and black, with white bars on the wings. It is gregarious, a multitude of individual nests hanging from the ends of contiguous twigs. It occurs in the West Indies and the warmer parts of Continental America. It has some affinity to the Baltimore bird.

**Bananal**, or **Santa Anna**, an island of Brazil, formed by the river Araguay, in the province of Matto-Grosso. Its length is 200 miles; breadth 35 miles. It is covered with dense forests, and has in its middle an extensive lake. Soil, fertile. Also the name of several small villages in Brazil.

**Banas**, or **Bunas**, the name of three rivers of India. (1) A river of Rajputana, rising in the Aravulli mountains, flows N. E. through Mewar for 120 miles, then S. E., and falls into the Chambal, after a total course of 300 miles; (2) a river which also rises in the Aravulli mountains, and, after a southwestward course of 180 miles, is lost in the Runn of Cutch; (3) a river of Chutia Nagpur, Bengal, has a northwestward course of about 70 miles, and falls into the Sone, near Rampur.

**Banat**, a large and fertile region in Hungary, consisting of the counties of Temesvar, Torontal and Krisso; principal town, Temesvar. The region originally belonged to Hungary; was occupied by the Turks in 1652-1716; and was reunited to Hungary in 1779. The population exceeds 1,500,000.



## Banbury

**Banbury**, a small town of Oxfordshire, on the Oxford canal and the Cherwell, 23 miles N. of Oxford, and 78 N. W. of London by rail. Its strong castle, built about 1125, was demolished during the Great Rebellion, when Banbury was noted for Puritanical zeal. In 1469 the Yorkists were defeated in the vicinity. The town is still famous for its cakes and ale, as in Ben Jonson's day; and it manufactures webbing and agricultural implements. Among the buildings are the parish church (1797) and the town hall (1854).

**Banc**, legally, is a seat or bench of justice, and in this sense has given rise to the expression of the English courts of common law, "sitting in banc," or *in banco* — that is, sitting together on the bench of their respective courts. Since the Judicature Act, 1873, two or more judges sitting together are called a Divisional Court.

**Banca**, an island belonging to the Dutch East Indies, between Sumatra and Borneo, 130 miles long, with a width varying from 10 to 30; pop., 1890, 80,921, a considerable proportion being Chinese. It is celebrated for its excellent tin, of which the annual yield is above 4,000 tons; but it produces nothing else of any importance.

**Banco**, in commerce, a term employed to designate the money in which the banks of some countries keep or kept their accounts, in contradistinction to the current money of the place, which might vary in value or consist of light and foreign coins. The term was applied to the Hamburg bank accounts before the adoption (in 1873) of the new German coinage. The mark banco had a value of 1s. 5½d.; but there was no corresponding coin.

**Bancroft, Aaron**, a Unitarian clergyman, born in Reading, Mass., Nov. 10, 1755; graduated at Harvard, in 1778; became pastor in Worcester in 1785, where he remained nearly 50 years. Besides a great number of sermons his works include a "Life of George Washington" (1807). He was the father of the historian, George Bancroft. He died at Worcester, Mass., Aug. 19, 1839.

**Bancroft, Edward**, an American physician, born in Westfield, Mass., Jan. 9, 1744; early in life ran away from home; became a practicing physician in Guiana; and passed the latter part of his life in England. During the Revolutionary War he is believed to have been a spy for the British. His publications include a "Natural History of Guiana" (1769) and "Researches Concerning the Philosophy of Permanent Colors" (2 vols., 1794-1813). He died in London, Sept. 8, 1820.

**Bancroft, George**, an American historian, born near Worcester, Mass., Oct. 3, 1800. He was educated at Harvard and in

## Bancroft

Germany, where he made the acquaintance of many literary men of note. In 1824 he published a translation of Heeren's "Politics of Ancient Greece," and a small volume of poems, and was also meditating and collecting materials for a history of the United States. Between 1834 and 1840 three volumes of his history were published. In 1845 he was appointed Secretary of the Navy, and effected many reforms and improvements in that department. He was American Minister to England from 1846 to 1849, when the University of Oxford conferred on him the honorary degree of D. C. L. He took the opportunity, while in Europe, to perfect his collections on American history. He returned to New York in 1849, and began to prepare for the press the fourth and fifth volumes of his history, which



GEORGE BANCROFT.

appeared in 1852. The sixth appeared in 1854, the seventh in 1858, the eighth soon after, but the ninth did not appear till 1866. From 1867 to 1874 he was Minister Plenipotentiary at the Court of Berlin. The 10th and last volume of his great work appeared in 1874. An additional section appeared, first as a separate work, in 1882: "History of the Formation of the Constitution of the United States," and the whole came out in six volumes in 1884-1885. He settled in Washington on returning from Germany, in 1875, and died there, Jan. 17, 1891.

**Bancroft, Hubert Howe**, an American historian, born in Granville, Ohio, May 5, 1832. In 1852 he went to California to establish a book business, and began to collect documents, maps, books and MSS. for a complete "History of the Pacific States" from Mexico to Alaska. In 1893 this library numbered 60,000 volumes, to which many additions have been made. His histories are still in preparation. "Literary Industries" (vol. 40, San Francisco, 1890) describes his work.

**Bancroft, Richard**, an English archbishop, born in Lancashire in 1544; studied at Cambridge, entered the Church, and rose rapidly during the reign of Elizabeth till he obtained the see of London in 1597. James I. made him Archbishop of Canterbury on the death of Whitgift. He suppressed the Puritans mercilessly, and they, in return, never ceased to abuse him. He died in 1610.



## Bancroft

**Bancroft, The**, a steel gunboat of the United States navy; built expressly for a practice ship for the cadets of the United States Naval Academy; launched in 1892. Her dimensions are: length, 187½ feet; breadth, 32 feet; mean draft, 11½ feet; horse-power, 1,213; displacement, 839 tons; speed, 13 knots per hour; rig, barkentine; main battery, four 4-inch breech loading rifles; secondary battery, two 6-pounder, two 3-pounder, and one 1-pounder rapid fire guns, besides Gatling guns. The "Bancroft" was named after George Bancroft because of the fact that the United States Naval Academy was established during his administration of the Navy Department.

**Band**, in architecture, is the name given to any flat fascia or ornament which is continued horizontally along a wall, or by which a building is encircled. Bands often consist of foliage, quatrefoils or of simple bricks. Band of a shaft is the molding or suits of moldings by which the pillars and shafts are encircled in Gothic architecture. Several bands are often placed at equal distances on the body of the shaft, when it is long, in which case they are known as shaft-rings.

**Band**, in music, a number of trained musicians in a regiment, intended to march in front of the soldiers and play instruments, so as to enable them to keep step as they move forward; also any similarly organized company of musicians, even though they may in no way be connected with the army; an orchestra. The word is also applied to the subdivisions of an orchestra, as string-band, wind-band, etc.

**Band**, or **Bands**, linen pendants from the neck, forming part of clerical, legal, and academic costume. It is a moot question whether they are a survival of the amice, or immediate descendants of the wide falling collar which was a part of the ordinary civilian dress in the reign of James I. In the Anglican Church they now are seldom worn, except by ultra-low churchmen; but they are in common use with Presbyterian ministers (ordained ministers as distinguished from licentiates). Foreign Catholic ecclesiastics wear black bands with a narrow white border.

**Banda**, a town and district of the North-western Provinces of India. The town stands on a plain on the right bank of the Ken river, 95 miles S. W. from Allahabad, and is a considerable cotton mart. Pop. 28,974. Area of district, 3,061 square miles; pop. (1891) 705,832.

**Bandage**, a surgical wrapper of some kind applied to a limb or other portion of the body to keep parts in position, exert a pressure, or for other purpose. To be able to apply a bandage suitably in the case of an accident is a highly useful accomplishment, which, through the teaching of am-

balance surgery, now so common, may be easily acquired.

**Bandai-San** (ban-dī'san), a volcano in Japan; 140 miles N. of Tokio. Its summit consists of several peaks, the highest of which is 6,035 feet above the ocean and 4,000 feet above the surrounding plain. On July 15, 1888, there was a terrible explosion of steam which blew out a side of the mountain, making a crater more than a mile in width, and having precipitous walls on three sides. The debris of broken rock and dust poured down the slope and over an area of 27 square miles, killing 461 persons and covering a number of villages.

**Banda Islands**, a group belonging to Holland, Indian Archipelago, S. of Ceram, Great Banda, the largest, being 12 miles long by 2 broad. They are beautiful islands, of volcanic origin, yielding quantities of nutmeg. Goenong Api, or Fire Mountain, is a cone-shaped volcano which rises 2,320 feet above the sea. Pop. about 7,000.

**Bandajan**, a pass over a range of the Himalayas, Kashmir State, 14,854 feet above sea level.

**Bandanna**, a variety of silk handkerchief having a uniformly dyed ground, usually of bright red or blue, ornamented with white or yellow circular, lozenge-shaped, or other simple figures produced by discharging the ground color.

**Banda Oriental**, a State of South America, originally settled by Spaniards from Buenos Ayres, claimed by Brazil, but, after a war, made in 1825 into the independent State of Banda Oriental del Uruguay — *i. e.*, Eastern Bank of the Uruguay, now usually called simply URUGUAY (q. v.)

**Banda Sea**, a space of ocean inclosed by islands of the Malay Archipelago; Buru and Ceram on the N.; Timor and the Serawatty Islands on the S.

**Banded Peak**, or **Mt. Hesperus**, a peak of the San Juan Mountains, in Southern Colorado; altitude, 12,866 feet.

**Bandel, Ernst von**, a Bavarian sculptor, born in 1800, at Ansbach; studied art at Munich, Nuremberg, and Rome; and from 1834 lived chiefly at Hanover, engaged off and on, for 40 years, on his great monument of Arminius, near Detmold, 90 feet high, which was unveiled by the Emperor Wilhelm on Aug. 16, 1875. He died near Donauwörth, Sept. 25, 1876.

**Bandelier, Adolph Francis Alphonse**, a Swiss-American archæologist, born in Berne, Aug. 6, 1840; settled early in the United States, where he has done important work under the direction of the Archæological Institute of America. His studies have been chiefly among the Indians of New Mexico and Arizona, Central America and Mexico. He has published many papers on the



subject. He is also the author of "Art of War and Mode of Warfare" (1877); "Social Organization and Government of Ancient Mexicans" (1878); "Tenure of Lands and Inheritances of Ancient Mexicans" (1878); "An Archæological Tour Into Mexico" (1885); a novel of Pueblo Indian life, "The Delight Makers," etc.

**Bandello, Matteo**, an Italian writer of *novelle*, or tales, born about 1480. He was, in his youth, a Dominican monk, and, having been banished from Italy as a partisan of the French, Henry II. of France gave him in 1550 the bishopric of Agen. He left the administration of his diocese to the Bishop of Grasse, and employed himself, at the advanced age of 70, in the completion of his *novelle*. He also wrote poetry, but his fame rests on his *novelle*, which are in the style of Boccaccio, and have been made use of by Shakespeare, Massinger, and Beaumont and Fletcher. He died about 1562.

**Bande Noire** (bänd-nwär), the name given when the Revolution in France had entailed the confiscation of much ecclesiastical property, also many castles and residences of the emigrant and resident nobility, to a number of speculators who bought up the edifices, etc., in order to demolish them and turn their materials to profit. They were so called on account of their disregard of sacred property, of art, antiquity, and historical associations.

**Banderas, Rio de** (ban-dā'ras), a river on the E. coast of Mexico; so called (river of flags) because, when discovered in 1518 by Juan de Grijalva, the natives waved white flags at the end of their spears, in token of friendship.

**Bandettini, Teresa** (ban-det-ē'nē), an Italian poet, born in Lucca, Aug. 12, 1763; was especially gifted in improvising verse. Beginning life as a danseuse, she discovered her poetic talent as if by accident, but came to be known and honored in most parts of her country. She was called the *Amarilla Etrusca*. Of her finished poems, there remain "La Morte de Adanoide," "Il Polidoro," "La Rosmunda," and some shorter pieces. She died in 1837.

**Band Fish** (*cepola*), a genus in the family *cepolidæ*, in the blenny-form division of acanthopterygious fishes. The body is much elongated and laterally compressed, and is covered by very small scales. The dorsal fin is very long, and consists like the anal of soft rays. The tail vertebræ are very numerous, and the whole structure of the body exhibits unusual delicacy, so that specimens are seldom obtained in an uninjured state. All the species inhabit quiet depths, and are unable to contend with waves and currents. The snakelike form and the beauty of their colors make them objects of great interest. One species, the

red band-fish (*C. rubescens*), not uncommon in the Mediterranean, is occasionally cast ashore by storms on the British coasts. It is about 15 inches long. Its brilliant appearance, when seen moving in the water, has suggested the names of fire-flame and red ribbon, by which it is known at Nice. The home of the genus is in Japanese waters.

**Bandhooka**, the name of an Indian shrub, the *ixora bandhuca*, sometimes called the jungle geranium. It has scarlet, or crimson, flowers, and belongs to the order *cinchonaecæ*, or cinchonads.

**Bandicoot**, the *mus giganteus*, the largest known species of rat, attaining the weight of two or three pounds, and the length, including the tail, of 24 to 30 inches. It is a native of India, and is very abundant in Ceylon. Its flesh is said to be delicate and to resemble young pork, and is a favorite article of diet with the coolies. It is destructive to rice fields and gardens. The name is also given to a family of Australian marsupials. The most common species (*perameles nasuta*), the long-nosed bandicoot, measures about one foot and a half from the tip of the snout to the origin of the tail, and in general appearance bears a considerable resemblance to a large, overgrown rat.

**Bandiera** (band-yā'ra), **Attilio** and **Emilio**, two brothers of a Venetian family, lieutenants in the Austrian navy, who attempted a rising in favor of Italian independence in 1843. The attempt was a failure, and they fled to Corfu; but, misled by false information, they ventured to land in Calabria with 20 companions, believing that their appearance would be the signal for a general insurrection. One of their accomplices had betrayed them, and the party was captured at once by the Neapolitan police. Attilio and Emilio were shot along with seven of their comrades in the public square of Cosenza, on July 25, 1844.

**Bandinelli, Baccio**, son of a famous goldsmith of Florence, and one of the best sculptors of his time, was born at Florence in 1493. He was an angry and jealous rival of Michael Angelo, whose grandeur of conception he strove to equal, and who is said to have retaliated his enmity by contempt. His genius, however, secured him many admirers and patrons among persons of distinction, and Pope Clement VII. even bestowed on him an estate. Among his best works, which all exhibit power, vigor, and skilful drawing, are his colossal group of "Hercules," with Cacus at his feet, his "Adam and Eve," his copy of the "Laocoön," and the exquisite *bassi-rilievi* which adorn the choir of the Duomo in Florence, where he died in 1560.

**Bandit**, one who, besides having been banished, has been publicly proclaimed an outlaw, and, having nothing further to hope



## Bandon

from society, or at least from the government which has taken these decisive steps against him, has become a highwayman, or robber of some other type. More generally, any robber, whatever may be the circumstances which have led to his adopting his evil mode of life. As robbers generally find that they can more easily carry out their plans if they go in gangs, the word bandit often occurs in the plural, banditti; there is, however, no reason to believe that this is etymologically connected with band, in the sense of a company of people associated together for some end.

**Bandon**, or **Bandonbridge**, a town of county Cork, Ireland, on the Bandon, 20 miles S. W. of Cork by rail. Bandon was founded in 1608 as a Protestant colony by the first Earl of Cork; was incorporated by James I., and now belongs chiefly to the Duke of Devonshire. Brewing, distilling, and tanning are the chief industries. The river Bandon rises in the Carberry Mountains, and at its mouth forms the harbor of Kinsale. Spenser describes it as "the pleasant Bandon, crowned by many a wood." It has a course of 40 miles, for 15 of which it is navigable to Innishannon, 4 miles below Bandon.

**Bandong**, or **Bandung**, a flourishing commercial town in the center of the western end of Java, in the vicinity of the volcano Gunong Guntour. Since 1864 it has been the capital of a province known as the Preanger Regencies.

**Bandtke** (bänt'ke), or **Bandtkie**, **Jerzy Samuel**, a Polish historian, born in Lublin, Nov. 24, 1768; author of "History of the Polish Nation" (1820); professor in the University of Cracow, in 1811-1835. He died in Cracow, June 11, 1835.

**Bane Berry**, the English name of the *actæa spicata*, a plant of the order *ranunculacææ*, or crowfoots. It is called also herb christopher. The berries are poisonous; with alum they yield a black dye.

**Banér**, **Johan Gustafsson** (bä-när'), a Swedish general in the Thirty Years' War, born in 1596; made his first campaigns in Poland and Russia, and accompanied Gustavus Adolphus, who held him in high esteem, to Germany. After the death of Gustavus, in 1632, he had the chief command of the Swedish army, and, in 1634, invaded Bohemia, defeated the Saxons at Wittstock, Sept. 24, 1636, and took Torgau. He ravaged Saxony again in 1639, gained another victory at Chemnitz, and, in 1640, defeated Piccolomini. In January, 1641, he very nearly took Ratisbon by surprise. He died in 1641.

**Bang**, **Herman**, a Danish novelist, born in 1857. He came into notice about 1879, since which time he has published a number of novels and some poems. "Hopeless Generations" (Haablose Slægter); "Eccentric

## Bangkok

Tales" (Exceentriske Noveller); "Under the Yoke" (Under Aaget); "Ten Years" (Ti Aar); and "By the Roadside" (Ved Veien), are the titles of some of them. The last named is considered the masterpiece.

**Bangalore**, a town of Hindustan, capital of Mysore, and giving its name to a considerable district in the E. of Mysore State. The town stands on a healthful plateau 3,000 feet above sea level, has a total area of nearly 14 square miles, and is one of the pleasantest British stations in India. In the old town stands the fort, reconstructed by Hyder Ali in 1761, and taken by Lord Cornwallis in 1791. Under English administration the town has greatly prospered in recent times. There are manufactures of silks, cotton cloths, carpets, gold and silver lace, etc. Pop. (1901) 159,030. The Bangalore district has an area of nearly 3,000 square miles, of which more than half represent cultivable land. Pop. over 800,000.

**Bangka**, or **Mang-Ka**, a Chinese town on Formosa Island. It is on the Tamsui river, 13 miles from its mouth, near the tea-producing districts. The river is navigable to this point for small steamboats, and a railroad connects the town with Kelung. The British mercantile agencies, for the purchase of tea, have their residence at the neighboring town of Tao-tu-tai.

**Bangkok**, the capital city of Siam, situated on both banks of the Menam, about 20 miles from its mouth, and in 14° N. lat., and 100° 20' E. long. The population is about 600,000, nearly half of whom are Chinese, the others, including Burmese, Annamese, Cambodians, Malays, Eurasians, and Europeans. The foreign trade of Siam centers in Bangkok, and is mainly in the hands of the Europeans and Chinese. The approach to Bangkok by the Menam, which can be navigated by ships of 350 tons burden (large sea-going ships anchor at Paknam, below the bar at the mouth of the river), is exceedingly beautiful. As the town is neared, numerous temples present themselves, and floating houses become common; and, finally, the whole city, with its rich gardens, and shining temples and palaces, bursts full upon the view. Stone buildings are used only for the royal palaces, some noblemen's houses, monasteries, and the dwellings of Europeans. A large number of the houses float on rafts, fastened by ropes to poles; most of the trade of the city is carried on upon the river. The internal traffic of Bangkok is chiefly carried on by means of canals, there being only a few passable streets in the whole city. Horses and carriages are rarely seen, except in the neighborhood of the palaces. The native houses on land—of bamboo or other wood, like the floating houses—are raised upon piles, six or eight feet from the ground, and are reached by ladders. The



## Bangor

circumference of the walls of Bangkok, which are 15 to 30 feet high, and 12 broad, is about 6 miles. Bangkok is the constant residence of the King. The palace is surrounded by high walls, and is nearly a mile in circumference. It includes temples, public offices, accommodation for officials and for some thousands of soldiers, with their necessary equipments, a theater, apartments for a crowd of female attendants, and several Buddhist temples, or chapels. Several of the famous white elephants are kept in the courtyard of the palace. Throughout the interior are distributed the most costly articles in gold, silver, and precious stones. The temples of Bangkok are innumerable, and decorated in the most gorgeous style, the Siamese taking a pride in lavishing their wealth on them. In the neighborhood of Bangkok are iron mines and forests of teakwood. The chief exports are rice, sugar, pepper, cardamoms, sesame, hides, fine woods, ivory, feathers, and edible birds' nests. The imports are tea, manufactured silks and piece goods, opium, hardware, machinery, and glass wares. Among recent evidences of progress may be mentioned the erection of steam mills, the introduction of gas into the royal palaces and many noblemen's houses, and the establishment of a regular mail to Bangkok in 1884. Siam joined the International Postal Union in 1885, and in 1890 a parcel post service (with Singapore and Europe) was established. Bangkok is now connected with Burma and Cambodia by telegraph, and is the center of a local system of (in 1893) 1,780 miles. A short railway at Paknam (on the coast) was opened in 1893; another line of 165 miles was being made; and others to the northern provinces have been surveyed and sanctioned. In 1893, a treaty was concluded at Bangkok, by which Siam made large cessions to France, two French gunboats having forced their way to the capital after an ineffective defense.

**Bangor**, city, port of entry, and county-seat of Penobscot co., Me.; at the junction of the Penobscot and Kenduskeag rivers; on the Maine Central railroad; 140 miles N. E. of Portland. It is at the head of navigation on the Penobscot river; is divided into two parts by the Kenduskeag; and derives excellent power for manufacturing from the Penobscot river, by means of a dam near the water works. The city has direct connection with the Canadian Pacific railway, and also by steamers, with New York, Boston, and important points on the New England coast. Water for domestic, fire, and small manufacturing purposes is also obtained from the Penobscot by the Holly system. Bangor is one of the most important lumber centers in the country, and, besides its many saw, planing, and molding mills, has several wood-pulp mills,

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iron foundries, carriage factories, ship-building yards, agricultural implement works, boot, shoe and moccasin factories, pork packing establishments, etc. It is a trade center for five counties, and is connected by electric railway with their principal cities and towns. In the fiscal year ending June 30, 1900, the imports of merchandise here aggregated in value \$1,266,060; and the exports, \$4,822,376. In 1900 there were 5 National banks; 10 daily, weekly, and monthly periodicals; and an assessed property valuation exceeding \$15,000,000. The total debt was less than \$1,000,000. The principal institution of public note is the Bangor Theological Seminary. The site of the city, called by the Indians Kenduskeag, was visited by the French, who erected a fort here, called Norombega, in 1656. The place was permanently settled in 1769; was incorporated as a town in 1791, and became a city in 1834. Pop. (1900) 21,850; (1910) 24,803.

**Bangorian Controversy**, a controversy stirred up by a sermon preached before George I. in 1717, by Dr. Hoadly, Bishop of Bangor, from the text "My kingdom is not of this world," in which the Bishop contended in the most pronounced manner for the spiritual nature of Christ's kingdom. The controversy was carried on with great heat for many years, and resulted in an enormous collection of pamphlets.

**Bangor-iscoed** (Bangor below the Wood), a Welsh village, beautifully situated, in a fertile and richly wooded country, on the right bank of the Dee, in a detached portion of Flintshire, adjoining the counties of Chester and Salop, 5 miles S. E. of Wrexham; was once the seat of one of the largest monasteries in Britain, founded before 180 A. D., and containing 2,400 monks, in the time of St. Augustine. To distinguish it from Bangor in Carnarvonshire, it is sometimes called Bangor in Maelor.

**Bangor Theological Seminary**, an educational institution in Bangor, Me.; chartered by the Legislature of Massachusetts in 1814; opened in Hampden in 1816; and removed to Bangor in 1819; under the direction of the Congregational Church, but open to all Christian young men. It has a three years' course; grounds and buildings valued at \$125,000; endowments aggregating \$300,000; a library of over 27,000 volumes; about 16 professors and instructors; about 40 students; and \$20,000 annual income.

**Bangs, Heman**, a Methodist Episcopal clergyman, born in Fairfield, Conn., April, 1790; became a member of the New York Annual Conference in 1815; preached in pulpits in New York and Connecticut; was one of the founders of Wesleyan University, in Middletown, Conn., and one of the most effective preachers in his Church. He died in New Haven, Conn., Nov. 2, 1869.



**Bangs, John Kendrick**, an American humorist and editor, born in Yonkers, N. Y., May 27, 1862. He was one of the founders of "Life," and has long been famed for his light verse and humorous stories, among which may be mentioned "New Waggings of Old Tales," with F. D. Sherman (Boston, 1887); "Coffee and Repartee" (New York, 1886); "Mr. Bonaparte of Corsica" (1895); "Water Ghost and Other Stories" (1896); "The Mantel-Piece Minstrels" (1896); "The Bicyclers and Other Farces" (1896); "A Houseboat on the Styx" (1896); "A Rebellious Heroine" (1896), and "The Pursuit of the Houseboat" (1897). He was editor of "Harper's Weekly" in 1898-1900.

**Bangs, Lemuel Bolton**, an American physician; born in New York, Aug. 9, 1842; was graduated at the College of Physicians and Surgeons in 1872; was Professor of Genito-Urinary Diseases in the Post-Graduate Medical School and Hospital of New York, and later at Bellevue Hospital Medical College; and was consulting surgeon to a number of hospitals in New York. He was president of the American Association of Genito-Urinary Surgeons (1895) and the editor of the "American Text-Book of Genito-Urinary Diseases," etc.

**Bangsriings** (*tupaidæ*), a family of arboreal insectivorous mammals, sometimes known as squirrel, or tree shrews. There are two genera — *tupaia*, with numerous species, of which the larger are eight or nine inches long; and *ptilocercus*, with a single species, the Bornean pentail. They are all oriental animals, and range from the Khasia Hills, in India, to Java and Borneo. The fur is soft and glistening, and a long, bushy tail is generally present. They are restlessly active during the day, searching for insects and fruits. Two of the largest species are the tana (*T. tana*), with a feathery tail, in one variety of a bright, golden color; and the ferruginous bangsring (*T. ferruginea*), widely distributed in the Malayan region. The soles of the feet in the latter are plaited like those of geckos, and give the animals a sure grip of a branch.

**Bangweolo** (also called Bemba), a great Central African lake, discovered by Livingstone in 1868, which is 150 miles long by 75 in width, and 3,700 feet above the sea. The Chambese, which flows into it, and the Luapula, which issues from it, constitute the head-stream of the Kongo. The shores are flat, and parts of the lake are mere marsh. In the N. W. part are four large islands, inhabited by the Mboghwa, a race of fishermen and herdsmen. On its S. shore Livingstone died.

**Banialuka** (ban-yä-lö'ka), a town of Bosnia, picturesquely situated on the Verbas, in a fine forest district, 54 miles S. E. of Novi by rail. It is strongly fortified, and,

besides some Roman remains, contains warm baths, 44 mosques, important powder-mills, and about 12,000 inhabitants, of whom some two-thirds are Mussulmans.

**Banian**, or **Banyan**, an Indian trader, or merchant, one engaged in commerce generally, but more particularly one of the great traders of Western India, as in the seaports of Bombay, Kurrachee, etc., who carry on a large trade by means of caravans with the interior of Asia, and with Africa by vessels. They form a class of the Vaisya caste, wear a peculiar dress, and are strict in the observance of fasts and in abstaining from the use of flesh. Hence — Banian days, days in which sailors in the navy had no flesh meat served out to them. Banian days are now abolished, but the term is still applied to days of poor fare.

**Banian Tree.** See BANYAN.

**Banim, John**, an Irish novelist, dramatist, and poet, born in Kilkenny, April 3, 1798; removed to Dublin in 1820, to devote himself to literature. His best work is contained in the "O'Hara Tales" (2 series, London, 1825-1827). His chief novels are "The Nowlans," "Boyne Water," and "The Croppy." His brother, MICHAEL, was associated in his work, and "The Bi' o' Writin' and Other Tales" (1838) is ostensibly a joint composition. A tragedy, "Damon and Pythias," was represented in London in 1821. John died in Kilkenny, Aug. 13, 1842.

**Banim, Michael**, an Irish novelist, born in Kilkenny, Aug. 5, 1796. He claimed to have written 13 out of the 24 books of fiction confusedly associated with the names of John and Michael Banim, and called himself the author of "Crohoore of the Bill Hook," one of the most popular of the "O'Hara Tales;" "The Ghost Hunter" (1833); "Father Connell" (1842), and "The Town of the Cascades" (2 vols., 1864). He died in Booterstown, Aug. 30, 1874.

**Banishment** (the act of putting under ban, proclamation, as an outlaw), a technical term in Scotch criminal law for the punishment of sending out of the country under penalties against return. This punishment was formerly much used in various forms — *e. g.*, banishment to the plantations or colonies; to England (even after the Union); from a particular county in Scotland, etc. Sometimes capital punishment was commuted to banishment for service in a foreign war. The old Scotch doom of deportation was gradually merged in transportation under various British statutes. At present, banishment is still the statutory sentence in cases of celebrating clandestine marriages. The idea of banishment occurs in the ostracism and petalism of Greece, and the relegation, exile, and deportation of



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Rome. It was generally accompanied by forfeiture of civil rights. In England, voluntary banishment was called abjuration.

**Banister, John**, an Anglo-American scientist, born in England; settled in the West Indies, and later in Virginia, in the vicinity of Jamesburg, where he devoted himself to the study of botany. He was a contributor of a catalogue of Virginia plants to Ray's "History of Plants," in 1660. The genus *Banisteria* was named in his honor. His publications include "Observations on the Natural Productions of Jamaica," "The Insects of Virginia," "Curiosities in Virginia," etc. He died in 1692. His son, JOHN, born in Virginia, was educated in England, and studied law there; became Colonel in the Virginia militia; member of the Virginia Assembly; and prominent in the patriotic conventions of the Revolutionary period; was a Representative from Virginia in the Continental Congress in 1778-1779, and one of the signers of the Articles of Confederation. He died near Hatcher's Run, Va., in 1787.

**Banjermassin**, a former Sultanate in the S. E. of Borneo, with an area of 5,928 square miles, and a population of about 300,000, chiefly Mohammedans. Tributary to Holland since 1787, it was annexed on the death of the last Sultan in 1857, and is now governed by the Dutch Resident for the S. and E. of Borneo, who has an assistant at Martapura, where the Sultans formerly lived. Banjermassin is watered by large rivers, and intersected by a chain of mountains, in several parts rising to 3,000 feet. Excellent small arms are manufactured. The products are pepper, wax, edible nests, rattans, benzoin, dragons' blood, coal, iron, diamonds, and gold dust. Banjermassin, the capital of the Residency, is built on the Island of Tatas, about 15 miles from the mouth of the Banjer, or Barito; pop. 30,000. The town is subject to frequent inundations, and the houses are raised on piles, most of the traffic being carried on in boats. The trade, which is considerable, is mostly in the hands of the Chinese, and the imports include piece goods, gunpowder, opium, rice, sugar, salt, Chinese porcelain, silks, and a few horses from Java.

**Banjo**, a musical instrument with five strings, having a head and neck like a guitar, with a body or sounding-board hollow at the back, and played with the hand and fingers. It is the favorite instrument of the plantation negroes of the Southern States and their imitators, and seems to have had its origin in the bandore, a musical instrument like a lute or guitar, invented by John Ross or Rose, a famous violin-maker, about 1562.

**Bank**, primarily an establishment for the deposit, custody and repayment on demand,

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of money; and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. The term is a derivative of the *banco* or *bench* of the early Italian money dealers, being analogous in its origin to the terms *trapezitai* (*trapeza*, a bench or table) applied to the ancient Greek money-changers, and *mensarii* (*mensa*, a table) applied to the public bankers of Rome.

**Divisions.**—In respect of constitution there is a broad division of banks into public and private; public banks including such establishments as are under any special State or municipal control or patronage, or whose capital is in the form of stock or shares which are bought and sold in the open market; private banks embracing those which are carried on by one or more individuals without special authority or charter and under the laws regulating ordinary trading companies. In respect of function three kinds of banks may be discriminated: (1) banks of deposit merely, receiving and returning money at the convenience of depositors; (2) banks of discount or loan, borrowing money on deposit and lending it in the discount of promissory notes, bills of exchange, and negotiable securities; (3) banks of circulation or issue, which give currency to promissory notes of their own, payable to bearer and serving as a medium of exchange within the sphere of their banking operations. The more highly organized banks discharge all three functions, but all modern banks unite the two first. For the successful working of a banking establishment certain resources other than the deposits are, of course, necessary, and the subscribed capital, that is, the money paid up by shareholders on their shares and forming the substantial portion of their claim to public credit, is held upon a different footing to the sums received from depositors. It is usually considered that for sound banking this capital should not be traded with for the purpose of making gain in the same way as the moneys deposited in the bank; and it is, for the most part, invested in government or other securities subject to little fluctuation in value and readily convertible into money. But, in any case, prudence demands that a reserve be kept sufficient to meet all probable requirements of customers in event of commercial crises or minor panics. The reserve of the banking department of the Bank of England is always in coin, or in notes against which an equivalent value of coin and bullion is lying in the issue department. In other English banks the reserve is usually kept partly in gold and partly in government stocks and Bank of England notes; but it sometimes lies as a deposit in the Bank of England. The working capital proper of a bank is constituted



by moneys on deposit, on which the bank may or may not pay interest; the advantages of security, of ease in the transmission of payments, etc., being regarded in the cases of banks little affected by competition as a sufficient return to the depositor. Thus the Bank of England pays no interest on deposits, while the contrary practice has prevailed in Scotland since 1729.

*Methods.*—Of the methods of making profit upon the money of depositors, one of the most common is to advance it in the discounting of bills of exchange not having long periods (seldom more than three months with the Bank of England) to run; the banker receiving the amounts of the bills from the acceptors when the bills arrive at maturity. Loans or advances are also often made by bankers upon exchequer bills or other government securities, on railway debentures or the stock of public companies of various kinds, as well as upon goods lying in public warehouses, the dock-warrant or certificate of ownership being transferred to the banker in security. In the case of a well established credit they may be advanced upon notes of hand without other security. Money is less commonly advanced by bankers upon mortgages on land, in which the money loaned is almost invariably locked up for a number of years. To banks of issue a further source of profit is open in their note circulation, inasmuch as the bank is enabled to lend these notes, or promises to pay, as if they were so much money and to receive interest on the loan accordingly, as well as to make a profitable use of the money or property that may be received in exchange for its notes, so long as the latter remain in circulation. It is obvious, however, that this interest on its loaned notes may not run over a very extended period, in that the person to whom they are issued may at once return them to the bank to lie there as a deposit and so may actually draw interest on them from the bank of issue; or he may present them to be exchanged for coin, or by putting them at once into circulation may ensure a certain number speedily finding their way back through other hands or other banks to the establishment from which he received them. A considerable number of the notes issued will, however, be retained in circulation at the convenience of the public as a medium of exchange; and on this circulating portion a clear profit accrues. This rapid return of notes through other banks, etc., in exchange for portions of the reserve of the issuing bank, is one of the restraints upon an issue of notes in excess of the ability of the bank to meet them. In England a more obvious restraint upon an unlimited

note issue, originating partly in a desire for greater security; partly in the belief that the note augmentation of the currency might lead to harmful economic results in its influence upon prices, is to be found in the bank acts of 1844 and 1845, which impose upon banks of issue the necessity of keeping an equivalent in gold for all notes issued beyond a certain fixed amount. The wisdom of these legal restrictions, which are not uniform throughout the kingdom, and the desirability of the acquisition and control by the State of the whole business of issue, are still matters of debate.

In specific relation to his customer the banker occupies the position of debtor to creditor, holding money which the customer may demand at any time in whole or in part by means of a check payable at sight on presentation during banking hours. For the refusal to cash a check from the erroneous supposition that he has no funds of his customer's in his hands, or for misleading statements respecting the position in which the bank stands, the banker is legally responsible. Moreover, the law regards him as bound to know his customer's signature, and the loss falls upon him in event of his cashing a forged check. In their relations to the community, the chief services rendered by banks are the following: By receiving deposits of money, and massing in sums efficient for extensive enterprises the smaller savings of individuals, they are the means of keeping fully and constantly employed a large portion of the capital of the community which, but for their agency, would be unproductive; they are the means by which the surplus capital of one part of a country is transferred to another, where it may be advantageously employed in stimulating industry; they enable vast and numerous money transactions to be carried on without the intervention of coin or notes at all, thus obviating trouble, risk and expense. The mechanism by which the last of these benefits is secured is to be found in perfection in the clearing-house system.

*History.*—Although banking operations on a considerable scale appear to have been conducted by the ancients, modern banking must be regarded as having had an independent origin in the reviving civilization of the Middle Ages. In the 12th century almost the whole trade of Europe was in the hands of the Italian cities, and it was in these that the need of bankers was first felt. The earliest public bank, that of Venice, established in 1171, and existing down to the dissolution of the republic in 1797, was, for some time, a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a



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public loan. In the early periods of the operations of this bank deposits could not be withdrawn, but the depositor had a credit at the bank to the amount deposited, this credit being transferable to another person in place of money payment. Subsequently deposits were allowed to be withdrawn, the original system proving inconvenient outside the Venetian boundaries. It was, however, less from the Bank of Venice than from the Florentine bankers of the 13th and 14th centuries that modern banking especially dates, the magnitude of their operations being indicated by the fact that between 1430 and 1433, 76 bankers of Florence issued on loan nearly 5,000,000 gold florins. The Bank of St. George at Genoa also furnished a striking chapter in financial history. The important Bank of Amsterdam, taken by Adam Smith as a type of the older banks, was established in 1609, and owed its origin to the fluctuation and uncertainty induced by the clipped and worn currency. The object of the institution (established under guarantee of the city) was to give a certain and unquestionable value to a bill on Amsterdam; and for this purpose the various coins were received in deposit at the bank at their real value in standard coin, less a small charge for recoinage and expense of management. For the amount deposited a credit was opened on the books of the bank, by the transfer of which payments could be made, this so-called bank money being of uniform value as representing money at the mint standard. It bore, therefore, an *agio* or premium above the worn coin currency, and it was legally compulsory to make all payments of 600 guilders and upwards in bank money. The deposits were supposed to remain in the coffers of the bank, but they were secretly traded with in the 18th century till the collapse of the bank in 1790. Banks of similar character were established at Nuremberg and other towns, the most important being the bank of Hamburg, founded in 1619. In England there was no corresponding institution, the London merchants being in the habit of lodging their money at the Mint in the Tower, until Charles I. appropriated the whole of it (£200,000) in 1640. Thenceforth they lodged it with the goldsmiths, who began to do banking business in a small way, encouraging deposits by allowing interest (4d. a day) for their use, lending money for short periods, discounting bills, etc. The bank-note was first invented and issued in 1690 by the Bank of Sweden, founded by Palmstruck in 1688, and one of the most successful of banking establishments. About the same time the banks of England and Scotland began to take shape, opening up a new era in the financing of commerce and industry.

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*Bank of England.*—The Bank of England, the most important banking establishment in the world, was projected by William Paterson, who was afterward the promotor of the disastrous Darien scheme. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 toward carrying on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation, denominated the Governor and Company of the Bank of England. The company thus formed, advanced to the government £1,200,000 at an interest of 8 per cent.—the government making an additional bonus or allowance to the bank of £4,000 annually for the management of this loan (which, in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital has been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000, in 1816, since which no further augmentation has taken place. There exists besides, however, a variable “rest” of over £3,000,000. The charter of the bank was originally granted for 11 years certain, or till a year's notice after Aug. 1, 1705. It was subsequently renewed for various periods in 1697, 1708, 1713, 1742, 1764, 1781, 1800, 1833 and 1844, certain conditions which the bank had to fulfill being specified at each renewal. On this last occasion it was continued till 12 months' notice from 1855. At the same time the issue department of the bank was established as distinct from the general banking department, the sole business intrusted to the former being the issue of notes. By this arrangement the bank was authorized to issue notes to the value of £14,000,000 upon securities especially set apart, the most important of the securities being the sum of £11,015,100 due to the bank by the government, together with so much of the coin and bullion then held by the bank as was not required by the banking department. The bank has since been permitted to increase its issue on securities to £15,750,000, but for every note that the issue department may issue beyond the total sum of £15,750,000 an equivalent amount of coin or bullion must be paid into the coffers of the bank. The Bank of England notes are, therefore, really equivalent to, and at any time convertible into, gold, as it is in the utmost degree improbable that any drain on



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the treasure in the bank will reduce the outstanding notes below £15,750,000. They are (like all English bank-notes) of the value of £5 and upward, and are legal tender throughout England. Notes once issued by the bank and returned to it are not reissued but are destroyed—a system adopted in order to facilitate the keeping of an account of the numbers of the notes in circulation, and so prevent forgery.

In compliance also with the act of 1844 the bank is compelled to publish a weekly account. The following shows the condition of the bank on Dec. 31, 1898: Issue department: notes issued, £44,225,000; securities, £16,800,000; bullion, £27,425,000. Banking department: capital and “rest,” £17,690,000; deposits and post bills, £43,502,000; securities, £42,361,000; notes in the reserve, £16,919,000; and coin in the reserve, £1,913,000.

The total of the notes given out by the issue department is called the issue circulation, the portion of it in the hands of the public being the active circulation, and that still in the banking department being the note reserve. This note reserve represents really the amount of bullion in the issue department available for the use of the banking department. Of the other items in the account it may be noted that the proprietors’ “rest” is a varying surplus increased always by accumulated profits up to April 5 and Oct. 10, when the bank dividends are paid to the shareholders; and that the public deposits, which include sums lodged on account of the customs, inland revenue, etc., increase through revenue receipts until the dividend terms in January, April, July and October. The other or private deposits comprise those of bankers, merchants and other persons. An increase in these private deposits indicates an increase of monetary ease, while a decrease informs us that bankers, merchants and traders have calls upon them for money.

A better indication of the demand for money is furnished, however, by the advances on commercial securities, and it is by this and the condition of the reserve that the bank rate of discount is regulated. When the reserve is high and the advances moderate the discount rate is low, and it is raised according as the reserve falls and advances are more in request, especially during an adverse foreign exchange and drain of gold. Gold is thus restrained from going abroad, and its influx into the country is encouraged. In addition to the profits which the bank may make by ordinary banking business, it receives an allowance for the management of the national debt, etc., at the rate of £300 per million on £6,000,000, and £150 per million on all

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debt above that sum. It also derives a profit from the foreign coin and bullion brought to it, for which it pays £3, 17s. 9d., or 1½d. per ounce less than the real value.

The management of the bank is in the hands of a governor, deputy-governor and 24 directors, elected by stockholders who have held £500 of stock for six months previous to the election. A director is required to hold £2,000, a deputy-governor £3,000, and a governor £4,000 of the stock. The court or board of directors meets every Thursday, when the weekly account is presented.

*Other English Banks.*—The other English banks consist of numerous joint stock and private banks in London and the provinces, many of the provincial establishments of both kinds having the right to issue notes. Private banks in London with not more than six partners have never been prevented from issuing notes, but they could not profitably compete with the Bank of England. The maximum issues of the provincial banks are limited to a certain amount, against which they are not compelled to hold gold in reserve, and they have no power to issue against specie in excess of the fixed circulation. Their actual issues are considerably below this amount. No union can take place between a joint-stock bank and a private bank, or between two joint-stock banks of issue, without one of them losing its issue. In June, 1898, there were reported 90 joint-stock banks, making returns in England and Wales; 3 in the Isle of Man; 11 in Scotland; and 9 in Ireland. There were 29 offices in London of colonial joint-stock banks and 23 offices of foreign banks. The paid-up capital of the English, Scotch, Irish, colonial and foreign joint-stock banks aggregated £138,245,000, and the assets, £1,320,899,000.

In Scotland there are no private banks, the only banks in that portion of the United Kingdom being (1898) 11 joint stock banks of issue, with 1,154 branches. By the act of 1845 new banks of issue were prohibited, a monopoly being given to such establishments as existed in the year previous to May 1, 1845. At the same time the issue of each was limited to the amount of its average circulation during that year, together with the specie held at the head office. Any bank issuing notes in excess of this limit is supposed to hold an equivalent amount of gold. The aggregate circulation, in 1898, was £7,486,000. The Bank of Scotland, established by act of Parliament, in 1695, had for its original capital only £100,000, increased to £200,000, in 1744; but it now has a capital of £1,250,000 paid up. It remained the only bank in Scotland till the Royal Bank of Scotland was established in 1727, with an original capital of £151,000, which has grown to £2,000,000.



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The British Linen Company was incorporated in 1746, for the purpose of promoting the linen manufacture, but soon became a general banking company; capital, £1,000,000. These three banks claim to be, by their charters, banks of limited liability. The total paid-up capital of the Scotch banks, in 1898, was £9,311,000. A large number of one-pound notes circulate in Scotland, thus tending to keep the requirements for gold low. From allowing a moderate rate of interest on money deposited with them, it is not uncommon for depositors in Scottish banks to lodge their money permanently as an investment; and the habit of keeping an account with a banker is much more general in Scotland than in England, branch offices of the banks being very numerous. Several of the Scotch banks have branch offices in London, but, of course, they cannot issue their own notes from these offices. The Scotch banks have enjoyed a high reputation for stability, and though public confidence was somewhat shaken by the failure of the Western Bank, in 1857, and even more rudely by that of the City of Glasgow Bank, in 1878, their shares are generally looked upon as a safe and remunerative investment. Their total deposits amounted to over £96,000,000, in 1898.

The banks in Ireland consist of one public or National bank, the Bank of Ireland, 91 joint-stock and several private banks. The authorized note circulation is arranged on the same footing as that of the Scotch banks. If any bank discontinues its issue and issues notes of the Bank of Ireland, the circulation of the latter may be, to an equal amount, increased. The circulation, in 1898, was £5,657,000. The Bank of Ireland, which was established by charter, in 1783, with similar privileges to those granted to the Bank of England, has lent the greater portion of its capital to government. Its capital is £2,769,230 (or £3,000,000, Irish); it has also a "rest" or reserve of over £1,000,000. The bank allows interest on money deposited for a stated period.

With regard to the banks in British colonies little need be said. All the more important are joint-stock concerns, and they are carried on subject to acts passed by the respective colonial legislatures. Some of them have their headquarters in London, and have been established by English capital. In Canada the banks are not allowed to issue notes of lower denominations than \$5, notes for small amounts up to \$4 being issued by the Dominion government; and the banking laws are such that there is no possibility of holders of bank-notes being losers by them. The total paid-up capital of the Canadian chartered banks, in 1898, was \$62,303,137; assets, \$365,634,052; and liabilities, \$277,407,521.

## Bank

*Bank of France.*—Of all other banks, the Bank of France is second in importance only to the Bank of England. It was established in the beginning of the 19th century, at first with a capital of 45,000,000 francs, and with the exclusive privilege in Paris of issuing notes payable to bearer, a privilege which was extended in 1848 to cover the whole of France. It has numerous branches in the larger towns, a number of these having been acquired in 1848, when certain joint-stock banks of issue were by government decree incorporated with the Bank of France, the capital of which was then increased to 91,250,000 francs, in 91,250 shares of 1,000 francs each. In 1857, the capital was doubled, and, besides this, it has a large surplus capital or rest. Like the Bank of England, it is a bank of deposit, discount, and circulation, and is a large creditor of the State. The government appoints the governor and two deputy governors, who are all required to be stockholders. There is also a body of 15 directors and 3 censors, nominated by the shareholders. The value of its note circulation in 1898 was 3,799,233,000 francs. See BANKS IN THE UNITED STATES.

*Banks for Savings.*—Savings banks are banks established for the reception of small sums so as to be taken advantage of by the poorer classes, and they are carried on entirely for behoof of the depositors. They are of comparatively recent origin, one of the earliest having been an institution in which small sums were received and interest allowed on them, established by Mrs. Priscilla Wakefield, at Tottenham, near London, in 1803. The first savings bank in Scotland was formed in 1810 by the Rev. Henry Duncan, of Ruthwell, Dumfriesshire. In 1814 the Edinburgh Savings Bank was established on the same principles, and the system soon spread over the kingdom. The first act relating to savings banks was passed in 1817. By it all deposits in savings banks, as soon as they reached £50, were placed in the hands of the National Debt Commissioners, who allowed interest on them. In 1824 it was enacted that the deposits for the first year should not exceed £50, nor those in subsequent years £30, the total deposits being limited to £150; also, that no more interest should be paid when the deposits, with compound interest accruing on them, standing in the name of one individual should amount to £200. This enactment is still in force. The interest was fixed in 1880 at £3, depositors to receive £2, 15s. An act of 1833 had provided for the purchase of government annuities by depositors, either for life, or for a term of years; and by the act of 1844, the maximum limit of these was fixed at £30, allowing, however, a husband and a wife to hold separate annuities, each of that amount.



## Bankes

The minimum is £4. These banks are managed by local trustees, unpaid, and having no personal interest in the business. A new class of savings banks, namely, post-office savings banks, was established in Great Britain in connection with the money order department of the post-office, by an act of Parliament, passed in 1861. Any sum not less than a shilling is received, so as not to exceed £30 in one year, or more than £150 in all; and when the principal amounts to £200, the payment of interest is to cease. Interest is paid on every complete pound at the rate of  $2\frac{1}{2}$  per cent. For the deposits the government is responsible, and they may be drawn from any post-office savings bank in the kingdom. Being exceedingly numerous, and very convenient in every way, these savings banks have been a great success, and have caused the transference to them of much of the funds formerly in the trustees' savings banks. The total amount deposited in the latter class of banks in the United Kingdom during the year 1897 was £12,015,556, and in the former, £38,423,140. By an act that came into operation in 1880, any person desiring to invest in government stock any sum of from £10 to £100, can do so through the post-office banks at a trifling cost, and obtain the dividend free of charge. Savings banks are now well known in all civilized countries, and the good they have done is incalculable. In the United States there is an enormous amount of money deposited in them. In Canada there were 814 post-office savings banks in 1898, with 142,289 depositors, and aggregate deposits of \$34,480,938. School savings banks are the most recent institutions of this kind, and have had a marked effect for good.

**Bankes, Henry**, an English statesman and historian; born in London in 1757; member of Parliament, 1780–1826; wrote "Civil and Constitutional History of Rome from the Foundation to the Age of Augustus." He died Dec. 17, 1834.

**Bank Holidays**, days during which banks are legally closed. In the United States they are: Jan. 1, or New Year's Day, a legal, or bank holiday in all the States, except Arkansas, Delaware, Georgia, Kentucky, Maine, Massachusetts, New Hampshire, Rhode Island, and North and South Carolina. July 4, Independence Day, and Dec. 25, Christmas Day, are bank holidays in all the States and Territories of the Union. Thanksgiving Day and public fast days appointed by the President of the United States are also legal, or bank, holidays. Feb. 12, the anniversary of the birth of Abraham Lincoln, is a legal holiday in 9 States. Feb. 22, the anniversary of the birth of Washington, is a legal holiday in all the States save Arkansas, Iowa, and Mississippi. The first Monday in September, Labor Day, is a holiday in nearly all the

## Bank Note

States. Jan. 8, anniversary of the Battle of New Orleans, and Firemen's Day, March 4, are legal holidays in Louisiana. Good Friday is a legal holiday in Florida, Louisiana, Minnesota, and Pennsylvania; and Shrove Tuesday in Louisiana and Alabama. Decoration Day (North) and Memorial Day (South) is observed in the several States. In England and Ireland: (1) Easter Monday. (2) The Monday in Whitsun week, generally called Whit Monday. (3) The first Monday in August. (4) Dec. 26, popularly called Boxing Day. In Scotland: (1) New Year's Day. (2) The first Monday in May. (3) The first Monday in August. (4) Christmas Day.

When one of these holidays falls on Sunday, it is observed on the following day, and a note or check becoming due on a holiday, or a Sunday, is payable on the first business day following.

**Bankiva Fowl**, a fowl living wild in Northern India, Java, Sumatra, etc., believed to be the original of our common domestic fowls.

**Bank Note**, an engraved certificate representing its face value in specie. In the production of bank notes, the principal purpose is to render their forgery impossible, or at least easy of detection. This is sought to be effected by peculiarity of paper, design, and printing. Bank of England notes are printed in one of the blackest and most indelible of inks, on paper expressly made for the purpose by one firm only. It is a handmade paper, remarkable for its strength, lightness, and difficulty of imitation. Its peculiar water mark constitutes one of the chief safeguards of the notes against forgery. No Bank of England notes are issued twice, so that this mark is rarely indistinct, and the paper does not lose its peculiar crispness. Some years ago a self-registering machine was invented for impressing on each note a distinctive mark, known only to the bank authorities. Owing to some of the notes of the Scotch banks printed simply in black ink, having been successfully forged by photography, those issued by them have since 1858 been printed in colored inks, at least two colors being used for each note. In order still further to lessen the risk of forgery, a new kind of note was in 1885 issued by the Bank of Scotland, printed in brown, yellow, and blue. The paper is of a similar kind to that used for the Bank of England notes, with an elaborate and easily recognized water mark. In 1887 the Commercial Bank of Scotland also issued a note of new design, printed in yellow and blue on the face, and with a dark brown device on the back. Foreign bank notes are also printed in colored inks. The actual cost of £1 notes is as nearly as may be one penny each, and of larger notes, only a fraction more.



## Bankruptcy Laws

Between 1837 and 1855 the plan of Perkins and Heath for reproducing an engraved steel plate by the use of the mill and die continued in use in the Bank of England. The pattern is engraved on a soft steel plate, which is then hardened, to transfer the pattern by pressure to a soft steel roller, on which, of course, the pattern is produced in relief; the roller, or mill is then hardened, to reproduce the pattern in the plate from which the printing is to be done; and thus almost any number of plates for all common purposes can easily be produced. In 1855, electrotype printing was introduced by Mr. Smee, with the assistance of the mechanical officials, and since that time, the notes of the Bank of England have been all produced by surface printing from the electrotype. The number of notes produced and issued by this bank sometimes amounts to 300,000 per week. There are 70 or 80 kinds of Bank of England notes, differing in their denominations or values, but similar in the mode of printing. Zincography and lithography are employed by some banks for the printing of their notes; and also acierage, a mode of hardening copper electrotypes with a thin surface of steel.

In the United States, the bank notes at present in circulation are manufactured by the Government Bureau of Engraving and Printing, the paper being made by a private concern, under a patented process, the chief ingredients being a mixture of linen and cotton fiber, into which are introduced threads of silk, so arranged as to be perceptible after the notes are printed. This style of paper is furnished only to the government. Superior skill is exercised in engraving the plates, nearly all parts of them being executed by the geometrical lathe and the ruling machine the work of which it is impossible to imitate successfully by hand. The printing of the notes is done in colored inks of the best quality, sometimes as many as four shades being used. The great expense of the machines used in the engraving, and the superior quality of the work generally, renders successful counterfeiting almost impossible. The notes, when badly worn, are returned to the United States Treasury, other notes being issued in their stead.

**Bankruptcy Laws**, regulations passed by a competent authority with a view to distributing the property of an insolvent equitably among his creditors and free the debtor from further obligation. In England, before 1841, only a tradesman could be a bankrupt. This distinction was then abolished. It was abolished in the United States in 1869. The act "to establish a uniform system of bankruptcy throughout the United States," was passed by both Houses of the 55th Congress, and by the approval of Presi-

## Bankruptcy Laws

dent McKinley, became a law on July 1, 1898. The question had been brought before Congress for a number of years, the issue not being between the political parties, but on the method of legislation, one side favoring the creditor and the other the debtor class. The Nelson bankruptcy bill, which at the first, or special, session of the 55th Congress, passed the Senate, failed to receive the consent of the House. The new law was a compromise between the Nelson bill, calculated chiefly to benefit debtors, and the Torrey bill, which was designed to guard the interests of both creditors and debtors. The adoption of the bill which has become a law was mainly through the long continued efforts of Senator Hoar (Rep., Mass.), aided especially by Senator Nelson (Rep., Minn.), and Representative George W. Ray (Rep., N. Y.). A conference between the two Houses was held, which reached an agreement on June 15, the report being adopted by the House, June 28, by a vote of 133 to 53, present and not voting, 24. All the votes against the bill came from the South and the far West.

The provisions under which a man can be thrown into bankruptcy against his will are as follows: (1) Where a man has disposed of his property with intent to defraud. (2) Where he has disposed of his property to one or more creditors to give a preference to them. (3) Where he has given a preference through legal proceedings. (4) Where a man has made a voluntary assignment for the benefit of his creditors generally. (5) Where a man admits in writing that he is bankrupt. The last two provisions are practically voluntary proceedings. Under the common law, a man is considered insolvent when he cannot pay his debts when they are due; under the new law, he is deemed insolvent only when his property, fairly valued, is insufficient to pay his debts. Only two offenses are cited under the new law: one when property is hidden away after proceedings in bankruptcy have been begun, and the other when perjury is discovered. Discharges are to be denied in only two cases: one, in which either of the offenses detailed has been committed, and the other, when it is shown that fraudulent books have been kept. The term of imprisonment for either of these offenses is not to exceed two years.

The law provides a complete system throughout the United States, and for its administration by the United States courts in place of the different systems formerly in existence in the various States administered by State courts. In bankruptcy proceedings, a bankrupt debtor may turn over all his property to the court, to be administered for the benefit of his creditors, and then get a complete discharge from his debts. A bankrupt may of his own motion



offer to surrender his property to the administration of the United States court and ask for his discharge in voluntary bankruptcy, or creditors may apply to the court to compel a bankrupt to turn over his property to be administered under the act for the benefit of the creditors in voluntary bankruptcy. The bankrupt who has turned over all his property and conformed to the provisions of the act, is entitled to a judgment of court discharging him from any future liability to his creditors.

Extended powers are given by the law for the taking possession and the administration of the assets, among others, to allow and disallow all claims against bankrupt estates; appoint receivers and take the necessary measures for the preservation and charge of the property of a bankrupt; to arraign, try, and punish bankrupts, officers, and other persons, and the agents, officers, and members of the board of directors or trustees, or other similar bodies of corporations for violation of the act; to authorize the business of the bankrupt to be conducted for limited periods; to cause the assets to be collected and reduced to money and distributed, and substantially determine all controversies in relation thereto; to enforce obedience to lawful orders by fine or imprisonment; and to extradite bankrupts from one district to another. As all questions, both of law and fact, in relation to the property or the rights of the various parties, must be decided in the bankruptcy proceeding, it is provided that referees be appointed, who are charged with the duty of hearing the allegations and testimony of all parties, and deciding all such questions that may arise. Each case, as it comes up, is assigned to some referee, whose duty it is to adjudicate and pass upon all such questions arising therein in the first instance, the right being reserved to any parties to appeal from the decision of the referee to the United States District Court. The duties of the referee are substantially of a judicial character, and he occupies much the position of a judge of primary resort, subject to an appeal to the court, and is required to take the same oath of office as that prescribed for judges of the United States courts.

Provision is made in the act for allowing bankrupts to compromise or settle with their creditors by a proceeding known as composition proceedings, whereby, if a bankrupt and a majority of his creditors agree upon some basis of settlement, the same, if approved by the court, shall become binding upon all creditors. The decision of the question as to the approval of compositions and granting discharges to a bankrupt from his debts, is specifically reserved by the act to the judges of the United States courts; but the court, by virtue of its

general powers, may refer such matters to the referee to take testimony and report to the court his opinion thereon. The aim of the act has been to make the expense of the proceedings depend largely upon the amount of the property involved, and the compensation of the referee is fixed substantially at 1 per cent. on the amount distributed to the creditors in ordinary cases, where the assets are distributed by the court, and one-half of 1 per cent. in composition cases, and the trustees who have charge of the actual management of the bankrupt's property receive as compensation such commissions on accounts paid out by them as dividends as the court may allow, not to exceed, however, 3 per cent. on the first \$5,000, 2 per cent. on the second \$5,000, and 1 per cent. on all sums in excess of \$10,000.

**Banks**, in navigation, are shelving elevations in the sea, or the bed of a river, rising to or near the surface, composed of sand, mud, or gravel. When tolerably smooth at the top, they constitute shallows, shoals, and flats; but when rocky, they become reefs, ridges, keys, etc. A good chart always defines them, indicating whether they are sands or rocky. Some sandbanks shift their position by reason of currents, etc., and are especially troublesome.

**Banks, Sir Joseph**, an English naturalist, born in London in 1743. After studying at Harrow and Eton, he went to Oxford in 1760, and formed there among his fellow undergraduates a voluntary class in botany, etc. He was chosen a member of the Royal Society in 1766, and soon after went to Newfoundland and Hudson Bay to collect plants. In 1768, with Dr. Solander, a Swedish gentleman, pupil of Linnæus, and then Assistant Librarian at the British Museum, he accompanied Cook's expedition as naturalist. In 1772 he visited Iceland along with Dr. Solander, and, during this voyage, the Hebrides were examined, and the columnar formation of the rocks of Staffa first made known to naturalists. In 1777 Banks was chosen President of the Royal Society, in 1781 was made a Baronet, and in 1795 received the Order of the Bath. He wrote only essays, papers for learned societies, and short treatises. He died in 1820, and bequeathed his collections to the British Museum.

**Banks, Nathaniel Prentiss**, an American legislator and soldier, born in Waltham, Mass., Jan. 30, 1816. At first a factory worker, he studied law, and became successively a member of the State and National Legislatures. He was Speaker of Congress in 1856, and in 1857, 1859, and 1861 was elected Governor of his native State. On the outbreak of the Civil War, he took a command in the army, at first on the Potomac, then at New Orleans, and finally on the Red river. Relieved of his command in



## Banks

1864, he re-entered Congress, voting mainly with the Republican party. He died in Waltham, Sept. 1, 1894.

**Banks, Thomas**, an English sculptor, born in 1735. He studied sculpture in the Royal Academy, and in Italy, where he executed several excellent pieces, particularly a bas-relief representing Caractacus brought prisoner to Rome, and a Cupid catching a butterfly, the latter work being afterward purchased by the Empress Catharine. On leaving Italy, he spent two unsatisfactory years in Russia, and then returned to England, where he was soon after made an Academician. Among his other works was a colossal statue of "Achilles Mourning the Loss of Briseis," in the hall of the British Institution, and the monument of Sir Eyre Coote, in Westminster Abbey. He died in 1805.

### Banks and Banking in the United States.

A bank is an institution for dealing in money and credit. The description given by Prof. Charles F. Dunbar is that "A bank may be described in general terms as an establishment which makes to individuals such advances of money or other means of payment as may be required and safely made, and to which individuals entrust money or the means of payment when not required by them for use." Under this general definition fall many different classes of banks:

*Commercial banks*, which receive deposits to be repaid on demand and lend on the promissory notes of business men, maturing at intervals of four months or less.

*Banks of issue*, which issue notes to circulate as money.

*Savings banks*, which receive deposits, usually to a lower customary minimum than commercial banks, and repayable only on notice, and which invest such deposits in securities which afford the means of paying interest on deposits.

These distinctions represent in a broad way the leading types of business done by banks, but the extension of credit in modern times has been so great, and the methods of employing it have become so varied, that there is a specialization of banking functions which has resulted in many other types of banks dealing in corporate securities, and in other directions. See TRUST COMPANIES.

The theory and history of banking are usually discussed from the standpoint of note-issue and commercial banking. Banks which issue notes are usually commercial banks also, but there are many commercial banks which do not issue notes. This is especially the case in Europe, where the note-issuing function is practically limited in England, France, Germany, Austria-Hungary, Russia, Spain and other countries to a single large institution, more or less con-

## Banks and Banking in the United States

trolled by the government. In the American Colonies prior to the Revolution, various experiments were made in banking, but without notable success. What is usually characterized as the first commercial bank, organized upon modern principles, is the Bank of North America, which was given a charter by the Continental Congress, May 26, 1781. Robert Morris (*q. v.*), the financier of the Revolution, was the chief founder, and the capital of the bank was \$400,000. The charter was confirmed by the State of Pennsylvania, April 1, 1782, and under this charter the bank continued to operate until absorbed into the national banking system in 1863.

*The Bank of the United States.*—One of the first needs which suggested itself to Alexander Hamilton in organizing the financial system of the new Federal Government was a National Bank. In accordance with his recommendation, the first "Bank of the United States" was incorporated in 1791, with a capital of \$10,000,000. This bank issued circulating notes, discounted commercial paper, made loans to the Government in anticipation of the revenues, and otherwise aided the Government in its financial operations. When the charter of the bank expired in 1811, party opposition prevented its renewal, although the coming war with Great Britain made its services highly desirable. The financial condition of the Government became so bad during the war that the second "Bank of the United States" was chartered in 1815. The capital was \$35,000,000. The Government subscribed one-fifth and had the privilege of naming five of the twenty-five directors. The bank was not well managed during its early career, but in 1835 had attained a circulation of \$23,075,422; loans of \$59,232,445; and deposits of \$5,061,456. The bank was driven to the wall by the resolute hostility of President Jackson, who, in 1833, suspended the deposit of public money in its custody. This measure, known as the "removal of the deposits," was the subject of a bitter political controversy, in which Clay, Webster, and others opposed Jackson, but he was supported by the people. The Federal charter of the bank expired in 1837. A charter was obtained by President Nicholas Biddle from the State of Pennsylvania, under which the bank continued to do business, but it was not successful, and in 1841 went into liquidation.

*The State Banks.*—After the expiration of the charter of the Bank of the United States, the country was served by banks chartered under State laws. These State banks had been from the beginning serious competitors of the Bank of the United States, but the laws of the States differed greatly among themselves. Some of the States authorized the issue of notes upon



**Banks and Banking in the United States**

State bonds, many of which proved worthless. The New England banks, however, were organized upon a system which required the prompt redemption of their notes at par, and adopted in 1824 what was known as "the Suffolk System" of redemption. This system provided for the deposit in the Suffolk Bank in Boston of a redemption fund by each bank, from which the notes were redeemed and afterwards sent home by the Suffolk Bank for collection. This system, with slight modifications, continued in successful operation until 1858. The circulation of the New England banks in 1858 was less than \$40,000,000, and the redemptions in the course of the year through the Suffolk Bank were \$400,000,000. It was the essential merit claimed for the system that this frequency of redemption not only applied a constant test of solvency to the issues of the banks, but kept the volume of the circulation constantly adjusted to business conditions. The State Bank of Indiana was among the most successful of the State banks. This bank had an exclusive charter for issuing bank-notes, and had branches at important points throughout the State. Under the management of Hugh McCulloch, afterwards Secretary of the Treasury, it weathered the crisis of 1857 without suspending specie payments, and retired its circulation when gold went to a premium in 1862. Another system, which attracted attention because it became the basis of the national banking system, was the free banking system of New York. This system authorized the issue of circulating notes upon the deposit of certain bonds with State officials. Differing systems of note-issue in different States were not adapted to the closer bonds of trade and communication which followed the extension of railways. The circulation of the State banks was largely local. Notes issued outside a State could not safely be received by banks within the State without careful scrutiny as to the responsibility of their issuers. The systems prevailing in New England, in Louisiana, in Ohio, and in Indiana, were eminently successful, and proved the soundness of the issue of bank notes upon the general assets of a well-conducted commercial bank. The speculation which was fostered by loose banking laws in some other States, and the need for uniformity, cast a certain degree of discredit upon the State banks, however, and prepared the way for the acceptance of the national banking system in 1864. The growth of the capital and business of the State banks is indicated by the increase of their note issues from \$98,608,711 in 1845, to \$186,952,223 in 1855, and \$193,306,818 in 1859. The increase in number of banks, capital stock and loans and deposits for representative years appears in the table below:

**Banks and Banking in the United States**

| Year. | No. of Banks. | Capital Stock. | Loans and Discounts. | Deposits.    |
|-------|---------------|----------------|----------------------|--------------|
| 1835  | 704           | \$231,250,337  | \$365,163,834        | \$83,081,365 |
| 1845  | 707           | 206,045,969    | 288,617,131          | 88,020,646   |
| 1850  | 824           | 217,317,211    | 364,204,078          | 109,586,595  |
| 1855  | 1,307         | 332,177,288    | 576,144,758          | 190,400,342  |
| 1860  | 1,562         | 421,880,095    | 691,945,580          | 253,802,129  |
| 1863  | 1,466         | 405,045,829    | 648,601,863          | 393,686,226  |

*The National Banking System*, although often attributed entirely to the unsatisfactory character of the circulation under the State systems, was due in a large measure to the necessities of the Federal Government during the Civil War. When it was found difficult to float Government bonds at favorable rates, Secretary Chase conceived the plan of creating a compulsory market for the bonds by giving special privileges to banks to be organized under Federal charters, upon the condition that they could issue circulating notes only when secured by the deposit of Government bonds. Even this tempting offer, however, made by the Act of February 25, 1863 (supplemented by the Act of June 3, 1864), did not give predominance to the national banks. The hold of the State banking systems was so strong upon the commercial community that it became necessary to provide for imposing a tax of 10 per cent. upon the face value of the notes of State banks paid out by them after July 1, 1866. This inevitably drove the State banks out of the note-issuing business. Some of them were converted into national banks, while others renounced the privilege of note-issue in order to continue their commercial business under State laws. The result was a phenomenal growth in the national banking system, which is illustrated by the organization in 1864 of 453 national banks, with an aggregate capital of \$79,366,950, and in 1865 of 1,014, with an aggregate capital of \$242,542,982. The distinctive feature of the national banking system was the provision in regard to the issue of circulating notes upon United States bonds. The law provided that any national bank desiring to issue notes should deposit with the United States Treasurer bonds of the United States to an amount not exceeding its capital stock, and that upon such bonds it might receive circulation equal to 90 per cent. of their par value. Such notes were to be taxed at the rate of 1 per cent. per annum. In a technical sense, the banks derived from the provision for circulation the benefit of what their critics described as "double interest." They were credited with the interest on bonds which were in the custody of the Treasury Department, and they were also able to lend their notes at interest. From this apparent profit, however, there were several deductions to be made: First, was the fact that notes could not be issued to the full par value of the bonds; second, was the tax of 1 per cent. upon circulation, reducing by that amount the profit



which would be earned, other things being equal; and third, were the amounts in gold or other lawful money required to be set aside for redemption purposes and for reserves. The element of the price of the bonds in the market proved to be an important factor in affecting the volume of circulation. The limit originally imposed upon the circulation of the national banks was \$300,000,000. This was increased in 1870 by a sum of \$54,000,000, and in 1875 the limit was removed. The circulation reached \$362,651,169 on January 1, 1883, but afterwards declined materially as the price of bonds rose. The fact that circulation could be issued to only 90 per cent. of the par value of the bonds greatly reduced the net profits on circulation when the price of 4 per cent. bonds rose in 1889 above 129, and other classes of bonds correspondingly. The circulation of bank notes fell as low as \$173,078,585 on January 1, 1892, but afterwards increased somewhat as the result of new issues of bonds in 1894, 1895, 1896 and 1898. The most vigorous stimulus to bank circulation was applied by the gold standard law of March 14, 1900. This law permitted national banks to issue circulation to the full par value of the bonds deposited, and reduced the tax upon circulation from 1 per cent. to one-half of 1 per cent. in the case of circulation which was secured by the new 2 per cent. refunding bonds, which were authorized by this law. Under this stimulus the volume of notes outstanding, secured by bonds, which stood on October 31, 1899, at \$207,920,774, reached, October 31, 1900, \$298,829,004; October 31, 1901, \$328,198,613; October 31, 1902, \$335,783,189; October 31, 1903, \$380,650,821; October 31, 1904, \$424,530,581; July 31, 1905, \$471,615,771. An important provision of the Act of March 14, 1900, was the authority then first given to incorporate national banks with a capital of \$25,000. The previous minimum limit had been \$50,000. Under this provision there were incorporated to October 31, 1904, 1,437 national banks with capitals of less than \$50,000, with aggregate capital of \$37,459,500, of which 159 banks were conversions of State and private institutions, 464 were reorganizations, and 814 were new institutions. One influence contributing to stimulate bank note circulation was the fact that after the suspension of the purchase of silver for coinage purposes in 1893, there remained substantially only two methods of increasing the volume of money in the country to meet the growth of business. One of these was the increase of the gold currency by the importation and production of gold, which carried the volume of gold money in the country from \$597,697,685 on July 1, 1893, to \$1,326,722,701 on July 1, 1904. The other was the increase in bank notes in cir-

ulation, which carried the amount during the corresponding dates from \$178,713,872 to \$433,595,888. The increase of about \$985,000,000 in these two elements of the circulation more than represented the increase in the net circulation of all kinds of money in the hands of the people, after the deduction of the amounts in the Treasury, which had also increased.

The subject of banking has thus far been discussed chiefly with reference to the function of note-issue, but this has become of less importance in commercial countries, as other methods of transferring credit have attained a wide development. This has not only been true of the national banks themselves, but has accounted for the development alongside the national banking system of State banks, private banks, and trust companies, which have not had the privilege of note-issue. The aggregate resources of all the banks in the United States have enormously increased in recent years without reference to the increase in the issue of notes. The following table shows the increase in the chief items of the accounts of national banks for representative years at the dates of the reports nearest to the beginning of the year:

| Year. | No. of Banks. | Loans and Discounts. | Individual Deposits. |
|-------|---------------|----------------------|----------------------|
| 1865  | 638           | \$166,448,718        | \$183,479,636        |
| 1870  | 1,615         | 688,875,203          | 546,236,881          |
| 1875  | 2,027         | 955,862,580          | 682,846,607          |
| 1880  | 2,052         | 933,543,661          | 755,459,966          |
| 1885  | 2,664         | 1,234,202,226        | 987,649,055          |
| 1890  | 3,326         | 1,811,686,981        | 1,436,402,685        |
| 1895  | 3,737         | 1,974,623,974        | 1,695,489,346        |
| 1897  | 3,661         | 1,901,160,110        | 1,639,688,393        |
| 1899  | 3,590         | 2,214,394,838        | 2,225,269,813        |
| 1900  | 3,602         | 2,479,819,494        | 2,380,610,361        |
| 1901  | 3,942         | 2,706,534,643        | 2,623,997,521        |
| 1902  | 4,291         | 3,038,255,447        | 2,964,417,965        |
| 1903  | 4,666         | 3,303,148,091        | 3,527,872,796        |
| 1904  | 5,180         | 3,469,195,044        | 3,300,619,898        |
| 1905  | 5,477         | 3,772,638,941        | 3,707,706,530        |

The consolidated returns of State and private banks, savings banks, and loan and trust companies in the United States show a growth within a few years, which is illustrated by the following table of the principal items of their accounts:

| Items.              | 1897.         | 1904.         |
|---------------------|---------------|---------------|
| Capital stock.....  | \$380,090,778 | \$625,116,824 |
| Surplus and Profits | 382,436,990   | 779,241,781   |
| Loans .....         | 2,231,013,262 | 4,360,209,382 |
| Deposits .....      | 3,324,254,807 | 6,688,107,157 |
| Total Resources...  | 4,258,677,065 | 8,542,839,386 |

The total banking power of the United States, as computed by the Comptroller of the Currency, increased between 1890 and 1904 from \$5,150,000,000 to \$13,826,600,000, and the banking power of foreign countries from \$10,835,000,000 to \$19,781,100,000, representing an increase for the entire world from \$15,985,000,000 to \$33,607,700,000—or an increase for the world of 110 per cent. during the short interval of fourteen years.

Recent general works on banking in the



## Banks Land

United States are: Dunbar, "Chapters on the Theory and History of Banking" (1892); White, "Money and Banking" (2nd ed., 1902); "Report of the Monetary Commission of the Indianapolis Convention" (1898); Noyes, "Thirty Years of American Finance" (1898); Dewey, "Financial History of the United States (1902); Conant, "A History of Modern Banks of Issue" (1896). See also BANK; BANK NOTE; CREDIT; CURRENCY; INTEREST; MONEY.

CHARLES A. CONANT.

**Banks Land**, an island in the W. of Arctic America, discovered by Parry in 1819, explored by MacLure in 1850, and named by him Baring Island. It is separated by Banks Strait from Melville Island, lying to the N. W., and by Prince of Wales Strait from Prince Albert Island, lying eastward.

**Bann**, two rivers in the N. E. of Ireland—the Upper Bann, flowing into, and the Lower Bann, out of, Lough Neagh. The Upper Bann rises in the Mourne Mountains, and runs 25 miles N. N. W. through the counties of Down and Armagh. The Lower Bann, strictly the continuation of the Upper, issues from the N. W. corner of Lough Neagh, and flows 40 miles N. N. W., through Lough Beg, dividing the counties of Antrim and Londonderry. It runs past Coleraine, into the Atlantic Ocean, 4 miles S. W. of Portrush. It has important salmon and eel fisheries. Vessels of 200 tons can reach Coleraine by the river, 4 miles from the ocean.

**Bannatyne Club**, a literary society instituted in Edinburgh (1823) by Sir Walter Scott (its first president), David Laing (secretary till its dissolution in 1865), Archibald Constable, and Thomas Thomson. It started with 31 members, subsequently extended to 100, having as its object the printing of rare works on Scotch history, literature, geography, etc. It derived its name from George Bannatyne (1545-1609), the collector of the famous MSS. of early Scottish poetry.

**Banneker, Benjamin**, an American negro mathematician, born in 1731. At the age of 50 he began the study of mathematics for astronomical purposes. He published annually after 1792 an almanac devised by himself. He aided in determining the boundaries of the District of Columbia. He died in 1806.

**Banner**, in heraldry, a flag, generally square, painted or embroidered with the arms of the person in whose honor it is borne, and of such a size as to be proportionate to his dignity. Theoretically, the banner of an emperor should be six feet square, that of a king five feet, that of a duke four feet, and that of a nobleman from

## Banns of Matrimony

a marquis to a knight banneret inclusive, three feet. No one under the rank of a knight banneret is entitled to a banner. A feudal banner is a square flag in which the arms of a deceased person are paneled, but with the helmet, mantle and supporters absent. When all the quarterings of the person who is dead are present, and the edge fringed, it is called a great banner. See ENSIGN; FLAG; STANDARD.

**Banneret**, an abbreviation for knight banneret; a member of an ancient order of knighthood which had the privilege of leading their retainers to battle under their own flag. They ranked as the next order below the Knights of the Garter, only a few official dignitaries intervening. This was not, however, unless they were created by the King on the field of battle, else they ranked after baronets. The order is now extinct, the last banneret created having been at the battle of Edgehill, in 1642, for his gallantry in rescuing the standard of Charles I.

**Bannock**, a tribe of North American Indians belonging to the Shoshoni stock. They are divided into two sections, one inhabiting part of Nevada, and the other part of Montana. Their language is entirely distinct from that of the other Shoshoni, and they are probably of a different race, affiliated by intermarriage. In 1839 the Southern Bannock were about 8,400 in number. Assigned, in 1869, to the Wind River reservation, all those who remained with the Shoshoni in Idaho were placed at Fort Hall, in 1874. Of the Northern Bannocks only 350 remained in 1869. In 1893 the whole tribe numbered about 600.

**Bannockburn**, a village of Stirlingshire, Scotland, 3 miles S. S. E. of Stirling, on the Bannock Burn, a little affluent of the Forth. It is an important seat of the woollen manufacturers, especially of carpets and tartans. Tanning is carried on to some extent, and the neighboring villages are noted for the manufacture of nails; while coal abounds in the vicinity. In the great battle of Bannockburn, fought on June 24, 1314, Robert Bruce, with 30,000 Scotch, gained a signal victory over Edward II., with 100,000 English, and secured his throne and the independence of Scotland. The English are said to have lost 30,000, and the Scotch 8,000 men. The "Bore Stone," on which Bruce is said to have fixed his standard on that eventful day, is still to be seen on an eminence; and near it is a flagstaff, 120 feet high, erected in 1870. Not far off was fought the battle of Sauchieburn.

**Banns of Matrimony**, public notice of the intended celebration of a marriage given either by proclamation, *viva voce*, by a clergyman, session clerk, or precentor in



## Banquette

some religious assembly, or by posting up written notice in some public place.

**Banquette** (bäng-ket'), in fortification, the elevation of earth behind a parapet, on which the garrison or defenders may stand. The height of the parapet above the banquette is usually about 4 feet 6 inches; the breadth of the banquette from  $2\frac{1}{2}$  or 3 feet to 4 or 6 feet, according to the number of ranks to occupy it. It is frequently made double, that is, a second is made still lower.

**Banquo**, a famous Scottish thane of the 11th century. In conjunction with Macbeth, cousin of Duncan, the King, he obtained a victory over the Danes, who had landed on the Scottish coast. Macbeth, shortly afterward, violently dethroned Duncan, and caused him to be secretly assassinated. Banquo, though not an accomplice, was a witness of the crime: and being subsequently regarded by Macbeth with fear and suspicion, the latter invited him and his son to supper, and hired assassins to attack them on their return home during the darkness of night. Banquo was slain, but the youth made his escape. Shakespeare has interwoven this occurrence with the theme of his tragedy of "Macbeth."

**Banshee**, a fay, elf, or other supernatural being, supposed by some of the peasantry in Ireland and the Scottish Highlands to sing a mournful ditty under the windows of the house when one of the inmates is about to die.

**Bantam**, an old and decayed town of the Island of Java, and, until of late years, one of the most famous trading marts in the Farther East, belonging to the Dutch. Its bay, formerly a great rendezvous of European shipping, is now choked up by coral reefs. The Dutch abandoned it in 1817 for the more elevated station of Serang, or Ceram, 7 miles inland.

**Bantam**, a variety of the common domestic fowl, originally brought from the East Indies, and supposed to derive its name from the above town. It is remarkable for its small size, being only about one pound in weight, and for a disposition more courageous and pugnacious than even that of a game-cock.

**Banteng**, **Bos Banteng**, or **Sondaicus**, a wild species of ox, native of Java and Borneo, having a black body, slender, white legs, short, sleek hair, sharp muzzle, and the back humped behind the neck.

**Banting**, **William**, an Englishman of notable corpulence, born in 1797, who, by adopting a simple diet was able to relieve himself of his superfluous flesh. He wrote a pamphlet called "A Letter on Corpulence" (1863), describing his system, which attracted so much attention that the word "to bant" has been incorporated in the

## Banvard

English language to express the reduction of obesity by diet. The dietary recommended was the use of butcher's meat principally, and abstinence from beer, farinaceous food, and vegetables. He died in 1878.

**Bantry Bay**, a deep inlet in the S. W. extremity of Ireland, in County Cork. It is 25 miles long, running E. N. E. with a breadth of 4 to 6 miles. It is one of the finest harbors in Europe, affording safe and commodious anchorage for ships of all sizes. Here a French force attempted to land in 1796. The coast around is rocky and high.

**Bantu**, the ethnological name of a group of African races dwelling below about 6° N. lat., and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Kongo, etc., but not the Hottentots. The term Bantu is also used to denote the homogeneous family of languages spoken in Africa throughout the vast region lying between Kamerun, Zanzibar, and the Cape of Good Hope, with the exception of the Hottentot, Bushmen, and Pigmy enclaves. Ba-ntu, in almost all of these languages, signifies "the people," and hence is applied to the whole linguistic family. The Bantu family, although divided into hundreds of dialects, is evidently derived from one mother tongue.

**Banu**, or **Bannu**, a district in the Punjab, British India, division of Darajot; about lat. 33° N., long. 71° E.; area, 1,680 square miles; population (1901) 231,485. The district is watered by the Indus, which here, during inundations, becomes a vast body of water, many miles in width. Nearly all the inhabitants are Mohammedans. Agriculture thrives, especially in the cultivation of the ordinary cereals, sugar cane, cotton, and various oil seeds. The chief towns are Edwardesabad, Trakhel and Kalabagh, each with less than 10,000 population.

**Banvard**, **John**, an American artist, poet, and dramatist, born in New York about 1820; was best known by his panorama of the Mississippi river, covering 3 miles of canvas, which was exhibited in the chief cities of Europe and America. He wrote a great number of poems; several plays: "Banvard, or the Adventures of an Artist" (1849); "Pilgrimage to the Holy Land" (1852), etc. He died in 1891.

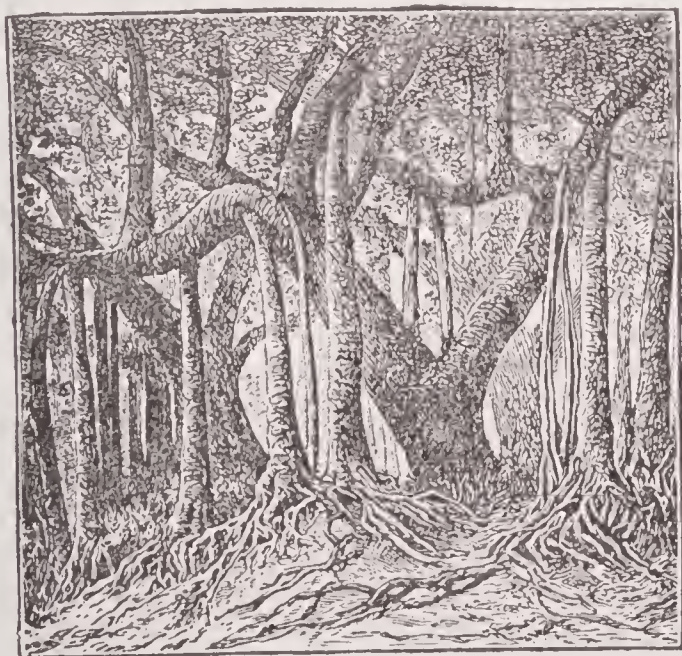
**Banvard**, **Joseph**, an American Baptist clergyman and historical writer, brother of the preceding, born in New York in 1810. Among his writings were "Plymouth and the Pilgrims" (1851); "Romance of American History" (1852); "Memoir of Webster" (1853); a historical novel, "Priscilla" (1854); "Soldiers and Patriots of the Revolution" (1876), etc. He died in 1887.



**Banville, Theodore Faullain de** (băn-vêl'), a French poet and novelist, born at Moulins, March 14, 1823; was the son of a naval officer, and went early in life to Paris, where he devoted himself exclusively to literature, contributed to many journals and reviews, and lived in close friendship with some of the foremost artists and men of letters of the day. First known as a poet through two volumes entitled "The Caryatides" (1842) and "The Stalactites" (1846), he established his reputation with the "Odes Funambulesques" (1857), a sort of great lyrical parody, published under the pseudonym "BRACQUEMOND," which immediately found great favor, and was followed by "New Odes Funambulesques" (1868, afterward reprinted as "Occidentales"); "Russian Idyls" (1872); "Thirty-six Merry Ballads" (1873); etc. His dramatic efforts did not meet with equal success, only "Gringoire" (1866) holding the stage for some time. As a prose writer he is favorably known by a number of humorous and highly finished tales and sketches, like "The Poor Mountebanks" (1853); "The Parisians of Paris" (1866); "Tales for Women" (1881); "The Soul of Paris" (1890), etc. Of considerable literary interest is "My Recollections" (1882). He died in Paris, March 13, 1891.

**Banxring** (genus *tupaia*), a quadruped belonging to the insectivora, inhabiting the Indian Archipelago, bearing some resemblance externally to a squirrel, but having a long pointed snout. They live among trees, which they ascend with great agility.

**Banyan Tree**, the *ficus indica*, a species of the genus *ficus*. It is regarded as a sacred tree by the Hindus. Its branches



BANYAN TREE.

produce long shoots, or aërial roots, which descend to the ground and penetrate the soil; so that, in course of time, a single tree becomes a vast umbrageous tent, sup-

ported by numerous columns. No fewer than 350 stems, each equaling in bulk the trunk of a large oak, and more than 3,000 smaller ones, have been counted in one example, covering a space sufficient to contain 7,000 persons.

The fruit of the banyan is of a rich scarlet color, and about the size of a cherry; it is eaten by the monkeys, which live with birds and enormous bats in the thick forest of branches. The bark is a powerful tonic, and is much used by the Hindu physicians. The white glutinous juice of the tree is used to relieve toothache, as an application to the soles of the feet when inflamed, and for making birdlime. *Ficus elastica*, also a native of India, yields an inferior kind of caoutchouc. *Ficus sycamorus*, the sycamore fig, is said to have yielded the wood from which mummy cases were made.

**Banyuwangy**, the extreme E. district of the island of Java; noted for its extensive coffee gardens, and for the remarkably pure sulphur obtained from the Goonong-Marapi volcanic mountain; also the name of the capital town, which is an important seaport and Dutch military post, on the Strait of Bali, about 550 English miles E. S. E. from Batavia. Goonong-Marapi mountain is of great height, and its sulphur can be used without refining. The immediate neighborhood of the mountain is uninhabited.

**Banz**, once one of the richest and most famous of the Benedictine monasteries, on the right bank of the Maine, 3 miles below Lichtenfels, Bavaria. Founded in 1071, and destroyed in the Peasants' War in 1525, it was rebuilt, and, although plundered again in the Thirty Years' War, it gradually became famed for the scientific attainments of its monks. In 1803 it was broken up, and its library and collections divided between the Munich museum and other institutions.

**Baobab**, a tree also styled the monkey-bread, African calabash, or Ethiopian sour-gourd tree. It has a fantastic look, its stem being of little height, but of great thickness; one specimen was found 30 feet in diameter. The fruit is about 10 inches long. Externally it is downy; within this down is a hard, woody rind, which requires a saw to cut it across; and inside the rind is an eatable pulp, of slightly acid taste. The juice mixed with sugar is serviceable in putrid and pestilential fevers. The Africans mix the dried and powdered leaves with their food to promote perspiration, and they have been found useful in diarrhœa and dysentery. The *adansonia* is properly a native of Africa, but it has been introduced, probably by the Mussulmans, into India, where its large white flowers appear in May and June, to be in due time followed by



fruit. It is known as *Adansonia digitata*, being so named after Adanson, a celebrated French traveler, who lived from 1749 to 1754 in Senegal, investigating its natural history. The tree is liable to be attacked by a fungus which, vegetating in the woody part, renders it soft and pithlike. By the negroes of the W. coast these trunks are hollowed into chambers, and dead bodies are suspended in them. There they become perfectly dry and well preserved, without further preparation or embalming.

**Baour=Lormian, Louis Pierre Marie François** (bä-ör'lör-myon'), a French poet and dramatist (1772-1854), who first attracted wide notice through his "Poems of Ossian" (1801), an extremely clever imitation of Caledonian verse; and afterward won success with a tragedy, "Omasis, or Joseph in Egypt" (1807). Of his other works may be mentioned "Political and Moral Vigils" (1811), in the manner of Young; "Duranti, or The League in the Province" (1828), a historical novel; and "Legends, Ballads, and Fabliaux" (1829). But his best work is probably a poetical translation of the Book of Job, completed after he had lost his eyesight.

**Bapaume** (ba-pōm'), a French town in the Department of Pas-de-Calais, 12 miles S. of Arras. Here, on Jan. 2 and 3, 1871, took place two bloody struggles between the French Army of the North and the Prussian "army of observation;" the French were defeated, with a loss of over 2,000.

**Baphometus**, the name of the image which the Knights Templars were charged with worshipping, when the order was suppressed by Philip IV. of France. It is probably a corruption of Mahomet, and the charge may have arisen from the circumstance that some of the Templars had gone over to the Moslem faith.

**Baptism** (from the Greek *baptizō*, from *bapto*, to immerse or dip), a rite which is generally thought to have been usual with the Jews even before Christ, being administered to proselytes. From this baptism, however, that of St. John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Matt. xxviii: 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments. In the primitive Church the person to be baptized was dipped in a river or in a vessel, with the words which Christ had ordered, generally adopting a new name to further express the change. Sprinkling, or, as it was termed, clinic baptism, was used only in the case of the sick who could not leave their beds. The Greek Church and Eastern schismatics

retained the custom of immersion; but the Western Church adopted or allowed the mode of baptism by pouring or sprinkling, since continued by most Protestants. This practice can be traced back certainly to the 3d century, before which its existence is disputed. Since the Reformation there have been various Protestant sects called Baptists, holding that baptism should be administered only by immersion, and to those who can make a personal profession of faith. The Montanists in Africa baptized even the dead, and in Roman Catholic countries the practice of baptizing church bells—a custom of 10th century origin—continues to this day. Being an initiatory rite, baptism is only administered once to the same person. The Roman and Greek Catholics consecrate the water of baptism, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but, among most Christians, it is preceded by a confession of faith made by the person to be baptized, if an adult, and by his parents or sponsors if he be a child. The Roman Catholic form of baptism is far more elaborate than the Protestant. This church teaches that all persons not baptized are damned, even unbaptized infants are not admitted into heaven; but for those with whom the absence of baptism was the chief fault, even St. Augustine himself believed in a species of mitigated damnation. Protestants hold that though the neglect of the sacrament is a sin, yet the saving new birth may be found without the performance of the rite which symbolizes it. Naming the person baptized forms no essential part of the ceremony, but has become almost universal, probably from the ancient custom of renaming the catechumen.

**Baptistery**, a place designed for the administration of baptism. In early ages, baptism was performed by immersion, and the place used for the purpose was a pond or stream; but in the middle of the 3d century, distinct or insulated houses were erected for the ceremony. The baptistery was an octagon or circular building, covered with a cupola roof, and adjacent to the church, but not forming a part of it. The most ancient baptistery is that of S. Giovanni in Fonte, at Rome, said to have been erected by Constantine the Great. The most celebrated are those of Florence and Pisa. This last is circular; its diameter is 116 feet; the walls are 8 feet high, and the building is raised on three steps, and surmounted by a dome in the shape of a pear. This dome, which is covered with lead, is intersected by long lines of very prominent fretwork, terminating in another dome, above which is the statue of St. John. The proportions of the interior are admirable;



eight granite columns, placed between four piers, decorated with pilasters, are arranged round the basement story; these support a second order of piers, similarly arranged, on which rests the dome. In the middle of the baptistery is a large octagonal basin of marble, raised on three steps. The most remarkable features of the baptistery of Florence are the bas-reliefs of its three magnificent bronze doors, executed by Andrea of Pisa, and Lorenzo Ghiberti.

**Baptists**, a Protestant denomination based on the belief that immersion is the only Scriptural mode of baptism, and that those only are proper subjects for this ceremony who are converted and profess personal faith in Christ. They thus reject both infant baptism and baptism by sprinkling or pouring of water as invalid. There are, however, other sects, including the Mennonites, the Christians, the Disciples of Christ, etc., who accept the prominent principles of the Baptists in whole or in part, and yet are not classified with them, owing to some minor differences. The Baptists reject the name of Anabaptists as a term of reproach, holding that it is incorrect, because their members generally receive the rite on their admission to the church, and because they were not identified with the Baptists of Munster. The Baptists first appeared in Switzerland, in 1523, and soon spread to Germany, Holland, and other continental countries, whence they were driven to England by persecution on account of their rejection of infant baptism. The history of the Baptists in England prior to the 16th century is still a matter of controversy. The first regularly organized church was Arminian, and was established in 1610 or 1611. A Calvinistic Baptist Church was founded about 1633. Those holding Arminian views received the name of General Baptists, and those holding Calvinistic views, the name of Particular Baptists. In 1640 there were seven Baptist congregations in London.

The Baptists in the United States spring historically from the English and Welsh Baptists; but the first Baptist Church was organized by Roger Williams, who was a minister in the Massachusetts Colony previous to his immersion. He was persecuted for holding principles which inclined to Anabaptism, and for antagonizing the authorities of the colony in ecclesiastical matters. After being immersed, in 1639, by Ezekiel Holliman, whom he in turn immersed with 10 others, he organized a Baptist Church in Providence, R. I. In 1644 he obtained a charter which granted to the people of Rhode Island entire freedom of conscience. There were other Baptists, however, who emigrated from England in the 17th century, and, before the end of the 18th century, became numerous in New England,

New York, Pennsylvania, Virginia, Georgia, and other States. In all the British colonies, excepting Rhode Island, the Baptists were persecuted for a long time. In Massachusetts laws were issued against them in 1644; several of them were imprisoned in 1651; others exiled in 1669; and a Baptist meeting-house was closed in 1680. New York issued laws against them in 1662, and Virginia in 1664. This persecution had greatly abated at the beginning of the 18th century. In Massachusetts they were freed from tithes in 1727; in Connecticut and New Hampshire in 1727; and in Virginia in 1785. After the Revolutionary War the Baptists increased with great rapidity, especially in the South and Southwestern States, and have steadily increased ever since.

There are at present three bodies of Regular Baptists, the Northern, the Southern, and the Colored, all of whom agree in doctrinal and ecclesiastical principles, but each has its own associations, State Conventions, and general missionary and other associations. In 1845 a controversy concerning slavery, which had been going on for some time, caused a division between the Baptists in the Northern and those in the Southern States, after which the Northern Baptists continued to support the Home Mission Society and the American Baptist Missionary Union, on an anti-slavery basis. In 1879 the question of reuniting the divisions was agitated, but nothing was accomplished. The Southern Division is the largest branch of white Baptists. After the division of 1845 the Southern churches established the Southern Baptist Convention, which holds annual meetings, where the promotion and direction of the denominational interests are considered, such as Sunday-schools, and home and foreign missions. It is composed of representatives from associations, other organizations, and from the churches. The Colored Baptists compose the largest body of Regular Baptists, although many Colored Baptists are not members of this division; those only being included who have separate churches, State Conventions, and associations. The Colored Baptists of the North are generally members of churches belonging to white associations. In 1866 the first State Convention of Colored Baptists was organized in North Carolina, the second in Alabama, and the third in Virginia, both in 1867, and the fourth in Arkansas in 1868. There are (1900) Colored conventions in 15 States and the District of Columbia. Besides these associations there are the American National Convention, which deliberates upon questions of general concern; the Consolidated American Missionary Convention, the General Association of the Western States and Territories, the New England Missionary Conven-



Baptists

tion, and the Foreign Missionary Convention of the United States.

Besides the three large divisions of Baptists, there are 10 smaller ones. (1) Six Principle Baptists date back to Roger Williams and the year 1639 for their origin. They differ from the Regular Baptists in holding the Arminian instead of the Calvinistic creed, and in the practice of the laying on of hands in the reception of members. (2) Seventh Day Baptists, in the United States, date their origin back to 1671, when Stephen Mumford, from England, organized the first church in Newport, R. I. Their only difference from other Baptists is found in their keeping the seventh day as "the Sabbath of the Lord." (3) Freewill Baptists. The first church of this sect was founded by Benjamin Randall in New Durham, N. H., in 1780. At first their organizations were called simply Baptist churches, but later the word "Freewill" was applied to them, in allusion to their doctrine concerning the freedom of the will. (4) Original Freewill Baptists date back to 1729, when a number of General Baptist churches were founded in North Carolina. In 1759 many of these general churches became Calvinistic. Those which did not join the Calvinistic association were called "Freewillers," because they held the doctrine of the freedom of the will. (5) General Baptists are thus named, because they originally differed from the Regular Baptists in holding that the atonement was for the whole race and not merely for those effectually called. They date back to the beginning of the 18th century. (6) Separate Baptists originated in the great Whitefield revival. In doctrine they generally agree with the Freewill Baptists. (7) United Baptists. A sect which sprang from the opposition to the great revival of George Whitefield. They hold moderate Calvinistic views. (8) Baptist Church of Christ. A sect organized in 1808 in Tennessee, where half their number is found. They have a mild form of Calvinism with a general atonement. (9) Primitive Baptists are variously known as Primitive, Old School, Regular, and Antimission Baptists. Their organization occurred about 1835. They do not believe in the establishment of Sunday-schools, mission, Bible, and other societies, which they hold are unscriptural because they are human institutions. (10) Old Two-Seed-in-the-Spirit-Predestinarian Baptists. A conservative body of Baptists who are strongly Calvinistic, believing firmly in predestination. The phrase "Two-Seed" is understood to mean their belief that there are two seeds, one of the good and one of the evil. The doctrine is supposed to have been originated by Elder Daniel Parker, who preached in Tennessee in 1806-1817, in Illinois till 1836, and later in Texas, where he died.

Bar

All Baptist denominations are congregational in polity, with the possible exception of the Original Freewill Baptists. Each church, under its officers of pastor and deacons, manages its own affairs. There are Associations and State Conventions, composed of pastors and delegates from the churches, but none of these bodies have any ecclesiastical authority. Councils, consisting of ministers and laymen, may be called to advise churches, to ordain ministers, or to recognize new churches at the invitation of individual churches.

*Statistics of the Churches.*—The following table gives a summary of the various Baptist Churches in the United States, as compiled for "The Christian Advocate" of New York (Jan. 27, 1910):

| No.  | DENOMINATIONS.                                 | Ministers. | Churches. | Communicants. |
|------|--|------------|-----------|---------------|
| 1..  | Regular (North)...                             | 8,095      | 9,239     | 1,176,380     |
| 2..  | Regular (South)...                             | 13,655     | 21,887    | 2,139,080     |
| 3..  | Regular (Colored)...                           | 12,602     | 17,429    | 1,874,261     |
| 4..  | Six Principle.....                             | 10         | 16        | 731           |
| 5..  | Seventh Day .....                              | 96         | 82        | 8,239         |
| 6..  | Free .....                                     | 1,294      | 1,303     | 73,536        |
| 7..  | Freewill.....                                  | 604        | 623       | 40,578        |
| 8..  | General .....                                  | 550        | 538       | 32,500        |
| 9..  | Separate .....                                 | 100        | 76        | 5,180         |
| 10.. | United.....                                    | 260        | 196       | 13,698        |
| 11.. | Baptist Church of Christ.....                  | 99         | 93        | 6,416         |
| 12.. | Primitive.....                                 | 1,500      | 2,922     | 102,311       |
| 13.. | Primitive (Colored)                            | 1,480      | 797       | 35,076        |
| 14.. | Old-two-Seed-in-the-Spirit Predestinarian..... | 35         | 55        | 781           |
| 15.. | Church of God....                              | 75         | 48        | 1,823         |
|      | Total Baptists..                               | 40,455     | 55,304    | 5,510,590     |

According to the census of 1901, the Baptist Church in Canada had a membership of 316,477, and reports for 1906 gave a total of 424,741 members of Baptist churches in Great Britain.

HENRY C. VEDDER.

**Baptist Young People's Union of America**, an association representing numerous young people's societies connected with the Baptist Churches in all the States and in Canada, organized in June, 1891, in Chicago, Ill., which place has since been its headquarters. Prior to the formation of the Union, the withdrawal of the Baptist societies was feared by the Christian Endeavor Societies, and a plan of federation was suggested in Nebraska, for the establishment of young people's societies over which no constitution should be required. This plan, with slight modifications, was accepted when the Union was organized. Conventions are held yearly.

**Bar**, in hydrography, a bank of sand, silt, etc., opposite the mouth of a river, which obstructs or bars the entrance of vessels. The bar is formed where the rush of the stream



## Bar

is arrested by the water of the sea, as the mud and sand suspended in the river water are thus allowed to be deposited. It is in this way that deltas are formed at the mouths of rivers. The navigation of many streams is kept open only by constant dredging or other artificial means.

**Bar**, in law, a word having several meanings; thus, it is the term used to signify an inclosure or fixed place in a court of justice where lawyers may plead. In English superior courts, Queen's counsel are admitted within the bar; other members of the bar sit or stand outside. A railed-off space within the Houses of Lords and Commons is similarly called the bar. The dock, or inclosed space where persons accused of felonies and other offenses stand or sit during their trial, is also called the bar; hence the expression, "prisoner at the bar." It has also a general meaning in legal procedure, signifying something by way of stoppage or prevention. There is also a trial at bar—that is, a trial before the judges of a particular court, who sit together for that purpose in banc.

**Baraba**, a steppe of Siberia, in the government of Tomsk, extending between the rivers Obi and Irtysh, and occupying more than 100,000 square miles. Covered with salt lakes and marshes, it was colonized in 1767 by the Russians, who have since cultivated parts of it.

**Barabbas**, a noted robber in Christ's time, who was imprisoned and awaiting death for the crimes of sedition and murder. It was a custom of the Roman government, for the sake of conciliating the Jews, to release one Jewish prisoner, whom they might choose, at the yearly Passover. Pilate desired thus to release Jesus, but the Jews demanded Barabbas (Matt. xxvii: 16-26).

**Baraboo**, city and county-seat of Sauk co., Wis.; on the Baraboo river and the Chicago and Northwestern railroad; 40 miles N. W. of Madison. It is in an agricultural region; has important manufacturing interests, which are promoted by an excellent water power; is a noted fruit center; and has a National bank, daily, weekly, and monthly periodicals, an assessed property valuation of about \$2,500,000, and a total debt of about \$60,000. Pop. (1890) 4,605; (1900) 5,751; (1910) 6,324.

**Barabra**, a Nubian people living on both sides of the Nile, from Wady Halfa to Asuan (Egyptian Sudan). They are about 40,000 in number, and are believed to belong to the same stock as the ancient Egyptians. They are an agricultural people, and zealous Mohammedans. Their language has affinities with Coptic.

**Baracoa**, a decayed seaport of Cuba, near the eastern end of the island, and for some

## Baranoff Island

years its capital. The town was founded in 1512. Near it is the mountain noted as the "Anvil of Baracoa." Since the occupation of the island of Cuba by the forces of the United States, Baracoa has revived in importance. Pop. about 3,000.

**Baraguay d'Hilliers** (bär-a-gā' dēl-yā), **Achille, Comte**, a marshal of France, w. born in Paris, in 1795. In 1830 he took part in the expedition to Algeria, in which his success against the Arabs gained him the confidence of Louis Philippe's government, who created him a lieutenant-general. He was, in 1836, appointed to the command of the military school of St. Cyr. In 1841, he was made governor-general of Algeria. On the fall of Louis Philippe in the revolution of 1848, the Provisional Government appointed him to the command of the military division of Besançon. He replaced Changarnier in the command of the Army of Paris, and concurred in the accomplishment of the *coup d'état* on Dec. 2, 1851. In the war with Russia in 1854, Baraguay d'Hilliers was commander-in-chief of the Baltic expedition, and for his services received the dignity of marshal of France, and later was nominated a senator. He took an active part in the campaign of 1859, when France leagued with Sardinia to free Italy from Austrian domination. He died in 1878.

**Baraguay d'Hilliers, Louis**, a French general, was born in Paris in 1764, and, receiving an appointment in the Army of Italy from Napoleon, shared all the success of the campaign of 1796-1797. Made a general of division and commandant of Venice, in 1798 he accompanied the expedition to Egypt; and afterward successively held appointments on the Rhine, in the Tyrol, and in Catalonia. He commanded a division in the Russian campaign of 1812, but during the retreat incurred the displeasure of Napoleon; and on Jan. 6, 1813, he died at Berlin of grief and exhaustion.

**Baralt, Rafael Maria**, a Venezuelan poet and historian, born in Maracaibo, Venezuela, July 2, 1814; was educated in Bogotá and at Caracas; served in the Venezuelan army, and went to Spain in 1843, where he held posts of honor and attained literary fame. He wrote "Ancient and Modern History of Venezuela" (1841); and "Odes to Columbus and to Spain." He died in Madrid, Jan. 2, 1860.

**Baranoff, Alexander Andrevich**, a Russian trader, born in 1746. He founded a trading colony on Bering Strait (1796), and established commercial relations with the United States, China and Hawaii. He died in 1819.

**Baranoff Island**, one of the Alexander Islands, Alaska. It is about 75 miles long. On its coast is the town of Sitka. The



## Barante

island derives its name from the Russian trader Baranoff, who, in 1799, took possession of it.

**Barante** (bar-änt'), **Aimable Guillaume Prosper Brugiere, Baron de**, a French historian and statesman, born at Riom in Auvergne, June 10, 1782. After filling some subordinate offices, he was appointed in 1809 prefect of La Vendée. In this year was published his "Tableau de la Littérature Française au XVIII<sup>e</sup> Siècle," of which Gœthe has said that it contains neither a word too little nor a word too much. In 1815 Louis XVIII. made Barante secretary of the Ministry of the Interior, and about the same time he took his seat in the Chamber of Deputies, where he voted with the Moderate Liberals. In 1819 he was raised to the Chamber of Peers. His principal work, a "Histoire des Ducs de Bourgogne de la Maison de Valois, 1364-1477," published in 12 volumes, 1824-1828, has run through several editions. It secured his election to the Academy in 1828. Between 1830 and 1840 he represented France at Turin and St. Petersburg, but after the revolution of 1848 he devoted himself entirely to literary pursuits. He died Nov. 23, 1866, in Auvergne.

**Barataria Bay**, in the S. E. part of Louisiana, extending N. from the Gulf of Mexico, between the parishes of Jefferson and Plaquemine. This bay is about 15 miles long by 6 wide. It, and the lagoons branching out of it, were rendered notorious about the years 1810-1812 as being both the headquarters and rendezvous of the celebrated Lafitte and his buccaneers.

**Baratier, Johann Philipp** (bar-at-yā'), a German litterateur, remarkable for the precocity of his intellect, was born in 1721. At the age of 7 he understood Greek and Hebrew, and two years later he compiled a Hebrew dictionary. He was 13 when he translated the "Itinerary of Benjamin of Tudela." Excess of work and, perhaps, a too rapid development of his intellectual faculties brought about a languid malady, and, at the age of 19 years he died.

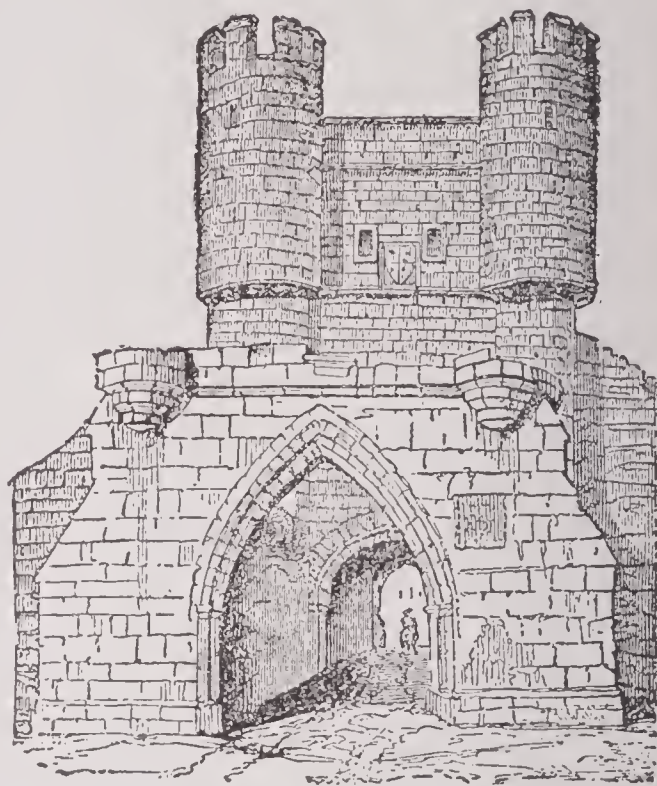
**Barattani, Felipe** (bär-ät-ä'nē), an Italian poet and dramatist, born at Filottrano, Ancône, March 1, 1825. He has won most applause for "Lyric Tragedies" (1858), in which his poetical capacities are most happily exploited; "Stella" (1866), a drama in verse; and "The Sons of Alexander VI.," a powerful metrical play.

**Baratynski, Jevgeni Abramovich** (bar-a-tin'skē), a Russian poet, born within the government of Tambov, in 1800, became one of the pages at St. Petersburg, but was dismissed at 15 for some boyish freaks. He enlisted as a private soldier three years later, and by seven years' service in Finland, fought his way to the rank of an officer,

## Barbadoes

which, however, he soon resigned to devote himself to a literary life. His first poem, "Eda," is a mirror of Finnish life and feeling; his greatest, "The Gypsy." He died in 1844 at Naples.

**Barbacan**, a projecting watch tower, or other advanced work, before the gate of a castle or fortified town. The term barbican



BARBACAN.

was more especially applied to the outwork intended to defend the drawbridge, which in modern fortifications is called the *tete du pont*.

**Barbacena**, a flourishing town of Brazil, in the State of Minas Geraes, 125 miles N. W. of Rio de Janeiro. It is situated in the Mantiqueira Mountains, about 3,500 feet above the sea. Pop. 5,000.

**Barbadoes**, or **Barbados**, the most eastern of the West India Islands, first mentioned in 1518, and occupied by the British in 1625; length 21 miles, breadth, 13; area, 106,470 acres, or 166 square miles; mostly under cultivation. It is divided into 11 Church of England parishes; capital, Bridgetown. It is more densely peopled than almost any spot in the world, the population in 1905 being 199,542, or about 1,174 to the square mile. The climate is very hot, though moderated by the constant trade winds; and the island is subject to dreadful hurricanes. The surface is broken, now without forests, and with few streams; the highest point is 1,145 feet above the sea level. There are few indigenous mammals or birds. The black lowland soil gives great returns of sugar in favorable seasons. The chief exports, besides sugar, are molasses and rum; imports: rice, salt meat, corn, butter, flour, etc. The exports are usually over £1,000,000 in value. Barbadoes has a considerable transit trade, being in some



measure the central mart for all the Windward Islands. It is the see of a bishop and the headquarters of the British forces in the West Indies. There is a railway across the island, also tramways, telephones, etc. The island forms a distinct government under a governor, an executive and a legislative council, and a house of assembly. Liberal provision is made for education both by old foundations and by annual vote.

**Barbadoes Cedar**, the English name of a cedar or juniper (*juniperus barbadensis*). It comes from Florida and the other warm parts of America.

**Barbadoes Cherry**, the English name of malpighia, a genus of plants constituting the typical one of the order *malpighiaceæ* (malpighiads). The term is especially applied to *malpighia urens* and its fruit, the latter, which sometimes resembles a cherry, but is far inferior to it, being eaten in the West Indies; so also is that of *M. glabra*, cultivated for the purpose.

**Barbadoes Flower Fence**, or **Barbadoes Pride**, a name given to the beautiful plant *poinciana pulcherrima*. It belongs to the leguminous order, and the sub-order *casalpiniceæ*. It is a low, spiny tree with an odor like savin. It is a native of the tropics of both hemispheres, and has Barbadoes prefixed to it because there especially it is used for fences.

**Barbadoes Gooseberry**, a name given to a species of cactus, the *C. pereskia* of Linnaeus, which grows in the West Indies.

**Barbadoes Leg**, a disease common in Barbadoes, the prominent symptom of which is the swelling to a large size of some portion of the body, generally the leg. It is called also elephant leg, or yam, or galle, or cochin leg, and is the *elephantiasis arabum* of medical writers.

**Barbadoes Lily**, the English name of the *amaryllis equestris*, now called *hippeastrum equestre*, an ornamental plant from the West Indies.

**Barbadoes Tar**, an old name for a kind of mineral pitch or petroleum, often of a greenish hue, sent forth by bituminous springs in Barbadoes.

**Barbara, Saint**, a Christian convert who suffered martyrdom at Nicomedia, in Bithynia, in 240 or 306. Her

father, Dioscorus, a fanatical heathen, delivered her up to the governor, Martianus, who, struck with her intelligence and beauty, attempted first by arguments to make her relinquish Christianity, and, when that failed, had recourse to the most exquisite tortures. At last, her father offered himself to behead her; scarce had he done so than he was struck with lightning. Hence St. Barbara is to this day prayed to in storms, and is the patron saint of artillery, being represented in art with cannons, a tower, and a monstrance. Her festival is Dec. 4.

**Barbarian**, among the Greeks, a foreigner; one who could not speak Greek. At first the Romans were included by the Greeks under the term barbarian; but as the inhabitants of the great Italian city gradually gained imperial power, and, moreover, began to consider the Greek language as a desirable, if not even an indispensable, part, of a liberal education, they were no longer placed in the category of barbarians, nor was their speech deemed barbarous: When the Greeks became the most civilized people in the world, the term barbarian came to be used with some reproach, but less so than among ourselves now.

**Barbaro, Francesco**, one of the most distinguished Italian authors of the 15th century, born at Venice, in 1398. He became successively senator, governor of Vicenza, Ambassador to Pope Martin V., general-in-chief at Brescia, and headed many embassies to Florence, to the Emperor Sigismund, and to many other sovereigns; which prove that he was as skilful in diplomacy as he was versed in literature. His eloquence was something marvelous, and many times he harangued the Senate, and the troops at Brescia; thus inducing the State and the army to defend for three years the walls of that besieged city against the superior forces of the Duke of Milan. His best work is "On the Choice of a Wife, and the Duties of Women," printed in Paris, in 1515. He died in 1454.

**Barbarossa, Arooj**, or **Horush**, styled **Barbarossa** from his red beard, was the son of a Greek, at Mitylene, and by profession a corsair chief. In 1516 he assisted Selim, King of Algiers, in driving the Spaniards out of that country, and, having taken possession of the capital, put Selim to death, and mounted the throne himself. He died in 1518.

**Barbarossa, Khairaddin**, also styled **Barbarossa**, brother and successor of the preceding, surrendered the sovereignty of Algiers to Selim I., Sultan of Turkey, in exchange for a force of 2,000 janissaries and the title of Dey. He was afterward appointed "capitan pasha" or high admiral of the Turkish fleet, and conquered Tunis, which was retaken, in 1535, by the Emperor



ST. BARBARA.



## Barbarossa

Charles V. In 1538 he gained a victory over the imperial fleet under the command of Andreas Doria, in the Bay of Ambracia. He died in 1546.

**Barbarossa.** See FREDERICK I., EMPEROR OF GERMANY.

**Barbaroux, Charles Jean Marie** (bär-brö'), one of the greatest of the Girondists, was born at Marseilles, March 6, 1767. At first an advocate and journalist at Marseilles, he was sent by that city to the Constituent Assembly at Paris. There he opposed the Court party, and took part with the Minister, Roland, then out of favor. After the events of the 10th of August, 1792, he returned to his native town, where he was received with enthusiasm, and was soon after chosen delegate to the Convention. In the Convention he adhered to the Girondists, and belonged to the party who, at the trial of the King, voted for an appeal to the people. He boldly opposed



BARBAROUX.

the party of Marat and Robespierre, and even directly accused the latter of aiming at the dictatorship; consequently, he was, in May, 1793, proscribed as a royalist and an enemy of the Republic. He fled to Calvados, and thence with a few friends to the Gironde, where he wandered about the country, hiding himself as he best could for about 13 months. At last, on the point of being taken, he tried to shoot himself; but the shot miscarried, and he was guillotined at Bordeaux, June 25, 1794. This "brave and beautiful young Spartan" was one of the great spirits of the Revolution. There was no loftier-minded dreamer in the Girondist ranks; hardly a nobler head than his fell in that reign of terror. He was "ripe in energy, not ripe in wisdom," says Carlyle, or the history of France might have been different.

## Barbault

**Barbary**, a general name for the most northerly portion of Africa, extending about 2,600 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 1,550 miles; comprising Morocco, Fez, Algeria, Tunis and Tripoli (including Barca and Fezzan). The principal races are the Berbers, the original inhabitants, from whom the country takes its name; the Arabs, who conquered an extensive portion of it during the times of the caliphs; the Bedouins, Jews, Turks, and the French colonists of Algeria, etc. The country, which was prosperous under the Carthaginians, was, next to Egypt, the richest of the Roman provinces, and the Italian States enriched themselves by their intercourse with it. In the 15th century, however, it became infested with adventurers who made the name of Barbary corsair a terror to commerce, a condition of things finally removed by the French occupation of Algeria.

**Barbary Ape**, or **Magot**, a monkey — the *macacus inuus*, found in the N. of Africa, and of which a colony exists on the Rock of Gibraltar. It is the only recent European quadrumanous animal. It is sometimes called the magot, and is the species occasionally exhibited, when young, by showmen in the streets. When adult, it becomes much less controllable. It has a full and moderately long muzzle, hair of a greenish-gray color, and a small tubercle in place of a tail.

**Barbary Gum**, the gum of the *acacia gummifera*. The tree grows in Mogador, in Morocco.

**Barbastel**, or **Barbastelle**, a bat with hairy lips (*barbastellus communis*), a native of England.

**Barbault, Anna Lætitia**, an English poet and essayist, born in Kibworth-Harcourt, Leicestershire, in 1743; was the daughter of the Rev. John Aikin, and, in 1774, married the Rev. Rochemont Barbault. She was well educated, and numbered among her friends many famous authors, including Sir Walter Scott and Wordsworth. Her first poems (1773) went through four editions in one year. She wrote "Early Lessons for Children" (about 1774); "Devotional Pieces" (1775); "Hymns in Prose for Children" (1776), translated



ANNA L. BARBAULD.



in many languages; "Eighteen Hundred and Eleven," her longest effort (1811); and prepared an edition of the best English novels in 50 volumes. She died in Stoke Newington, March 9, 1825.

**Barbazan, Arnould Guilhem, Sire de**, a French captain, who was distinguished by Charles VI. with the title of "Chevalier Sans Reproche," and by Charles VIII. with that of "Restaurateur du Royaume et de la Couronne de France," born about the end of the 14th century. He earned the former of his titles while yet young, by his successful defense of the National honor in a combat fought in 1404, between six French and six English knights, before the Castle of Montendre; and the latter designation he acquired by his extraordinary exertions on the side of the Dauphin, at a time when the cause of native royalty, powerless in presence of the Anglo-Burgundian league, boasted few adherents. He was killed at Bullegneville, in 1432.

**Barbecue**. 1. A beef dressed whole, as is done in an election campaign. To do this, the carcass of the animal, split to the backbone, is laid upon a large gridiron, under and around which is placed a charcoal fire.

2. A large gathering of people, generally in the open air, for a social entertainment or a political rally, one leading feature of which is the roasting of animals whole to furnish the numerous members of the party with needful food.

**Barbel**. 1. A small fleshy thread or cord, of which several hang from the mouth of certain fishes.

2. A knot of superfluous flesh growing in the channels of a horse's mouth.

3. A fish—the *barbus vulgaris* of Fleming, the *cyprinus barbus* of Linnæus, belonging to the order *malacopterygii abdominales* and the family *cyprinidæ*. It is found abundantly in English rivers, spawning in May or June. It has been known to weigh 15½ pounds, but is not prized as food.

**Barber**, one who shaves beards and dresses hair. The occupation of barber is an institution of civilized life, and is only known among those nations that have made a certain progress in civilization. It is referred to by the Prophet Ezekiel: "And thou, son of man, take thee a barber's razor, and cause it to pass upon thine head and upon thy beard." (Ezek. v: 1.) We do not read of a barber at Rome till about the year 454 of the city; but there, as elsewhere, when once introduced, they became men of great notoriety, and their shops were the resort of all the loungers and newsmongers in the city. Hence they are alluded to by Horace as most accurately informed in all the minute history, both of families and of the State. But in early times, the operations of the barber were not confined, as

now, to shaving, hair-dressing, and the making of wigs; but included the dressing of wounds, blood-letting, and other surgical operations. It seems that in all countries the art of surgery and the art of shaving went hand in hand. The title of barber-chirurgien, or barber-surgeon, was generally applied to barbers. The barbers of London were first incorporated by Edward IV. in 1461, and at that time were the only persons who practiced surgery. The barbers and the surgeons were separated, and made two distinct corporations; in France, in the time of Louis XIV., and in England in 1745. The sign of the barber-chirurgien consisted of a striped pole from which was suspended a basin; the fillet round the pole indicating the riband or bandage twisted round the arm previous to blood-letting, and the basin the vessel for receiving the blood. This sign has been generally retained by the modern barber. In our country, nevertheless, it is only occasionally that the basin may be seen hanging at the door of an old barber's shop. The character of the barber is amusingly illustrated in one of the tales of the "Arabian Nights Entertainments," and has been immortalized by Beaumarchais, Mozart, and Rossini, under the name of "Figaro."

**Barber, Edward Atlee**, an American archaeologist, born in Baltimore, Md., Aug. 13, 1851; was graduated at Williston Seminary in 1869, and was assistant naturalist in the United States Geological Survey in 1874–1875. Subsequently he was engaged in gold dredging. His writings include a history of the ancient Pueblos; a large number of magazine articles on ceramics; "Pottery and Porcelain of the United States," "Manual for Collectors of Blue China," "Genealogies of the Barber and Atlee Families," etc.

**Barber, John Warner**, an American author, born in Windsor, Conn., in 1798; wrote a "History of New Haven" (1831); "Incidents of American History" (1847); "Elements of General History" (1844); and "Our Whole Country" (1861), etc. He died in 1885.

**Barberini**, a celebrated Florentine family, which, since the pontificate of Maffeo Barberini (Urban VIII., 1623 to 1644), has occupied a distinguished place among the nobility of Rome. During his reign he seemed chiefly intent on the aggrandizement of his three nephews, of whom two were appointed cardinals, and the third Prince of Palestrina.

**Barber Poet**, a name given to Jacques Jasmin (1798–1864), the last of the Troubadours. He was a barber of Gascony.

**Barberry**, or **Berberry**, the English name of the berberis, a genus of plants constitut-



## Barberry Blight

ing the typical one of the order *berberidaceæ* (*berberids*). The common barberry (*barberis vulgaris*) is planted in gardens or in hedges, being an ornamental shrub, especially when covered with a profusion of flowers or loaded with fruit. It has yellow flowers with an unpleasant smell, which, however, are much frequented by bees. The berries are oblong in form, red in color, except at the top, where the stigma, which is black, remains. Their juice is acid, hence they are used for preserves and confectionery. The root, boiled in lye, and the inner bark of the stem, dye a fine yellow.

**Barberry Blight**, the English name of a minute fungal, the *æcidium berberidis* of Persoon. It occurs on the leaves of the barberry, forming roundish, bright red spots, consisting of the fruits of the *æcidium*, which form little cups full of spores when they burst. These spores germinate on the leaves or stems of wheat, send out mycelium into the plant, and produce the disease called rust, which was thought to be a distinct fungus. Several generations of this form grow in the summer, but in the elder specimens a darker two-celled spore is produced, which remains on the straw during the winter, and, germinating in the spring, produces spores that cause the barberry blight.

**Barberton**, a mining town of the former South African, or Transvaal Republic, at the De Kaap gold fields. It is situated at the base of a high range of hills 2,500 feet above sea level, 180 miles E. of Pretoria, and 100 N. W. of Delagoa Bay, with both of which it is connected by railway. In 1886–1887, owing to the discovery of rich gold reefs, there was a rush to the place, and the population soon rose to 8,000 or more; but the superior attraction of the Witwatersrand reefs and the growth of Johannesburg reduced Barberton to a subordinate place.

**Barbès, Armand** (bär-bāz'), a French politician and revolutionist, born in the Island of Guadeloupe, in 1810. At an early age he was taken to France, and, in 1830, went to Paris to attend the law classes, where he had an opportunity of manifesting his political opinions at that period of public excitement. He had inherited some fortune from his father, and he thus had ample leisure to devote his attention to the formation of secret societies. During the whole reign of Louis Philippe he was constantly engaged in conspiracies. In consequence of an unsuccessful attempt to overthrow the government, he was condemned to death, a sentence which was commuted to perpetual confinement. The revolution of 1848 restored Barbès to liberty. He then founded a club, which took his name, in which the doctrines of socialism were superadded to

## Barbiano

republicanism. The name of Barbès sounded in the ears of the people like the tocsin against monarchy and the bourgeoisie. After the insurrection of May, 1849, Barbès was sentenced to deportation. In 1854 he was again set at liberty, and left France, a voluntary exile. He died in 1870.

**Barbet.** (1) Any bird of the family *picidae* and the sub-family *capitoninae*. The barbets have short, conical bills, with stiff bristles at the base, short wings, and broad and rounded tails. It is from the bristles, which have an analogy to a beard, that the name is derived. These birds are found in the warmer parts of both hemispheres, the most typical coming from South America. (2) A dog, called also the poodle. It is the *canis familiaris*, variety *aquaticus*. It has a large, round head, with a more considerable cerebral cavity than any other variety of dog, pendant ears, long curly hair, white with black patches, or *vice versa*. There is a large and a small barbet. (3) A name given to a small worm that feeds on the aphids.

**Barbette**, a mound of earth on which guns are mounted to be fired over the parapet.

In fortification. *En barbette*: Placed so as to be fired over the top of a parapet, and not through embrasures.

The Moncrieffe barbette is a special form of the barbette system invented by Colonel Moncrieffe, by which a gun is elevated at the moment of firing, the recoil causing it to disappear, by a movement like that of a child's rocking horse, into a circular pit sufficiently large to accommodate it and the gunners, thus protecting both from danger except for the brief period when the piece is being fired. The gun is raised to its proper elevation for firing by the depression of certain weights which are attached to the rockers upon which it is supported.

**Barbey d'Aurevilly, Jules** (bär-bā' dō-re-vē-yē), a French critic and novelist, born at Saint-Sauveur-le-Vicomte, Manche, Nov. 2, 1808. As a contributor to the "Pays" in Paris, where he settled in 1851, he created a sensation by the unreserved tone and peculiar style of his literary criticisms; in 1858 he founded the "Réveil" with Granier de Cassagnac and Escudier. Works: "On Dandyism and G. Brummel" (1845); "The Prophets of the Past" (1851); "Goethe and Diderot" (1880); "Polemics of Yesterday" (1889); "Nineteenth Century: The Works and the Men" (1861–1892). Of his novels the best are "The Bewitched" (1854); and "The Chevalier des Touches" (1864). He died in Paris, April 24, 1889.

**Barbiano, Abrecht da** (bärb-yä'nō), an Italian military officer; formed the first



regular company of Italian troops organized to resist foreign mercenaries, about 1379. This organization, named the "Company of



ABRECHT DA BARBIANO.

St. George," proved to be an admirable school, as from its ranks sprang many future officers of renown. He became Grand Constable of Naples in 1384, and died in 1409.

**Barbié du Bocage, Jean Denis** (barb-yā dü bö - käzh), a French geographer, born in Paris in 1760;

laid the foundation of his fame in 1788 by his "Atlas" to Barthélemy's "Voyage du Jeune Anacharsis." His maps and plans to the works of Thucydides, Xenophon, etc., exhibit much erudition, and materially advanced the science of ancient geography. He also prepared many modern maps, and published various excellent dissertations. He held many honorable posts, and died in 1825.

**Barbier, Henri Auguste** (barb-yā'), a French poet, born in Paris, April 29, 1805; studied law, but followed his inclination for literature; and, having first written a historical novel (1830, with Royer), depicting French medieval society, was led, through the July revolution, to enter his proper sphere, that of the poetical satire: in which he obtained a brilliant success with "The Iambes" (1831; 31st ed., 1882), a series of poignant satires, political and social, lashing the moral depravity of the higher classes,—notably the ignoble scramble for office under the new government, the subject of "The Quarry," the most famous among these satires. His next works, "Lamentation" (1833), bewailing the misfortunes of Italy, and "Lazarus" (1837), in which he describes the misery of the English and Irish laborer, show a considerable falling off; and in those that followed, the poet of "The Iambes" is scarcely to be recognized. He was elected to the Academy in 1869, and died in Nice, Feb. 13, 1882.

**Barbier, Jules**, a French dramatist, born in Paris, March 8, 1825. Having won success with his first effort, "A Poet" (1847), a drama in verse, he produced "The Shades of Molière" (1847); "André Chenier" (1849); "Willy Nilly," a comedy (1849); and thereafter in collaboration, mostly with Michel Carré, a number of dramas and vau-

devilles, also many librettos for comic operas. After the war of 1870-1871 he published "The Sharpshooter, War Songs" (1871), a collection of patriotic poems; and later two other volumes of lyrics, "The Sheaf" (1882) and "Faded Flowers" (1890); besides "Plays in Verse" (2 vols., 1879). He died Jan. 17, 1901.

**Barbiera, Raphael** (bärb-yā'rä), an Italian poet and journalist, born in Venice, 1851. His contributions to periodical literature are particularly valuable, and a volume of "Poems" has been received with pleasure, while works on Italian literature and numerous anthologies indicate good taste, "The Calendar of the Muses" (1888) being an instance.

**Barbieri, Giovanni Francesco** (bar-bē-ā'rē), otherwise known as GUERCINO (the squinter) DA CENTO, an eminent and prolific historical painter, born near Bologna in 1590. His style showed the influence of Caravaggio and of the Caracci, his best work being of the latter school. Chief work, a St. Petronilla in the Capitol at Rome; but most of the large galleries have pictures by him. He died in 1666. PAOLO ANTONIO BARBIERI, a celebrated still-life and animal painter, was a brother of Guercino; born 1596, died 1640.

**Barbieri, Giuseppe**, an Italian poet and pulpit orator, born in Bassano, 1783; was distinguished for the tasteful eloquence of his sermons. In "Little Poems," "Sermons on Feast Days," and "The Euganean Hills," he displays the resources of his well-stored mind with the utmost elegance. He died at Padua in 1852.

**Barbizon** (bär-bē-zōn'), a village on the skirts of the forest of Fontainebleau, a great artists' resort, the home of Millet; Corot, Diaz, Daubigny, and Rousseau were also of the "Barbizon school" of painters.

**Barbosa, Duarte**, a Portuguese traveler, born at Lisbon, in 1480. He traveled all through India, visited the Molucca Islands, and was Magellan's companion and historiographer in his circumnavigation of the globe. He was murdered by the natives of the Island of Cebu in 1521.

**Barbou** (bär-bö'), the name of a celebrated French family of printers, the descendants of JOHN BARBOU, of Lyons, who lived in the 16th century. From his press issued the beautiful edition of the works of Clement Marot in 1539. His son, HUGH BARBOU, removed from Lyons to Limoges, where, among other works, his celebrated edition of "Cicero's Letters to Atticus" appeared in 1580. JOSEPH GERARD BARBOU, a descendant of the same family, settled in Paris, and continued in 1755 the series of Latin classics in duodecimo—rivals to the Elzevirs of an earlier date—which had been begun in 1743 by Coustelier. This series of



## Barbour

classics is much prized for its elegance and correctness.

**Barbour, Erwin Hinckley**, an American geologist, born near Oxford, O.; was graduated at Yale College in 1882; was assistant paleontologist in the United States Geological Survey in 1882-1888; Stone Professor of Natural History and Geology in Iowa College in 1889-1891; became Professor of Geology in the University of Nebraska, and acting State Geologist in 1891; and curator of the Nebraska State Museum in 1892. In 1893 he took charge of the annual Morrill geological expeditions, and since then he has also been engaged in the United States Geological and Hydrographic Surveys.

**Barbour, James**, an American statesman, born in Orange county, Va., June 10, 1775. He was admitted to the bar when 19 years old. He served in the Virginia Legislature from 1796 to 1812, becoming governor of the State in the latter year. Three years later he was elected to the United States Senate and in 1825 became Secretary of War. He was minister to England in 1828-1829. In politics he was strongly anti-Democratic. He was chairman of the convention which nominated Harrison and Tyler for the presidency and vice-presidency. He died in Orange county, Va., June 8, 1842.

**Barbour, John**, a Scottish poet, born about 1316; was educated, it is thought, at Oxford and Paris; and was a clerk in the King's household. Barbour is one of the most ancient poets of Scotland; and his great epic, "The Bruce," tells the story of Robert Bruce and the battle of Bannockburn. It was written in 1375 and brought him favor from the King. First printed in Edinburgh in 1571; best modern edition by Skeat ("Early English Text Society"). He also wrote "Legends of the Saints," of 33,533 verses; and a fragment on the Trojan War. He died in Aberdeen, March 13, 1395.

**Barbour, John Humphrey**, an American educator, born in Torrington, Conn., May 29, 1854. He was graduated from Trinity College in 1873, and ordained in the Protestant Episcopal Church in 1878. He was rector of Grace Church, Hartford, till 1889, and then became Professor of New Testament Literature and Interpretation at the Berkeley Divinity School. He died in Middletown, Conn., April 29, 1900.

**Barbour, Oliver Lorenzo**, an American lawyer, born in Cambridge, N. Y., July 12, 1811; received an academical education, and was admitted to the bar in 1832. During 1847-1876 he was reporter of the New York Court of Chancery and the New York Supreme Court. He compiled a large number of legal digests, treatises on several branches of practice; and annotated editions of

## Barca

Collyer's, Chitty's, and Cowen's works. He died in Saratoga, N. Y., Dec. 17, 1889.

**Barbour, Philip Pendleton**, an American jurist, born in Orange county, Va., May 25, 1783. He studied law at William and Mary College and began to practice in 1802. He led the war party in the Virginia Legislature from 1812 to 1814, when he was elected to Congress, becoming Speaker of the House in 1821. Four years later he was appointed a judge in his native State, returning to Congress in 1827; resigning through ill-health. He was subsequently appointed a Federal judge, and in 1836 promoted to the Supreme Court of the United States. In politics he was a Democrat. He died in Washington, Feb. 24, 1841.

**Barbour, William McLeod**, a Congregational clergyman, born in Fochabers, Scotland, May 29, 1827; graduated from Oberlin College in 1859, and from Andover Theological Seminary in 1861; pastor in South Danvers (now Peabody), Mass., 1861-1868; professor in Bangor Theological Seminary in 1868-1877; Professor of Divinity and college pastor in Yale, 1877-1887; became principal and Professor of Theology in the Congregational College in Montreal, Canada, in 1887.

**Barbuda** (bar-bö'da), one of the West Indies, annexed by Great Britain in 1628; about 15 miles long and 8 wide; lying N. of Antigua; pop. 800. It is flat, fertile, and healthy. Corn, cotton, pepper, and tobacco are the principal produce, but the island is only partially cleared for cultivation. There is no harbor, but a well sheltered roadstead on the W. side. It is a dependency of Antigua.

**Barca**, a country extending along the N. coast of Africa, between the Great Syrtis (now called the Gulf of Sidra) and Egypt. Bounded on the W. by Tripoli, and on the S. by the Libyan Desert, it is separated from Egypt on the E. by no definite line. It nearly corresponds with the ancient Cyrenaica; and a great part of it is a high plateau. The climate is healthful and agreeable in the more elevated parts, which reach a height of almost 2,000 feet, and in those exposed to the sea breeze. There are none but small streams, but the narrow, terrace-like tracts of country are extremely fertile, realizing all that is said of the ancient Cyrenaica. Rice, dates, olives, saffron, etc., are produced in plenty. The pastures are excellent; the horses still celebrated, as in ancient times. But the good soil extends over only about a fourth of Barca; the E. exhibits only naked rocks and loose sand. Many ruins in the N. W. parts attest its high state of cultivation in ancient times, when its five prosperous cities bore the title of the Libyan Pentapolis. As early as the time of Cyrus, Barca became a State, which proved dangerous



## Barcelona

to the neighboring State of Cyrene; but within a single century it sank, and became subject to Egypt. In the Roman period, its inhabitants were noted for their predatory incursions. It was afterward a province of the Greek empire, and had declared itself independent when the Arabs invaded and conquered it in 641. The present inhabitants consist of Arabs and Berbers. Barca is sometimes regarded as a department of Tripoli, sometimes as an independent province, governed directly from Constantinople. Its area is about 70,000 square miles; and the population is estimated at 500,000. The capital is Bengazi.

**Barcelona**, the most important manufacturing city in Spain, in province of same name; pop. (1900) 533,000. The province of Barcelona has an area of 2,985 square miles, and pop. 1,054,541. The streets of the old town, forming the N. W. division, are crooked, narrow, and ill paved. Those of the new are much more spacious and regular. There is a large suburb E. of the town where the sea-faring portion of the population chiefly reside. Barcelona is the see of a bishop. It has a university, and colleges and schools for general and special educational purposes; public libraries, in one of which is a splendid collection of manuscripts; several hospitals and other charitable institutions; the finest theater in Spain, and numerous ancient and elegant churches, with a cathedral, which, begun in 1298, is not yet completed. Barcelona manufactures silk, woolens, cottons, lace, hats, firearms, etc., which form its principal exports. It imports raw cotton, coffee, cocoa, sugar, and other colonial produce; also Baltic timber, salt fish, hides, iron, wax, etc. Next to Cadiz it is the most important port in Spain. The harbor was extended and its entrance improved in 1875. Barcelona is a place of great antiquity, and associated with many historical events. Local tradition fixes the date of its foundation 400 years before the Romans; and it is said to have been refounded by Hamilcar Barca, the father of Hannibal, from whom its ancient name, Barcino, was derived. An important city under the Romans, Goths, and Moors, Barcelona in 878 became an independent sovereignty, under a Christian chief of its own, whose descendants continued to govern it, and to hold the title of Count of Barcelona, until the 12th century, when its ruler adopted the title of King of Aragon, to which kingdom it was annexed. During the Middle Ages, Barcelona became a flourishing seaport, rivaled in the Mediterranean by Genoa only.

**Barcelona**, formerly called New Barcelona, capital of a district and of the State of Bermudez, Venezuela, near the mouth of the Neveri, 160 miles E. of Caracas. The surrounding country is fertile, but Barce-

## Barclay

lona is very unhealthy. Cattle, jerked beef, hides, indigo, cotton, and cacao are the chief exports. Pop. 12,785. The district, formerly a separate State, has since 1881 formed one of the divisions of the State of Bermudez.

**Barclay, James**, a Canadian educator, born in Paisley, Scotland, June 19, 1844; was educated there, in Edinburgh, and at the University of Glasgow; was licensed by the Paisley Presbytery in 1870; and was called to St. Paul's Church, in Montreal, in 1883. While in Scotland he was frequently summoned to Balmoral to preach before Queen Victoria. Dr. Barclay is actively interested in the athletic life of Montreal; served through the Riel Rebellion in the Northwest Territories, in 1885, and, besides being connected with various local institutions, has been president of Trafalgar Institute since its opening.

**Barclay, John**, a Scotch poet, born in Pont-à-Mousson, France, Jan. 28, 1582; educated in the Jesuit college of his native town; went to England in 1603, and attained the favor of James I. He wrote important books in Latin. "Argenis," a romance (Paris, 1621), unites classical with modern fiction. Fénelon was indebted to it for "Telemachus." It has always won the admiration of literary men, especially Richelieu and Coleridge. Another romance, "Satyricon" (London, 1603), partly autobiographical, attacks the Jesuits and Puritans. Other works include "Sylvæ," Latin poems (1606); "Apologia" (1611), and "Icon Animorum" (1614). He died in Rome, Aug. 12, 1621.

**Barclay, Robert**, the apologist of the Quakers, born in 1648, at Gordonstown, Moray, and educated at Paris, where he became a Roman Catholic. Recalled home by his father, he followed the example of the latter and became a Quaker. His first treatise in support of his adopted principles, published at Aberdeen in the year 1670, under the title of "Truth Cleared of Calumnies," together with his subsequent writings, did much to rectify public sentiment in regard to the Quakers. His chief work, in Latin, "An Apology for the True Christian Divinity, as the Same is Preached and Held Forth by the People Called, in Scorn, Quakers," was soon reprinted at Amsterdam, and quickly translated into German, Dutch, French, and Spanish, and, by the author himself, into English. His fame was now widely diffused; and, in his travels with William Penn and George Fox, through England, Holland and Germany, to spread the opinions of the Quakers, he was received everywhere with the highest respect. The last of his productions, "On the Possibility and Necessity of an Inward and Immediate Revelation," was not published in England until 1686; from which time Bar-



clay lived quietly with his family. He died in 1690. He was a friend of and had influence with James II.

**Barclay de Tolly, Michael, Prince**, a Russian military commander, of Scottish descent, born in Livonia in 1755. He began his military career in the campaigns against the Turks, the Swedes, and the Poles. He was wounded at Eylau, when he was made lieutenant-general. In March, 1808, he surprised the Swedes at Umea, by a march of two days over the ice which covered the Gulf of Bothnia. He was made governor-general of Finland, and, in 1809, appointed Minister of War. He was author of the plan of operations which was followed with signal advantage by the Russian army in the campaign of 1812. After the battle of Bautzen, May 26, 1813, he was appointed commander-in-chief of the Prusso-Russian army; and under him Wittgenstein commanded the Russians; Blücher the Prussians; and the Grand Duke Constantine the Imperial Guard. On the day the allies entered Paris he was created General Field-Marshal. He died in 1818.

**Barclay=Allardice, Robert**, known as Captain Barclay, the pedestrian, was born in 1779, and succeeded to the estate of Urie, near Stonehaven, in 1797. He entered the army (1805), and served in the Walcheren expedition (1809), but afterward devoted himself to agriculture, cattle-breeding, and the claiming of earldoms (Airth, Strathearn and Menteith). He died May 8, 1854. His feat of walking 1,000 miles in 1,000 consecutive hours took place at Newmarket, in June to July, 1809.

**Barcochba**, or **Barcokecas** ("son of a star"), a famous Jewish impostor, whose real name was Simeon, and who lived in the 2d century A. D. After the destruction of Jerusalem by Titus, the Jews, at different periods, sought to regain their independence; and Barcochba, seeing his countrymen still impatient of the Roman yoke, resolved to attempt their emancipation. With this view he sought to sound the dispositions of his co-religionists of Egypt, Mesopotamia, Greece, Italy and Gaul, and sent forth emissaries, who traveled over all the provinces of the Roman Empire. When all was ready Barcochba solemnly announced himself as King and Messiah, and seized by surprise on many fortified places. All who refused to submit to him, particularly the Christians, were put to death. When the great success which at first attended his enterprise became known, great numbers of Jews, from all parts of the world, hastened to join his standard; and so formidable did this revolt become, that Julius Severus, general of the armies of the Emperor Adrian, and one of the greatest captains of the age, was compelled to act with extreme caution, and to

content himself with surprising such detached bodies of the enemy as happened to be off their guard. Soon, however, the superior discipline of the Romans prevailed. The Jewish army, shut up in the fortress of Bethar, succumbed under fatigue and famine; Barcochba perished miserably, and all his followers were massacred or reduced to slavery. From this period may be dated the entire dispersion of the race of Israel over the face of the earth. This war cost the conquerors much blood. It lasted for five years, and did not terminate till the year 136.

**Bard**. 1. Originally: A poet by profession, especially one whose calling it was to celebrate in verse, song, and play the exploits of the chiefs or others who patronized him, or those of contemporary heroes in general. Bards of this character flourished from the earliest period among the Greeks, and to a lesser extent among the Romans. Diodorus and Strabo, in the first century B. C., allude to them under the name of Greek *bardoi*, and Lucan, in the first century A. D., under that of *bardi*. Tacitus seems to hint at their existence among the Germanic tribes. It was, however, above all, among the Gauls and other Celtic nations that they flourished most.

According to Warton, they were originally a constitutional appendage of the Druid hierarchy. At Llanidan, in Anglesea, Wales, formerly inhabited by Druidical conventual societies, vestiges exist of *Tre'r Dryn* = the Arch-Druid's mansion; *Bodrudau* = the abode of the inferior Druids; and near them *Bod-owyr* = the abode of the Ovades, *i. e.*, of those passing through their novitiate; and *Tre'v Beirdd* = the hamlet of the bards.

They may be even considered as essential constituents of the hierarchy, if the division of it into priests, philosophers and poets be accurate. The bards did not pass away with the Druids, but flourished, especially in Wales, honored at the courts of princes, and figuring up to the present day at the eisteddfods or gatherings of bards and minstrels. They were similarly honored throughout Ireland, and indeed among the Celts everywhere.

2. Later: A vagrant beggar, who could not or would not work, and who, moreover, pretended to be wanting in understanding, if indeed, he were not so in reality.

3. Now: A synonym for a poet.

**Bard**, a fortress and village in the Italian province of Turin, on the left bank of the Dora Baltea, about 23 miles S. E. of Aosta. When the French crossed the St. Bernard, in 1800, the fortress of Bard, manned by 400 Austrians, maintained for 10 days a resistance to their further advance into Italy. Ultimately Napoleon contrived to elude the vigilance of the garrison, and passed by a



mountain-track during the night. Bard was taken a short time after by the French, and razed, but, in 1825, it was restored.

**Bard, Samuel**, an American physician, born in Philadelphia, April 1, 1742; practiced in Philadelphia and New York; was the principal mover in the establishment of the medical school of Kings (Columbia) College; president of the New York College of Physicians and Surgeons that succeeded the medical school. He died in Hyde Park, N. Y., May 24, 1821.

**Bardesanists**, a Christian sect which flourished in Mesopotamia, from A. D. 161 to 180. They were the followers of Bardesanes, of Edessa, who at one time advocated the tenets of Valentinus, the Egyptian, though he afterward abjured them. Mosheim contends against this view, declaring that Bardesanes admitted two principles, like the Manichæans. His followers denied the Incarnation and the Resurrection, and continued to exist as late as the 5th century.

**Bardili, Christoph Gottfried** (bardil'ē), a German metaphysician, born in Blaubeuren, Württemberg, May 28, 1761; distinguished as a critic and opponent of Kant; Professor of Philosophy at Stuttgart; philosophically a forerunner of Schelling and Hegel through his exposition and defense of the reality of pure abstract thought as a ground of concrete thinking and being. He died in Stuttgart, June 5, 1808.

**Bardsley, Charles Wareing**, an English author, born in Keighley, Yorkshire, in 1834; graduated at Oxford in 1868; and ordained deacon in 1870. His publications include "English Surnames, their Sources and Significations" (1875); "John Leeley's Troubles" (3 vols., 1876); "Memorials of St. Anne's, Manchester" (1876); "Curiosities of Puritan Nomenclature" (1880); "Her Grandfather's Bible, a Tale of Furner's Fells" (1886), etc.

**Bardsley, John Wareing**, an English clergyman, born in Keighley, Yorkshire, March 29, 1835; educated in Trinity College, Dublin; ordained in 1860; Bishop of Sodor and Man in 1887; transferred to Carlisle in 1892. His works include "Counsels to Candidates for Confirmation" (1882); "The Origin of Man" (1883), etc.

**Barebone, or Barbone, Praise-God**, a member of the legislative body assembled by Cromwell in 1653, after the dissolution of the Long Parliament. The royalists facetiously distinguished him by calling the convention "Barebone's Parliament." At the time when General Monk was in London, Barebone headed the mob which presented a petition to Parliament against the recall of Charles II. It is said that there were three brothers of this family, each of whom

had a sentence to his name, viz.: "Praise-God Barebone," "Christ-came-into-the-world-to-save Barebone" and "If-Christ-had-not-died-thou-hadst-been-damned Barebone."

**Barebone's Parliament**, the "Little Parliament" summoned by Oliver Cromwell, met July 4, 1653, and was so nicknamed from the name of one of its members. It consisted of 139 persons, "faithful, fearing God, and hating covetousness," but mostly of very destructive social principles. These began by abolishing the Court of Chancery, and were proceeding to abolish tithes, to the alarm of the more moderate members, and of Cromwell himself, who dissolved the Parliament on Dec. 12, of the same year.

**Barefooted Friars**, monks who use sandals, or go barefoot. They are not a distinct body, but may be found in several orders of mendicant friars—for example, among the Carmelites, Franciscans, Augustines. There were also barefooted nuns.

**Barége** (bär-āzh'), a light, open tissue of silk and worsted or cotton and worsted for women's dresses, originally manufactured near Baréges.

**Baréges**, a watering-place, S. of France, department of Hautes-Pyrénées, about 4,000 feet above the sea, celebrated for its thermal springs, which are frequented for rheumatism, scrofula, etc. The place is hardly inhabited except in the bathing season, June till September.

**Baregine**, a slimy or gelatinous deposit in the hot sulphurous springs at Baréges, Aix-la-Chapelle, and elsewhere, which is found on microscopic examination to consist of masses of rods and filaments of beggiatoa mixed with grains of reduced sulphur. The thermal waters apparently act as culture fluids for the atmospheric germs, and it is to the vital activities of these fungi that Cohn ascribes the evolution of sulphuretted hydrogen from the spring.

**Bareilly** (ba-rāl'ē), a town of Hindustan in the new United Provinces; capital of a district of the same name, on a pleasant and elevated site. It has a fort and cantonments, a government college, and manufactures sword-cutlery, gold and silver lace, perfumery, furniture and upholstery. On the outbreak of the Indian Mutiny the native garrison took possession of the place, but it was retaken by Lord Clyde in May, 1858. Pop. (1901) 117,433. The district has an area of 1,614 square miles; pop. 1,030,936.

**Barentz, Willem**, a Dutch navigator. He was one of the early Arctic explorers; his attempt being to find a northeast passage to China. In his first voyage he reached lat. 77°–78°, and in his last, 80° 11'. He commanded several exploring expeditions around Nova Zembla and Spitzbergen,



## Barentz Sea

on one of which he had seven vessels loaded with rich goods for Eastern trade. In the summer of 1596, he set out with two ships, which were frozen in at Ice Haven in September. For over 80 days the sun was below the horizon, and the explorers passed the winter in the direst misery. The following June they attempted to reach the mainland in boats, but most of them were lost. Barentz, among others, perished.

**Barentz Sea**, that part of the Arctic Ocean between Nova Zembla and Spitzbergen; so called from its explorer, Willem Barentz.

**Barère de Vieuzac, Bertrand** (bär-är' de vyè-zäk'), a French Revolutionist and agitator, born at Tarbes, Sept. 10, 1755. First an advocate at Toulouse, he acted as a Deputy in the National Assembly, and was sent by the Department of the Hautes-Pyrénées to the National Convention in 1792. He soon became active as a journalist, and attached himself to the "Mountain," supporting it with eloquence of such a flowery and poetical style as afterward earned him the name of the "Anacreon of the guillotine." He was president of the Convention when the sentence was passed upon Louis XVI. He rejected the appeal to the people, and gave his vote with these words: "The law is for death, and I am here only as the organ of the law." Though a supporter of Robespierre, he concurred in his downfall, yet this did not save him from being impeached and sentenced to transportation. His sentence was not carried into effect, and he shared in the general amnesty of the 18th Brumaire. Elected a Deputy during the Hundred Days, he was banished after the second restoration. He went to Brussels, where he devoted himself to literary work till the revolution of July permitted his return. In 1832 he was once more elected as a Deputy by the Department of the Hautes-Pyrénées; his election, however, was annulled, on account of errors of form, whereupon the government called him to be a member of the administration of that Department, which office he held till 1840. Barère was one of the most graceful and consummate liars in history. His masterpiece in this kind is his famous account of the sinking of the ship "Vengeur," in 1794, which is still dear as a heroic story to the French people, and was described in glowing words, as a real historical exploit, by Carlyle, in the first edition of his "French Revolution." He died Jan. 14, 1841.

**Baretti, Giuseppe Marcantonio** (bar-et'è), an Italian critic and poet (1719-1789), who, after a roaming life in Italy, settled in London in 1751, whither he returned again about 1766, having left England in 1760, and founded in Venice the critical periodical "Frusta Letteraria" ("Literary Scourge"), which contained his most import-

## Bar Harbor

ant work, and is considered as epoch-making in Italian literature. Of his writings in English, the "Account of the Manners and Customs of Italy" (1768-1769), attracted much attention. His "Dictionary of the English and Italian Languages" (1760, lately 1873) is still highly esteemed.

**Barfleur**, a seaport town of France, in the Department of La Manche, about 15 miles E. of Cherbourg. It is now a place of little importance, but it is noteworthy in history as the port whence, in 1066, William the Conqueror set out on his invasion of England. Close by, on the ill-famed "Pointe de Barfleur," stands the highest lighthouse in France, 271 feet above the sea.

**Barham, Richard Harris**, an English humorous writer; born in Canterbury, where his family had resided for several generations, Dec. 6, 1788. He was educated at St. Paul's School, London, on leaving which he entered himself at Brasenose College, Oxford, and afterward studied for the Church, though his original destination was the legal profession. Having been ordained a clergyman, he was appointed to the curacy of Ashford, and from thence to that of Westwell, both in Kent. In 1814 he married, and was shortly afterward presented to the rectory of Snargate, in Romney Marsh, in the same county. Shortly afterward he was elected one of the minor canons of St. Paul's Cathedral, and having now a considerable amount of leisure time on his hands, employed it in writing for Groton's "Biographical Dictionary" and Blackwood's "Magazine," to the former of which he contributed nearly one-third of the articles, and to the latter "My Cousin Nicholas," a tale of college life, which obtained a large share of popularity. In 1824 he was appointed one of the priests in ordinary of the chapel-royal, and was shortly afterward presented to the rectory of the united parishes of St. Mary Magdalene and St. Gregory-by-St. Paul, London. In 1837 on the starting of Bentley's "Miscellany," under the editorship of Charles Dickens, Mr. Barham laid the main foundation of his literary fame by the publication in that periodical of the "Ingoldsby Legends," a series of humorous tales in irregular and very original verse which achieved an immense success. He died in London, June 17, 1845.

**Bar Harbor**, a popular summer resort in Hancock county, Me.; on the E. shore of Mt. Desert Island, and opposite Porcupine Islands. It derives its name from a sandy bar which connects Mt. Desert with the largest of the Porcupine group. The village is known locally as East Eden. The surrounding scenery is very pleasing, and within a short distance are many points of interest readily accessible to the tourist. Among these are the summit of Green Moun-



## Bari

tain, Eagle Lake, Mt. Newport, Kebo, The Ovens, Great and Schooner Heads, Spouting Horn, Thunder Cave, and Eagle Cliff.

**Bari**, ancient **Barium**, a seaport of Southern Italy, on a small promontory of the Adriatic, capital of the province Terra di Bari. It was a place of importance as early as the 3d century B. C., and has been thrice destroyed and rebuilt. The present town, though poorly built for the most part, has a large Norman castle, a fine cathedral, and priory, etc. It manufactures cotton and linen goods, hats, soap, glass, and liquors; has a trade in wine, grain, almonds, oil, etc., and is now an important seaport. Pop. (1901) 77,478. The province has an area of 2,065 square miles, and is fertile in fruit, wine, oil, etc.; pop. (1901) 827,698.

**Bari**, a negro people of Africa, dwelling on both sides of the White Nile, and having Gondokoro as their chief town. They practice agriculture and cattle-rearing. Their country was conquered by Baker for Egypt.

**Bariatinski, Alexander Ivanovich, Prince**, a Russian field-marshal, born in 1814, and educated with the future Czar, Alexander II. While a young officer in the hussars, some love passages with a Grand Duchess caused his transfer to the Caucasus, where his successes against the famous Shamyl secured him, in 1852, the rank of lieutenant-general. On the accession of Alexander II. he returned to St. Petersburg, and in 1856 was appointed to the command of the Army of the Caucasus. Three successful campaigns were closed by the storming of Ghunib, and the capture of Shamyl. For these services he was made a field-marshal. His health, however, had broken down, and the remainder of his life was passed chiefly abroad. He died in Geneva, March 9, 1879.

**Barilla**, the ash of sea weeds and plants, as *salsola soda*, which grow on the sea side. It is prepared on the coast of Spain, and was formerly the chief source of sodium carbonate.

**Barilla de Cobre** (bar-il'a dè kō'brè), the commercial name for native copper brought from Bolivia.

**Baring**, family name of the founders of one of the greatest financial and commercial houses in the world; now known as Baring Brothers & Co. The father of the founders was JOHN BARING, a German cloth manufacturer, who started a small business at Larkbear, near Exeter, England, in the first half of the 18th century. Two of his sons, FRANCIS and JOHN (1730-1816), established in London in 1770 the now existing house.

BARING, Sir FRANCIS (1740-1810), born at Larkbear, was deaf from his youth; but, receiving a commercial training in the house of Boehm, he overcame all obstacles, and

## Baring

founded a large and successful business. He became a director of the East India Company, and, being a staunch supporter of Pitt, was created a baronet by that minister in 1793. He represented Grampound, Chipping Wycombe, and Calne in Parliament from 1784 to 1806. He took an active part in the discussions relative to the bank restriction act of 1797, and wrote on this and other financial subjects. At the time of his death, he was reckoned the first merchant in Europe, and had amassed a fortune of nearly £7,000,000.

BARING, Sir THOMAS (1772-1848), eldest son of the above, succeeded his father in the baronetcy. He appears to have taken no active part in the business of the firm, being chiefly remarkable as an admirer and encourager of art. His magnificent collection of paintings was dispersed by public sale after his death in April, 1848. His fourth son, Charles Thomas (1807-1879), Bishop of Durham, was a strong Evangelical, noted for his piety. For ALEXANDER BARING, see ASHBURTON (LORD).

BARING, Sir FRANCIS THORNHILL (1796-1866), son of Sir Thomas, whom he succeeded, was educated at Oxford, where, in 1817, he took a double first class. He represented Portsmouth from 1826 till 1865. Under successive Whig governments, he was a Lord of the Treasury, Secretary to the Treasury, Chancellor of the Exchequer, and First Lord of the Admiralty. He was created Baron Northbrook in 1866, and died Sept. 6, the same year. His son, Thomas George, second Lord Northbrook, was born in 1826, and was successively a Lord of the Admiralty, Under Secretary of State for India, Under Secretary of War, Governor-General of India (1872-1876), and First Lord of the Admiralty (1880-1885), and was created an Earl in 1876.

BARING, EVELYN, EARL CROMER, was born in 1841, in 1877-79 was British commissioner of the Egyptian public debt office, and in 1879 became British controller-general in Egypt. In 1880 he was appointed financial member of council in India. From 1883 until his resignation in 1907 he was British agent and consul-general in Egypt, and a minister plenipotentiary in the diplomatic service. His able administration transformed the country. He wrote "Modern Egypt" (1908).

BARING, THOMAS (1799-1873), brother of the first Lord Northbrook, devoted himself early to commercial pursuits, and also to politics, in which he was a Conservative, thus taking the opposite side to his brother. He entered Parliament in 1835, representing Huntingdon from 1844 till his death.

In 1885, the then head of the firm, Edward Charles Baring, was raised to the peerage, as Baron Revelstoke. The firm is engaged to a large extent in the negotiation



of national loans, in exchange and money broking, in the produce trade, home and colonial, and in importation and exportation from, and to, foreign countries.

**Baring=Gould, Sabine**, an English antiquary and novelist, born in Exeter, Jan. 28, 1834. He graduated from Cambridge in 1856, and has been since 1881 rector of Lew-Trenchard in Devon. He is author of "Iceland: Its Scenes and Sagas" (1864); "The Book of Werewolves" (1865); "Curious Myths of the Middle Ages" (series 1 and 2, 1866-1867); "Lives of the Saints" (1872-1879); "Yorkshire Oddities" (2 vols., 1874); and "Germany, Past and Present" (2 vols., 1879). He has written religious books, and of late years novels which have become popular. They include "Mehalah: a Story of the Salt Marshes" (2 vols., London, 1880); "John Herring" (2 vols., 1883); "Red Spider" (1887); "Grettitis the Outlaw" (1890); "The Broom Squire" (1896); "Guavas the Tinner" (1897); "Bladys" (1897); "Domitia" (1898); "Pabo the Priest" (1899); "A Book of the West" (1899); "Furze-Bloom" (1899); "Family Names," etc. (1910).

**Baring Island**, an island, also a strait and bay of the same name, in the Arctic Archipelago. They were named for Sir Francis Baring, who was First Lord of the Admiralty at the time of their discovery.

**Baringo**, an African lake, N. E. of the Victoria Nyanza, and just N. of the equator. It is about 20 miles long, lies 6,000 feet above the sea, and has no known outlet, though its water is fresh.

**Barita**, a genus of birds, placed by Cuvier among the *laniadae* (shrikes), but transferred by Vigors to that of *corvidae* (crows). The birds belonging to it are called by Buffon *cassicans*. They are found in Australia and New Guinea. *Barita tibicen* is the piping crow of New South Wales.

**Barite**, or **Baryte**, a mineral, called also baroselenite, sulphate of baryta, heavy spar, and by the Derbyshire miners, cauk, calk, or cawk. It is placed by Dana in his celestite group. It is orthorhombic, and has usually tabular crystals, or is globular, fibrous, lamellar, or granular. Its hardness is 2.5-3.5; sp. gr., as much as 4.3-4.72, whence the name heavy spar; its luster, vitreous, or slightly resinous; its color white, yellowish, grayish, black, reddish, or dark brown. It is sometimes transparent, sometimes almost opaque. When rubbed, it is occasionally fetid. Its composition is: Sulphuric acid, 34.3; baryta (monoxide of barium), 65.7 = 100, whence the name sulphate of baryta. It is found as part of the gangue of metallic ores in veins in secondary limestones, etc. It is found in the United States and on the continent of Europe. Dana thus subdivides barite: Variety 1.

(a) Ordinary, (b) created, (c) columnar, (d) concretionary, (e) lamellar, (f) granular, (g) compact or cryptocrystalline, (h) earthy, (i) stalactitic and stalagmitic. Bologna stone is included under (d). 2. Fetid. 3. Allomorphite. 4. Calcareobarite. 5. Celestobarite. 6. Calstronbarite. It is found altered into calcite, spathic iron, and a variety of other minerals.

**Baritone**, or **Barytone**, a male voice, the compass of which partakes of those of the common bass and the tenor, but does not extend so far downward as the one, nor to an equal height with the other. Its best tones are from the lower A of the bass clef to the lower F in the treble.

**Barium**, a dyad metallic element; symbol Ba; atomic weight, 137. Barium is prepared by the decomposition of barium chloride,  $\text{BaCl}_2$ , by the electric current, or by the vapor of potassium. It is a white, malleable metal, which melts at red heat, decomposes water, and oxidizes in the air. Barium occurs in nature as barium carbonate and sulphate. Its salts are prepared by dissolving the carbonate in acids, or by roasting the native sulphate of barium with one-third its weight of coal, which converts it into barium sulphide,  $\text{BaS}$ ; this is decomposed by hydrochloric or nitric acid, according as a chloride or nitrate of barium is required. All soluble salts of barium are very poisonous; the best antidotes are alkaline sulphates. The salts of barium are employed as re-agents in the laboratory, and in the manufacture of fireworks, to produce a green light. Barium is precipitated as a carbonate,  $\text{BaCO}_3$ , along with carbonates of strontium and calcium, by ammonia carbonate. Barium can be separated by dissolving the carbonates in acetic acid, and adding potassium chromate, which gives a yellow precipitate of the insoluble barium chromate. Barium salts give an immediate white precipitate on the addition of calcium sulphate, an insoluble precipitate with  $4\text{HF} \cdot \text{SiF}_4$  (hydrofluosilicic acid), and a white precipitate insoluble in acids with sulphuric acid or with soluble sulphates; this precipitate is not blackened by  $\text{H}_2\text{S}$ . Barium chloride gives a green color to the flame of alcohol, and the spectrum of barium salts contains a number of characteristic green lines.

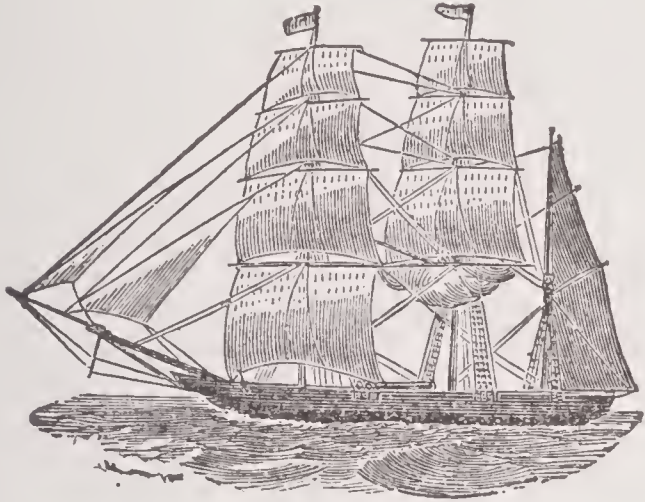
**Bark**, the exterior covering of the stems of exogenous plants. It is composed of cellular and vascular tissue, is separable from the wood, and is often regarded as consisting of four layers: (1) The epidermis, or cuticle, which, however, is scarcely regarded as a part of the true bark; (2) the *epi-phlœum*, or outer cellular layer of the true bark or cortex; (3) the *mesophlœum*, or middle layer, also cellular; (4) an inner vascular layer, the *liber*, or *endophlœum*, commonly called bast. Endogenous plants



## Bark

have no true bark. Bark contains many valuable products, as gum, tannin, etc.; cork is a highly useful substance obtained from the epiphloeum; and the strength and flexibility of bast make it of considerable value. Bark used for tanning is obtained from oak, hemlock-spruce, species of acacia, growing in Australia, etc. Angostura bark, Peruvian, or cinchona bark, cinnamon, cascarilla, etc., are useful barks.

**Bark**, or **Barque**, a three-masted vessel of which the foremast and mainmast are



BARK.

square-rigged, but the mizzenmast has fore-and-aft sails only.

**Bark, Peruvian**, is the bark of various species of trees of the genus *cinchona*, found in many parts of South America, but more particularly in Peru, and having medicinal properties. It was formerly called Jesuit bark, from its having been introduced into Europe by Jesuits. Its medicinal properties depend upon the presence of quinine, which is now extracted from the bark, imported, and prescribed in place of nauseous mouthfuls of bark.

**Barka**, or **Benghazi**. See BARCA.

**Bark Beetle**, or **Bark Chafer**, a name common to many of the large family of coleopterous insects, called by entomologists *scolytidae*. They are all small, and generally of uniform color; they have hard bodies, and short, often club-shaped, antennæ. Most of the family live in wood or vegetable substances, as mushrooms, dried plants in herbariums, etc., and some of them are extremely injurious to living trees.

**Barker, Albert S.**, an American naval officer, born in Massachusetts, March 31, 1843; was graduated at the United States Naval Academy in 1859; served on the frigate "Mississippi" in the operations to open the Mississippi river in 1861-1863, taking part in the bombardment and passage of Forts Jackson and St. Philip and the Chalmette batteries, the capture of New Orleans, and the attempted passage of Port Hudson, where his vessel was destroyed. He became Captain May 5, 1892; commanded the

## Barker's Mill

cruiser "Newark" during the war with Spain; subsequently succeeded to the command of the battleship "Oregon," which he took to Manila; became a Rear-Admiral, and was placed in command of the Norfolk Navy Yard in 1899; and in July, 1900, succeeded the late Rear-Admiral Philip as commandant of the Brooklyn Navy Yard.

**Barker, Fordyce**, an American physician, born in Wilton, Franklin co., Me., May 2, 1819. Completing courses at Bowdoin, Harvard, and in Europe, he entered upon the practice of his profession in Norwich in 1845. He made a specialty of obstetrics and diseases of women. After serving as Professor of Midwifery at Bowdoin, he removed to New York city in 1850. He was an incorporator of the New York Medical College and obstetrical surgeon to Bellevue Hospital, besides acting as consulting physician in leading hospitals. He wrote "Puerperal Diseases" and "On Seasickness." He died in New York city, May 30, 1891.

**Barker, James Nelson**, an American author, born in Philadelphia, June 17, 1784. He served with distinction in the war of 1812, but subsequently entered civil life, becoming mayor of his native city in 1820. Later he was collector of customs at Philadelphia (1829 to 1838), and, during the ensuing 20 years was comptroller of the United States Treasury. He wrote notable poems, including "The Sisters," and "Little Red Riding Hood." His dramatic works, especially "Marmion," "The Indian Princess," and "Smiles and Tears," were popular. He died in Washington, March 9, 1858.

**Barker, Matthew Henry**, an English novelist, born at Deptford in 1790; followed the sea; and, under the name of "The Old Sailor," wrote spirited sea tales, very popular in their day. They include "Land and Sea Tales" (London, 1836); "Life of Nelson" (1836); "Topsailsheet Blocks" (3 vols., 1838; new ed., 1881); and "The Victory, or the Wardroom Mess" (1844). He died in London, June 29, 1846.

**Barker, Mount**, a range of hills S. E. of Adelaide, South Australia; altitude, 1,300 feet.

**Barker's Mill**, also called Scottish turbine, a hydraulic machine on the principle of what is known as the hydraulic tourniquet. This consists of an upright vessel free to rotate about a vertical axis, and having at its lower end two discharging pipes projecting horizontally on either side and bent in opposite directions at the ends, through which the water is discharged horizontally, the direction of discharge being mainly at right angles to a line joining the discharging orifice to the axis. The backward pressures at the bends of the tubes, arising from



## Bark Louse

the two issuing jets of water, cause the apparatus to revolve in an opposite direction to the issuing fluid.

**Bark Louse**, or **Scale Insect**, an insect of the family *coccidæ*, order *hemiptera*. The bark lice are very small insects, whose females are wingless, their bodies resembling scales. They sting the bark of trees with their long, slender beak, drawing in the sap, and, when very numerous, injure or kill the tree. On the other hand, the males have two wings, but no beak, and take no food. The apple bark louse (*mytalipsis pomorum*) is destructive to young apple trees, while in Florida, *M. gloverii* is a pest of the orange tree. The mealy bug, or coccus, of hot-houses, also belongs to this group.

**Barksdale, William**, an American statesman and military officer, born in Rutherford county, Tenn., Aug. 21, 1821. He was admitted to the bar when under 21, and rapidly achieved eminence in law and politics, editing the Columbus "Democrat," and serving in the Mexican War. He entered Congress in 1853, but gave up his seat when his State seceded, and took command of a regiment of Mississippi volunteers. He was made a Brigadier-General after a campaign in Virginia, and was killed at Gettysburg, July 2, 1863.

**Barlaam and Josaphat**, a famous mediæval spiritual romance, which is in its main details a Christianized version of the Hindu legends of Buddha. The story first appeared in Greek in the works of Joannes Damascenus in the 8th century. The compilers of the "Gesta Romanorum," Boccaccio, Gower, and Shakespeare have all drawn materials from it.

**Barlæus**, or **Bærle**, **Kaspar van** (bärli'us), a Dutch historian and learned writer, born in Antwerp, Feb. 12, 1584. His "Poems," mostly Latin, are not fiery, but his "History of Brazil under Maurice of Nassau" is decidedly so; and he composed also numerous fine orations, the influence he exercised upon thought being very considerable. He died in Amsterdam, Jan. 14, 1648.

**Barletta, Gabriello**, an Italian monk, born perhaps at Barletta, in the kingdom of Naples, in the 15th century. He became celebrated at Naples on account of his sermons, in which he mixed sarcasm and the ludicrous with the sacred; quoting, now Vergil, now Moses; placing David at the side of Hercules; and commencing a sentence in Italian to continue it in Latin, and end it in Greek. Sometimes he forgot himself so far as to use expressions of which he had not considered the signification, as when he asked by what signs the Samaritan knew Jesus was a Jew. Very serious authors, Nicéron and others, have given the response of the preacher; but it cannot be reproduced

## Barley Break

here. There is under his name a collection of Latin sermons, which have gone through more than 20 editions.

**Barley**, seeds or grains of various species and varieties of the genus *hordeum*. That most commonly in cultivation is *hordeum vulgare*, spring, or two-rowed barley, especially the rath-ripe and thanet sorts. *H. hexastichon* (*i. e.*, with the seeds growing in six rows) is the bear, or bigg barley. *H. distichon*, two-rowed, or common barley, is preferred for malting, which is one of the chief purposes for which barley is cultivated. *H. scocriton*, or sprat-barley, is more rare. Perhaps the four so-called species now enumerated may be only varieties of one plant. Barley is the hardiest of all the cereals, and was originally a native of Asia, but it is now cultivated all over the world, even as far N. as Lapland. In ancient times, it was largely used as an article of food, but the greater proportion of the barley now grown is used in the preparation of malt and spirits. For culinary purposes, it is sold in two forms, Scotch or pot barley, and pearl barley, the former being the grain partially deprived of its husk; the latter, by longer and closer grinding, being rounded and having the entire husk removed.

Bread made from barley meal is darker in color and less nutritious than that made from wheat flour; but it is cheaper and more easily digested. One pound of barley meal contains one ounce of flesh formers and 14 ounces of heat givers. Barley meal is sometimes adulterated with oat husks, and is itself used to adulterate oatmeal, and occasionally wheat flour; but these admixtures are readily detected by the microscope.

**Barley Break**, or **Barley Brake**, a game once common, as shown by the frequency with which it was alluded to by the old poets. It was played by six young people, three of either sex, formed into couples, a young man and a young woman in each, it being decided by lot which individuals were to be paired together. A piece of ground was then divided into three spaces, of which the central one was profanely termed hell. This was assigned to a couple as their appropriate place. The couples who occupied the other spaces then advanced as near as they dared to the central one to tempt the doomed pair, who, with one of their hands locked in that of their partner, endeavored with the other to grasp them and draw them into the central space. If they succeeded, then they were allowed themselves to emerge from it, the couple caught taking their places. That the game might not be too speedily finished, leave was given to the couple in danger of being taken to break hands and individually try to escape, while



## Barleycorn

no such liberty was accorded to those attempting to seize them.

**Barleycorn, John**, a personification of the spirit of barley, or malt liquor, often used jocularly, and in humorous verse. This usage is comparatively ancient. Dr. Murray's "Dictionary" quotes a title in the Pepysian Library, about 1620, "A pleasant new ballad \* \* \* of the bloody murder of Sir John Barleycorn." Burns' ballad on John Barleycorn, "There was Three Kings into the East," is well known, and more popular than the verse deserves.

**Barlow, Francis Channing**, an American military officer, born in Brooklyn, N. Y., Oct. 9, 1834; was graduated at Harvard College in 1855; studied law in New York, and practiced there. In 1861 he enlisted as a private in the 12th Regiment, New York State National Guard, which was among the first troops at the front. He was promoted Lieutenant after three months' of service; Colonel during the siege of Yorktown; distinguished himself in the battle of Fair Oaks, or Seven Pines, for which he was promoted Brigadier-General; fought in almost every subsequent battle of the Army of the Potomac. He was severely wounded at Chancellorsville, May 2, 1863, and at Gettysburg, July 1, 1863. He was mustered out of the service with the rank of Major-General of volunteers. In 1866-1868, he was Secretary of State of New York; in 1871 became Attorney-General; and in 1873 resumed law practice in New York. He died in New York city, Jan. 11, 1896.

**Barlow, Joel**, an American poet and diplomatist; born in Reading, Conn., March 24, 1754. In 1774 he was placed at Dartmouth College, and after a very short residence entered Yale College, where he displayed a talent for versification, which gained him the friendship of Dr. Dwight, then a tutor there. Barlow, more than once during the vacations of the college, served as a volunteer in the army of the Revolution. In 1778 he received the degree of B. A., and at first applied himself to the study of the law, but soon after accepted the position of chaplain in the army, which he held till the close of the war. During this period his songs and addresses were said to have animated and encouraged the soldiers; at this time, too, he planned and partly composed his "Vision of Columbus." He went to Hartford, where, not being successful as a lawyer, he started a weekly newspaper, continuing at the same time the preparation of his poem for the press. It was published in 1787, and some months after in London. To promote the sale of his poem, and that of a new edition of the "Psalms" adapted by him, Barlow gave up the newspaper and became a bookseller. In 1788 he went to France as agent for the

## Barmecides

Ohio Company. The Revolution was then in progress, and Barlow went about lecturing and organizing societies in its favor. He went to England in 1791, and was deputed in the following year by the London Constitutional Society to present an address to the French Convention. In 1795 he was appointed American consul at Algiers, a post he only held for two years. Returning to Paris he made some successful commercial speculations, and acquired a considerable fortune. He returned to his native country in 1805. In 1811 he was appointed minister plenipotentiary to France. In the following year, he was invited by Napoleon, who was then in Russia, to meet him for conference at Wilna, Poland. He fell in with the French army and was a sharer in its memorable retreat. Being overcome by cold and privation, he died near Cracow, Dec. 22, 1812. His principal poem is a long epic, entitled "The Columbiad" (Philadelphia, 1807). His prose writings bear the stamp of an active and energetic intellect, but want that ripeness of judgment required by the complex nature of the subjects he examines.

**Barlow, Peter**, an English physicist and mathematician; born in Norwich, in 1776. He was Professor of Mathematics in the Royal Military Academy at Woolwich for a period of 40 years. His greatest work is the "Mathematical and Philosophical Dictionary." He was also the author of an elaborate work on the "Machinery and Manufactures of Great Britain" (1837); of a treatise on the "Force and Rapidity of Locomotives" (1838); and of an "Essay on Magnetic Attraction," one of the first works in which the phenomena of magnetism were distinctly enunciated. He died in 1862.

**Barmecides**, an illustrious family of Khorassan, the romance of whose history is equally familiar to Europeans and Americans in the "Thousand and One Nights" (Arabian Nights' Entertainments), and to Orientals in the pages of their historians and poets; and who flourished at the Court of the early Abbasside Caliphs. Barmec, or Barmek, the founder of the family, transmitted the honors conferred on him by the Caliph Abd-al-Malik to his son, Khalid, and from him they passed to his son, Yahia, who, becoming tutor to the famous Haroun-al-Raschid, acquired an influence over that Prince; which, with Haroun's personal affection for the family, carried his sons, Fadl, or Fazl, Giaffar, Mohammed, and Mousa, to the highest dignities of the Court. The virtues and munificence of the Barmecides were, for a long period, displayed under favor of Haroun, as well as to the admiration of his subjects; but one of the brothers, Giaffar, having at last become an object of suspicion to the cruel and treacherous caliph,



## Barmen

Yahia and his sons were suddenly seized, Giaffar beheaded, and the others condemned to perpetual imprisonment. The year 802 is assigned as the date of this tragedy.

**Barmen**, a German city on the Wupper, in the Prussian Rhine Province, government of Düsseldorf, and formed by the union of seven villages contained in the fine valley of Barmen. It has extensive ribbon and other textile manufactures; also dye works, manufactures of chemicals, metal wares, buttons, yarns, iron, machines, pianos, organs, soap, etc. Pop. (1905) 156,080.

**Barnabas**, the surname of the apostle Joses, or Joseph, a fellow-laborer of Paul. He was a Levite, and a native of the Isle of Cyprus, and is said to have sold all his property, and laid the price of it at the feet of the apostles (Acts iv: 36, 37). When Paul came to Jerusalem, three years after his conversion, about A. D. 38, Barnabas introduced him to the other apostles (Acts ix: 26, 27). Five years afterward, the Church at Jerusalem being informed of the progress of the Gospel at Antioch, sent Barnabas thither, who beheld with great joy the wonders of the grace of God (Acts xi: 20, 24). He afterward went to Tarsus, to seek Paul and bring him to Antioch, where they dwelt together two years, and great numbers were converted. They left Antioch A. D. 45, to convey alms from this Church to that of Jerusalem, and soon returned, bringing with them John and Mark (Acts xi: 28, 30; xii: 25). While they were at Antioch, the Holy Ghost directed that they should be set apart for those labors to which he had appointed them; viz., the planting of new churches among the Gentiles. They then visited Cyprus, and some cities of Asia Minor (Acts xv: 2-14), and after three years' absence returned to Antioch. In A. D. 50, he and Paul were appointed delegates from the Syrian churches to consult the apostles and elders at Jerusalem, respecting certain questions raised by Jewish zealots; and they returned after having obtained the judgment of the brethren of Jerusalem. At Antioch, Barnabas was led to dissimulation by Peter, and was, in consequence, reprovved by Paul. While preparing for a second missionary tour, Paul and Barnabas, having a dispute relative to Mark, Barnabas' nephew, they separated, Paul going to Asia, and Barnabas with Mark to Cyprus. (Acts xiii: 15; Gal. ii: 13.) Nothing is known of his subsequent history. When he gave all his estates to Christ, he gave himself also, as his life of generous self devotion and missionary toil clearly shows. He was a beloved fellow laborer with Paul, somewhat as Melancthon was with Luther. The festival of St. Barnabas is celebrated in the Roman Catholic Church on the 11th of June.

**Barnabas, Epistle of**, an anonymous writing that makes greater claim to canon-

## Barnacle

cal authority than most of the other uncredited writings. It is cited by Clemens Alexandrinus, Origen, Eusebius, and Jerome, who admit it to be the work of Barnabas, but declare that it ought not to be esteemed of the same authority as the canonical works. It is published by Archbishop Wake among his translations of the works of the Apostolical Fathers, in the preliminary dissertation to which he gives the arguments adduced to prove it to be the work of St. Barnabas. It is, however, generally believed to have been written by some converted Jew in the 2d century, and seems to have been addressed to the unconverted Jews. It is divided into two parts. In the first part the writer shows the unprofitableness of the old law, and the necessity of the Incarnation and Death of Christ. He cites and explains allegorically certain passages relating to the ceremonies and precepts of the law of Moses, applying them to Christ and His law. The second part is a moral instruction, under the notion of two ways,—the way of light, under which is given a summary of what a Christian is to do that he may be happy forever; and the way of darkness, with the different kinds of persons who shall be forever cast out of the kingdom of God.

**Barnabas, Gospel of**, an apocryphal work ascribed to the apostle Barnabas. It relates the history of Christ very differently from the Evangelists, and is believed to be a forgery of some nominal Christians, and afterward altered and interpolated by the Mohammedans, the better to serve their purpose. It corresponds with those traditions which Mohammed followed in the Koran.

**Barnabite** (named after the Church of St. Barnabas at Milan, given over to the Barnabite Order in 1535), any member of a certain religious order, properly called the Regular Clerks of the Congregation of St. Paul. Its founders were the three clerics Ferrari, Morigia, and Zaccaria, of Milan. It arose in the 16th century, was approved by Clement VII., in 1532, and confirmed by Paul III. in 1535. The principal occupation of the Barnabites was preaching to sinners. The order has its headquarters in Rome, and several monasteries in Italy and Austria.

**Barnaby, Sir Nathaniel**, an English naval architect, born in Chatham, in 1829. From 1855 to 1885 he was engaged in the designing office of the Admiralty in the construction of nearly all the British naval vessels. He brought about the substitution of steel for iron in ship-building, and the subsidizing of merchant vessels for use in war. He was made a K. C. B. in 1885.

**Barnacle**, in zoology, (1) A general name for both pedunculated and sessile cirripeds. (2) Special: The English name of the pedunculated cirripeds (*lepadidæ*), as contradistinguished from those which are ses-



sile, yet more especially applied to the *lepas*, the typical genus of the family and order.

In ornithology the name for the bernicle goose. Formerly the absurd belief was entertained that these geese sprang from the barnacles described above. Max Müller believes that the bird was originally called *hibernicula*, which was converted into *bernicula* by the dropping of the first syllable, after which the similarity of the name to the cirriped led to the two being confounded together and generated the myth. Two species of the genus *lepas* were called, by Linnæus, *lepas anserifera* and *L. anatifera* = goose-bearing, of course with no belief in the fable suggested by the name.

**Barnard, Lady Anne**, author of "Auld Robin Gray," was born in 1750, eldest daughter of James Lindsay, fifth Earl of Balcarres. In 1793 she married Andrew Barnard, a son of the Bishop of Limerick, and colonial secretary to Lord Macartney at the Cape of Good Hope. There Lady Anne lived till 1807, when, losing her husband, she returned to London, her residence till her death, May 6, 1825. Her matchless lyric, named after the old Balcarres bard, was written as early as 1772 to sing to an ancient melody; but she first acknowledged its authorship in 1823 to Sir Walter Scott, who two years later edited it for the Bannatyne Club, with two continuations.

**Barnard, Charles**, an American dramatist, born in Boston, Mass., Feb. 13, 1838. He is a journalist and dramatist. His most popular play is "The County Fair" (1888). Author of "The Tone-Masters" (New York, 1871); "Knights of To-day" (1881); "The Whistling Buoy" (1887); dramas, and books on gardening and electricity.

**Barnard, Edward Emerson**, an American astronomer, born in Nashville, Tenn., Dec. 16, 1857; graduated at Vanderbilt University in 1887; was astronomer in Lick Observatory, California, in 1887-1895, and then became Professor of Astronomy in Chicago University and Director of the Yerkes Observatory. His principal discoveries are the fifth satellite of Jupiter in 1892, and 16 comets. He has made photographs of the Milky Way, the comets, nebulae, etc. The French Academy of Sciences awarded him the Lelande gold medal in 1892, and the Arago gold medal in 1893, and the Royal Astronomical Society of Great Britain gave him a gold medal in 1897. He is a member of many American and foreign societies, and a contributor to astronomical journals.

**Barnard, Frederick Augustus Porter**, an American educator, born in Sheffield, Mass., May 5, 1809; was graduated at Yale College in 1828; instructor there in 1830; Professor of Mathematics and Natural Philosophy in the University of Alabama in

1837-1848, and afterward of Chemistry and Natural History till 1854; Professor of Mathematics and Astronomy in the University of Mississippi, 1854-1861; its president in 1856-1858; and its Chancellor in 1858-1861. He was president of Columbia College, New York city, in 1864-1888. In 1860 he was appointed a member of the expedition to observe the eclipse of the sun in Labrador; was engaged in 1862 in reducing observations of the stars in the Southern Hemisphere; had charge of the publication of charts and maps of the United States Coast Survey in 1863; was named one of the original incorporators of the National Academy of Sciences in 1863; was one of the United States commissioners to the Paris Exposition in 1867; member of the American Philosophical Society, corresponding member of the Royal Society of Liege, and member of many other scientific and literary associations. Among his publications are "Letters on College Government" (1854); "Report on Collegiate Education" (1854); "Art Culture" (1854); "History of the American Coast Survey" (1857); "University Education" (1858); "Undulatory Theory of Light" (1862); "Machinery and Processes of the Industrial Arts, and Apparatus of Exact Science" (1868); "Metric System of Weights and Measures" (1871); etc. He died in New York city, April 27, 1889.

**Barnard, Henry**, an American educator, born in Hartford, Conn., Jan. 24, 1811. He was president of the University of Wisconsin (1856-1859), and St. John's College, Annapolis, Md. (1865-1866); founded the "American Journal of Education" (1855); was United States Commissioner of Education (1867-1870). Among his numerous writings are "Hints and Methods for Teachers" (1857); "Pestalozzi and Pestalozzianism" (1861), "German Educational Reformers" (1862); etc. He died in Hartford, July 5, 1900.

**Barnard, John**, an American Congregational clergyman, born in Boston, Nov. 6, 1681. He was one of the earliest New England dissenters from Calvinism. Ordained colleague minister of Marblehead (1716); he took great interest in the local fisheries and commerce. He wrote "History of the Strange Adventures of Philip Ashton" (1725), etc. He died at Marblehead, Mass., Jan. 24, 1770.

**Barnard, John Grosz**, an American military engineer, born in Sheffield, Mass., May 19, 1815; brother of F. A. P. Barnard. He was graduated at the United States Military Academy in 1833; served from 1835 to 1852 on the coast of the Gulf of Mexico; and was brevetted Major in the Mexican War. He subsequently had charge of the fortifications of San Francisco and New York harbors. For his services as Chief



Engineer of the Army of the Potomac in the Civil War he was brevetted Major-General, United States Army and United States Volunteers. He produced many scientific and military publications. He died in Detroit, Mich., May 14, 1882.

**Barnard-Castle**, a town of England, county of Durham, giving name to a parliamentary division of the county. There is a large thread mill and carpet manufactories, the Bowes Museum and Art Gallery, endowed by private munificence, and costing over \$400,000; and the Northern Counties School, richly endowed. The castle was originally built about 1178 by Bernard Baliol, grandfather of John Baliol.

**Barnard College**, an educational (non-sectarian) institution for women only, in New York city; organized in 1889, and named in honor of Frederick A. P. Barnard, through whose efforts its foundation was largely due. It was made essentially a part of Columbia University, certain courses of study in the University and the use of its library being open to the students of Barnard. The site of the college is on Morningside Heights, directly opposite the extensive grounds of the Columbia University. In January, 1900, the college was formally incorporated into the general system of Columbia University. The trustees of the latter authorized Seth Low, president of the university, to charge himself with the welfare of Barnard on precisely the same terms as he was charged with that of the university. It has grounds and buildings valued at over \$2,000,000; endowment, over \$1,050,000; scientific apparatus, \$70,000; total receipts, over \$200,000; faculty, about 75; students, over 650; and graduates, over 700.

**Barnardo, Thomas J.**, an English philanthropist; founder of the Barnardo Homes for homeless children; had his attention first turned in this direction by the condition in which he found a boy in a ragged school in East London in 1866. Following up the subject, he began to rescue children who had found their only shelter at night under archways, or in courts and alleys. These were introduced to his homes, where they received an industrial training, were saved from a possible career of crime, and enabled to achieve an honorable position in life. In 1899 over 36,000 boys and girls had passed through the homes; at the same time Dr. Barnardo had under his direction in the United Kingdom and the colonies 24 mission branches and 86 distinct homes dealing with every age and class of needy and destitute childhood, including an immigration depôt in Ontario, an industrial farm in Manitoba, a home for babies, and a hospital for sick children. Up to 1899 the number of trained and tested boys and girls who had been placed in colonial situations exceeded 10,000. He died Sept. 19, 1905.

**Barnato, Barney**, a South African speculator. His real name is believed to have been Bernard Isaac. He was born in London, England, about 1845, of Hebrew parents. He began business there as a dealer in diamonds, and in five years earned enough to buy shares in the Kimberly diamond mines. He established a partnership with Cecil Rhodes, and, when, in 1886, gold was discovered, secured possession of the greater part of the region. He committed suicide by jumping from the deck of the steamer "Scot," bound from Cape Town to Southampton, June 14, 1897.

**Barnave, Antoine Pierre Joseph Marie** (bär-näv'), a French orator, was born at Grenoble in 1761. He was the son of a rich procureur. He was chosen a Deputy of the *tiers état* to the assembly of the States-General, and showed himself an open enemy to the court. The Constituent Assembly appointed him their President in January, 1791. After the flight of the King, he defended Lafayette against the charge of being privy to this step, and, upon the arrest of the royal family, was sent, with Petion and Latour-Maubourg, to meet them, and to conduct them to Paris. When the correspondence of the court fell into the hands of the victorious party, Aug. 10, 1792, they pretended to have found documents which showed him to have been secretly connected with it, and he was guillotined Nov. 29, 1793.

**Barn Burners**, the nickname given to the radical element of the Democratic Party in New York State, which supported Van Buren in the campaign of 1848.

**Barnby, Sir Joseph**, an English composer and organist, born in York, Aug. 12, 1838; was chorister in York Minster; organist, St. Andrew's, Wells Street, London, 1863-1871; precentor and choir-master, St. Ann's, Soho, 1871; precentor and director of musical instruction in Eton College, 1875. His "Rebekah," a sacred idyll, "The Lord Is King," both with orchestra; numerous highly interesting services and anthems (such as "King All Glorious," for the Church, as well as several secular choruses and songs, rendered him famous both in England and the United States. He is, perhaps, most widely and affectionately known by his "Original Tunes to Popular Hymns," (2 vols.), numbering 146. He is rated one of the ablest of living vocal conductors, and the Barnby Choir has wide renown. He died Jan. 28, 1896.

**Barnegat Bay**, a bay on the E. coast of New Jersey, about 25 miles in length. Barnegat Inlet connects the bay with the Atlantic.

**Barnes, Albert**, an American Presbyterian minister, born in Rome, N. Y., Dec.



1, 1798. For 37 years pastor of the First Presbyterian Church in Philadelphia; he was best known by his "Notes" on the New Testament (of which over 1,000,000 volumes are said to have circulated), Isaiah, Job, Psalms, etc. He wrote also "The Church and Slavery" (1857); "Life at Threescore and Ten" (1869), etc. His heterodox views caused the formation of the New School of Presbyterian theology (1837). He died at Philadelphia, Dec. 24, 1870.

**Barnes, Barnabe**, an English poet, born in Yorkshire about 1569. He was the son of the Bishop of Durham; was educated at Oxford; and went to Normandy in 1591 with the Earl of Essex. His fame rests on a collection of sonnets, madrigals, and odes, called "Parthenophil and Parthenope" (London, about 1593). Other books, "A Divine Century of Spiritual Sonnets" (1595); and "The Devil's Charter," a tragedy (1607). He died in St. Mary-le-Bow, Durham, in December, 1609.

**Barnes, Joseph K.**, an American medical officer, born in Philadelphia, July 21, 1817; was educated in the medical department of the University of Pennsylvania; became Assistant Surgeon in the army in 1840, and served at various posts through the Mexican War. At the beginning of the Civil War he was summoned from Oregon, and assigned to duty in the office of the Surgeon-General. In 1863, he was appointed a Medical Inspector, with the rank of Colonel, and in September of the same year was promoted to Brigadier-General. In 1865 he was brevetted Major-General, United States Army. He was Surgeon-General of the army from 1864 till 1882, when he was retired. He died in Washington, D. C., April 5, 1883.

**Barnes, Dame Juliana**, Abbess of the Benedictine Monastery of Sopewell, near St. Alban's, England. She flourished in the 15th century, and was the author of a celebrated work entitled "The Boke of St. Alban's" from its having been printed in that monastery in 1486. It is a learned treatise on hawking, hunting, and coat-armor, and is now of extreme rarity and value.

**Barnes, William**, an English poet and philologist, born in Dorsetshire, Feb. 22, 1800; wrote many books on philology; and three series of "Poems of Rural Life in the Dorsetshire Dialect" (London, 1844, 1846 and 1863), and "Poems of Rural Life" (1866). His fad was the disuse of all but the Anglo-Saxon elements of the English language. He died in Winterbourne Came, in October, 1886.

**Barnet**, a town of England, in Herts, 11 miles from London, where was fought in 1471 a battle between the Yorkists and Lancastrians, resulting in the defeat of the

latter and the death of Warwick; Edward IV. being thus established on the throne.

**Barneveldt, Jan Van Olden** (bär'nevelt), Grand Pensionary of Holland, born in 1549. He had scarcely reached his 20th year when he was called to the office of Councilor and Pensionary of Rotterdam; and such was the opinion even then entertained of his eminent abilities and integrity that he was allowed an important share in the management of those transactions with France and England by which the United Provinces sought to maintain themselves against Spain, whose yoke they had just thrown off. His conduct in the high office of Grand Pensionary of Holland and West Friesland, which he afterward filled, not only secured the independence, but restored the trade and improved the finances of the United Provinces. After the election of Maurice of Nassau to the dignity of Stadtholder, Barneveldt became the champion of popular liberties, and opposed with determination the ambitious designs of the new prince. He was so far successful as to have a truce of 12 years concluded with Spain, in opposition to the views of the Stadtholder; and such was the popularity of that measure that he must have had the advantage over his rivals if their respective claims had come to be submitted to any assembly of the States; but about this time, the fanaticism of two sects, the Arminians and Gomarists, raged throughout Holland, and the Grand Pensionary was involved in the ruin of the former. After the condemnation of the Arminians by the Synod of Dort, Barneveldt was adjudged to death as a traitor and heretic, by 26 deputies named by Maurice. The sentence was carried into effect in 1619.

**Barney, Joshua**, an American naval officer, born in Baltimore, Md., July 6, 1759. He was captured by the British in March, 1778, but was exchanged in August of the same year; was captured again and held a prisoner till he escaped in 1781. In April, 1782, he took the British ship "General Monk," off Cape May; in November, 1782, he carried dispatches to Dr. Franklin in France, and brought back a sum of money lent by the French government. In 1794 he went with Monroe to France, and for six years served in the French navy. In 1814, he commanded the fleet stationed in Chesapeake Bay. He died in Pittsburg, Pa., Dec. 1, 1818.

**Barni, Jules Romain**, a French scholar and critic, born in Lille, June 1, 1818. His efforts to propagate the Kantian philosophy through the medium of "Observations on the Sense of the Sublime and Beautiful" (1836); "Foundations of Ethical Metaphysic" (1848), and "Kantian Philosophy" (1850), earned him distinction; as



## Barn Owl

did also, in another, but contiguous field, a "History of Moral and Political Ideas in France in the Eighteenth Century" (1866). He died in Mers, Department of Somme, July 4, 1878.

**Barn Owl**, a bird of prey belonging to the family *strigidæ*. It is called also the white owl, the church owl, the screech owl, the European screech owl (Macgillivray), the hissing owl, the yellow owl, the gill-howther, the howlet, and the hoolet. Above it is light, reddish yellow, mottled with ash-gray and black and white spots; beneath, it is white with small dusky spots. The male is 14 inches long, and the female 15. It preys on the smaller mammalia and birds, with beetles and other insects. It is permanently resident, builds its nest in a steeple, a dovecote, or a hollow tree, and lays from two to five pure white eggs. It is found in the United States and in Europe.

**Barnum, Frances Courtenay (Baylor)**, an American novelist, born in Arkansas, 1848. She has written "On Both Sides," an international novel; "Behind the Blue Ridge," "Juan and Juanita," a story for boys and girls; "Claudia Hyde." She has also been a frequent contributor to magazines, and a writer of short stories.

**Barnum, Phineas Taylor**, an American showman, born at Bethel, Conn., July 5, 1810; after various unsuccessful business ventures, finally established Barnum's Museum in New York (1841), which was twice burned. He introduced Tom Thumb, Jenny Lind, Commodore Nutt, Admiral Dot, the woolly horse, Jumbo, etc., to the American public. In 1871 he established his great circus. He was mayor of Bridgeport, and four times member of the Connecticut Legislature. His benefactions were large and frequent. He wrote "Humbugs of the World" (1865); "Struggles and Triumphs" (1869); "Lion Jack, a Story" (1876); "Autobiography" (1855; new editions 1869 and later). He was a lecturer on temperance and other popular subjects. He died at Bridgeport, Conn., April 7, 1891.

**Barnum, William H.**, an American statesman, born in Boston Corners, N. Y., Sept. 17, 1818; received a public school education and amassed large wealth in manufacturing; was a member of Congress from Connecticut in 1866-1876, when he was elected United States Senator to complete the term of Orris S. Ferry (deceased). In 1880 and 1884 he was chairman of the Democratic National Committee. He died in Lime Rock, Conn., April 30, 1889.

**Barnwell, Robert Woodward**, an American statesman, born in Beaufort, S. C., Aug. 10, 1801; was graduated at Harvard University in 1821; became a lawyer; was a member of Congress from South Carolina in 1829-1833; a United States Senator from

## Baroda

that State, 1850-1851; Commissioner from South Carolina to confer with the Federal Government regarding the proposed secession of the State, in 1860; member of the Provisional Confederate Congress, 1861-1862; a Confederate Senator in 1862-1866; and then president of the University of South Carolina (an office he had held in 1835-1841) till 1873. He died in Columbia, S. C., Nov. 25, 1882.

**Baroche, Pierre Jules** (bär-ōsh'), a French statesman, born at Paris, 1802. In 1847, he was elected member of the Chamber of Deputies for the Department of Charente-Inférieure, where he steadily opposed the ministry of Guizot. He signed the *Acte d'Accusation*, drawn up by Odillon Barrot, on Feb. 23, 1848, in which they were accused of violating the rights of citizens, and of systematic corruption. On Dec. 2, 1851, Baroche was nominated President of the Council of State; an office in which he exhibited much ability and tact, and, subsequently, filled the offices of Minister of Foreign Affairs (1860), and Minister of Justice (1863). He was made a Senator in 1864, and died in 1870.

**Baroda**, the second city of Guzerat, and third in the Presidency of Bombay, India; capital of the territory of the Guicowar (Gaekwār), in the State of the same name. It is 248 miles N. of Bombay, with which it is connected by railway. It stands to the E. of the Viswamitri, which is here crossed by four stone bridges, one of which is of singular construction—an upper range of arches resting on a lower one. It has several palaces, Hindu and other temples, contains the chief court of the State, a high class school, and two vernacular schools. The majority of the houses are mean and overcrowded. Baroda occupies an important situation between the coast and the interior, and its trade in native produce is considerable. The Mahratta State of Baroda, the political control of which in 1875 was transferred from Bombay to the government of India, includes the territories of the Guicowar in various parts of the province of Guzerat. Area of these territories, 8,570 square miles. The N. districts, which form a wide plain, are drained by the Nerbudda, Tapti, Mahi, and other rivers. The soil is fertile here; ruined temples, deserted towns, and tanks half filled with mud, are a witness of former prosperity. A military force of about 3,000 is maintained and performs police duty. In the N. division there is a famous breed of large white cattle; grain, cotton, opium, tobacco, sugar cane, flax, indigo, and oil seeds are the chief agricultural products, and grow luxuriantly. Baroda came under British suzerainty in 1802. In 1874 a Guicowar was deposed for an alleged attempt to poison the British resident.



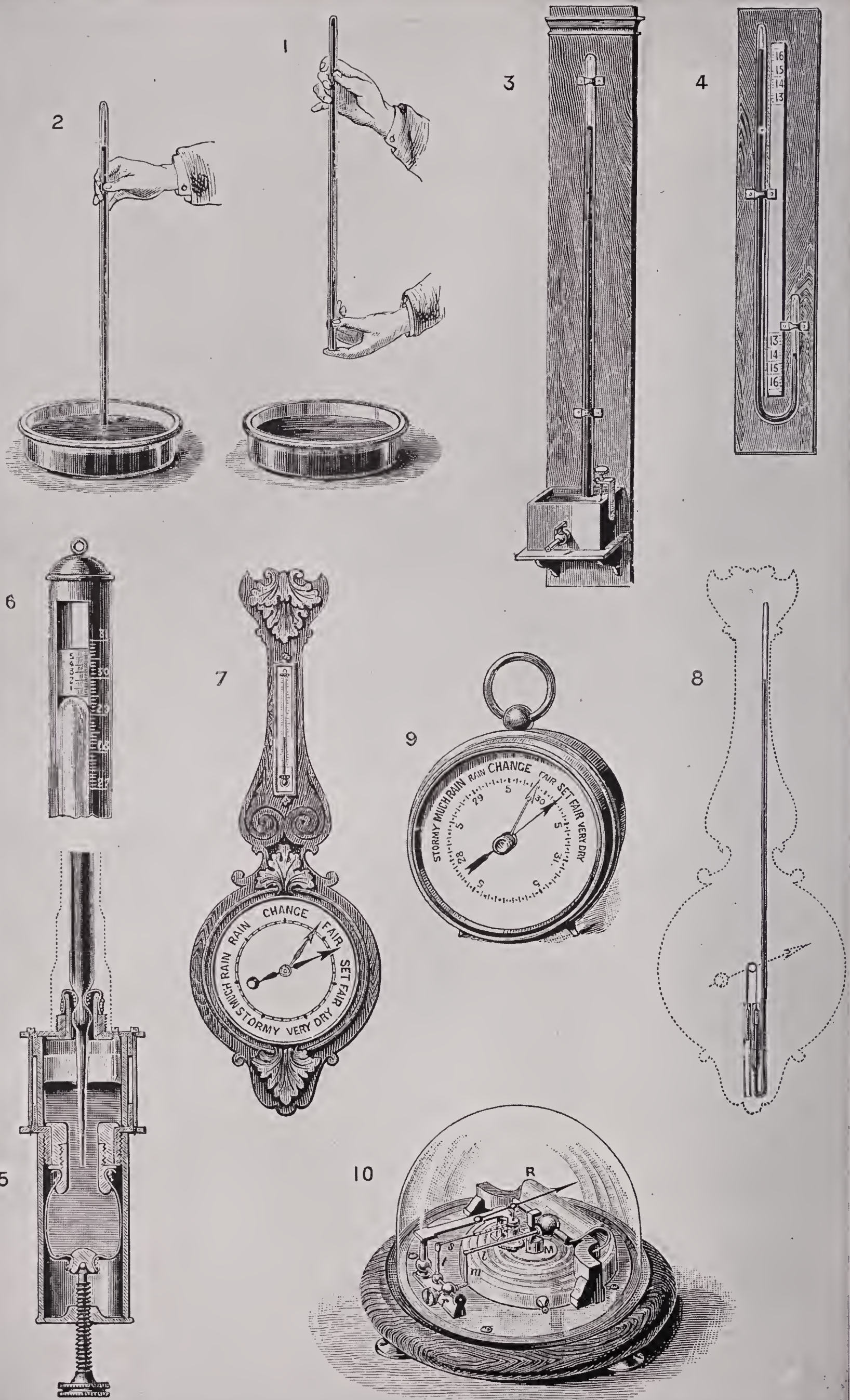
## BAROMETER.

FIG.

- 1-2. Torricelli's Experiment with Tube Full of Mercury.
3. Barometer In Its Simplest Form.
4. Barometer with Bent Tube and Scale.
- 5-6. Fortin's Portable Barometer—Structural Details.
7. Common Wheel-barometer or Weather-glass.
8. Internal Structure of Same.
9. Aneroid Barometer.
10. Internal Mechanism of Aneroid.



# BAROMETER.





## Barograph

**Barograph**, a self-registering barometer (see BAROMETER). One of the most common forms employs an arm attachment carrying a pencil moved uniformly by clockwork. This registers the variations of pressure.

**Barometer**, an instrument for measuring the weight of the air and the variations of its pressure in order to determine changes in the weather, the height of mountains, and other phenomena. This most useful instrument had its origin in an experiment of Torricelli, an Italian, who flourished about the middle of the 17th century. Torricelli took a glass tube about three feet in length, being open at one end only, and having filled it with mercury, he placed the open end in a eup containing the same fluid metal, taking care the while that none of the mercury flowed out of the tube, or that any air was admitted. When the tube was placed in a vertical direction, with the open end in the cup, he found that a portion of the mercury descended into the cup, the height of the column of the metal in the tube being only about 30 inches. It was inferred by the experimenter that the atmosphere, by reason of its weight, pressed on the surface of the mercury in the eup, and forced it up the tube to the height of 30 inches; because a column of air from the cup to the top of the atmosphere was only equal to the pressure arising from the weight of a column of mercury of the same base, and 30 inches high. Pascal repeated and varied this experiment, and confirmed Torricelli's conclusion. These experiments were made in 1645, and six years afterward it was found by Perrier that the height of the mercury in the Torricellian tube varied with the weather; and the instrument was proposed to be employed for the measurement of the height of mountains by Boyle in 1665.

The common barometer consists of a glass tube 33 inches in length, the diameter of the bore being about one-third of an inch. This tube is hermetically sealed at the top, and the bottom is curved up, and open to the atmosphere. It is filled with purified mercury, and there is affixed to it a scale which marks the height of the mercurial column. In Great Britain the height of the mercury seldom passes without the limits of 28 and 31 inches; and this will, therefore, be a sufficient length for the scale of the instrument when it is only to be used as a weather glass. The weather points are marked thus: At 28 inches, stormy weather;  $28\frac{1}{2}$ , much rain or snow; 29, rain or snow;  $29\frac{1}{2}$ , changeable; 30, fair or frost;  $30\frac{1}{2}$ , settled fair or frost; 31, very dry weather or hard frost. To use the barometer as a weather glass several particulars must be attended to which have been given by different authors in the form of rules, as those of Halley, Walker, Patrick, etc. Patrick's rules, probably the best,

## Barometer

are as follows: (1) The rising of the mercury presages, in general, fair weather, and its falling the contrary. (2) In very hot weather a fall indicates thunder. (3) In winter the rising presages frost, and in frosty weather, if the mercury falls three or four divisions (tenths of an inch), a thaw is certain; but in a continual frost, if the mercury rises, there will be snow. (4) When foul weather happens soon after a fall, expect but little of it; and, on the other hand, fair weather coming quickly after a rise will probably not last. (5) In foul weather, when the mercury rises much and high, and so continues for two or three days before the foul weather has gone away, then a continuance of fair weather may be expected to follow. (6) In fair weather, when the mercury falls much and low, and thus continues for two or three days before the rain comes, then a great deal of wet and high winds may be expected. (7) The unsettled motion or frequent rising and falling of the mercury denotes changeable weather. (8) The divisions on the scale are not so strictly to be observed as the rising and falling of the mercury; for if it stands at much rain and then rises to changeable it presages fair weather, though not to continue so long as though the mercury had risen higher; and so, on the contrary, if the mercury stand at fair and then fall to changeable it presages foul weather, though not so much as if it had sunk lower.

The ordinary objection to the common weather glass is that the scale divisions are too small to enable one to determine correctly the amount of the variation in the height of the mercury, and various means have been adopted to remedy this defect. One of the simplest is to bend the upper part of the tube so that the part within the range of variation should slant; the mercury will thus move farther for a given change in pressure. This arrangement gives an awkward form to the instrument, and hence the wheel-barometer was introduced. It presents more symmetry in form, and possesses the same advantage as the bent barometer in enlarging the divisions of the scale. This instrument is bent up at the lower or open end, where a piece of glass floats on the surface of the mercury. The float is attached to a small balance weight by a thread or small ribbon, which passes over a pulley, on the axis of which there is fixed an index hand, which traverses the circular index plate. The rising or falling of the quicksilver in the tube causes a similar rise or fall of the float, which by the action of the thread turns the pulley, and thus the index hand attached to its axis will also move, and indicate the change in the altitude of the mercurial column. The friction of the additional apparatus connected with the pulley detracts from the sensibility of the instrument, and it is,



## Barometer

therefore, unfit for purposes where great nicety is required. Formerly a rack and pinion were employed instead of the pulley and ribbon.

For very delicate operations, such as the measurement of altitudes, the scale of the barometer having a straight tube is furnished with a vernier, which greatly increases the accuracy of the reading. But several other additions must be made to the barometer intended for the measurement of heights, the instrument being then called the portable barometer. Of these there are various kinds. In that of Fortin, the cistern is formed of a tube of boxwood, surmounted by a tube of glass, and is closed below by a piece of leather, which can be raised or lowered by means of a screw. The screw works in the bottom of a brass case which incloses the cistern, except at the middle, where it is cut away in front and behind so as to expose to view the surface of the mercury. The barometer tube is inclosed in a brass tube with two slits on opposite sides, and on this inclosing tube the scale divisions are engraved, the zero point whence they are reckoned being the lower extremity of an ivory point fixed in the covering of the cistern. In order to determine the height of the mercurial column with precision a cylindrical sliding piece furnished with a vernier moves in the tube at the top of the mercury. To adjust the instrument for observation, the surface of the mercury must be made by means of the screw to touch the ivory point, a condition fulfilled when the extremity of the point touches its image in the mercury, and the sliding piece must be adjusted till it is tangential to the top of the column. When the instrument is to be carried about from place to place the screw at the bottom should be turned till the mercury reaches the top of the tube, and the instrument held in an inverted position.

In taking the measurement of mountains the general rule given is to subtract the ten-thousandth part of the observed altitude for every degree F. above 32°. The aneroid barometer depends not on the variation in the height of a column of liquid, but on the change in form of a thin metallic vessel, partially exhausted of air. It consists essentially of a cylindrical box with a corrugated top, partially exhausted of air. At the center of the upper surface is a small pillar *M*, connected with a powerful steel spring *R*. The rise or fall in the top of the box due to changing atmospheric pressure is transmitted by means of the levers *l* and *m* to a metallic axis *r*; and this axis carries a lever *t*, whose end is attached to a chain *s*, which turns a drum on whose axis the index needle is fixed. The chain is kept constantly stretched by means of a spiral spring. Aneroid barometers are graduated by comparison with the mercurial barometer.

## Baron

**Barometz**, a fraudulently constructed natural history specimen, called also the Scythian lamb, and represented as being half animal and half plant. In reality it is a woolly-skinned fern (*Cibotius barometz*), stripped of everything but its root stock and the stipes or stalks of four of its fronds, and then turned upside down. This fern grows in salt plains in the region of the Caspian Sea, and is sometimes known to botanists as *Aspidium barometz*, and is also called baranetz.

**Baron**, in the feudal system of the Middle Ages, the title baron, derived from the Latin *varo*, which signifies a man, and, sometimes, a servant, was given, at first, to the immediate tenant of any superior. In old records, the citizens of London are so styled. The family of Montmorency, in France, called themselves, *premiers barons de la Chrétienté*. This title was introduced by William the Conqueror into England, from Normandy, and used to signify an immediate vassal of the crown, who had a seat and vote in the royal court and tribunals, and, subsequently, in the House of Peers. It was the second rank of nobility, until dukes and marquises were introduced, and placed above the earls, and viscounts also set above the barons. In Germany, the ancient barons of the empire were the immediate vassals of the crown. They appeared in the imperial court and diet, and belonged to the high nobility. But these ancient feudatories were early elevated to the rank of counts or princes. The modern barons only form a rank of lower nobility after the counts. In England, baron is the lowest grade of rank in the House of Lords. The coronation robes of a baron differ from those of the other peers in having but two rows of spots on the mantle; and the parliamentary robes, in having but two guards of white fur, with rows of gold lace. The right of wearing a coronet was first conferred on barons by Charles II. It is adorned with six pearls, set at equal distances, of which four are usually shown. A baron is styled right honorable, and his children enjoy the prefix of honorable. In England, too, the four puisne judges of the Court of Exchequer bear the title of baron, and the chief judge that of Lord Chief Baron of the Exchequer. They are addressed as My Lord, but have no seat in the House of Lords, unless by being previously made a member of the peerage. Barons of the Cinque Ports: formerly members of the House of Commons, elected, two for each, by the seven Cinque Ports. Baron and femme: a term used in the old English law books for husband and wife. Baron of beef: two sirloins of beef joined together by a part of the backbone.

**Baron, Michel**, a French comedian, born in 1653, and long attached to Molière's com-



## Baronet

pany. For nearly 30 years he played with the greatest success, and retired from the stage, in 1691, without any apparent reason. In 1720, however, he again returned, and was received with immense enthusiasm, playing, with great success, even the most youthful parts. In 1729 he was taken ill, while on the boards, and died shortly after. Although his merit in his profession was very great, yet his vanity was equal. He wrote also some plays, printed in three volumes after his death.

**Baronet**, originally a term apparently in use as early as the time of Edward III. for certain landed gentlemen not of the dignity of lords, summoned to Parliament to counterbalance the power of the clergy. Subsequently it became the name given to three titled orders.

1. **Baronets of Great Britain:** A titled order, the lowest that is hereditary. Speaking broadly, they rank in precedence next after the nobility, or, more specifically, next after the younger sons of viscounts and barons; but in reality they are inferior to the Knights of the Order of St. George or of the Garter, certain official dignitaries, and knights-banneret created on the actual field of battle. The order was instituted by James I., on May 22, 1611, to raise money by fees paid for the dignity, and thus obtain resources for the settlement of Ulster. The number was to be limited to 200; but a device for increasing an honor so profitable to the treasury was soon found, so that before the death of Charles I. 458 patents for the creation of baronets had been issued; and by the end of 1878 there were 698 baronets in existence. The dignity is generally confined to the heirs male of the grantee. The badge of a baronet is sinister, a hand gules (= a bloody hand) in a field of argent. Etiquette requires that he be addressed as "Sir A. B., Bart."

2. **Baronets of Ireland:** A titled order instituted by James I. in 1619. It is believed that this dignity has not been conferred on any one since the union of Great Britain and Ireland in 1801, but many of the titles granted before the union still remain in the British baronetage.

3. **Baronets of Scotland:** A titled order planned by James I., but actually instituted, not by him, but by Charles I. in 1625, just after the accession of the latter monarch to the throne. The object aimed at in the creation of the order was the planting of Nova Scotia (New Scotland). Each baronet by his patent received 18 square miles of territory in that colony, with a sea coast bounding it on one side; or a tract of land extending for 3 miles along a navigable river, and stretching for 6 miles inland. Since the union between England and Scotland in 1707, no baronets have been created holding rank in the latter country alone, but some

## Barquisimeto

titles existing previously still figure in the British baronetage.

**Baronius**, or **Baronio**, **Cæsar**, an Italian ecclesiastical historian, born in 1538; educated at Naples; in 1557 went to Rome; was one of the first pupils of St. Philip of Neri, and member of the oratory founded by him; afterward cardinal and librarian of the Vatican Library. He owed these dignities to the services which he rendered the Church by his "Ecclesiastical Annals," comprising valuable documents from the papal archives, on which he labored from the year 1580 until his death, June 30, 1607. They were continued, though with less power, by other writers, of whom Raynaldi takes the first rank.

**Barons' War**, the war carried on for several years by Simon de Montfort and other barons of Henry III. against the King, beginning in 1263.

**Barony**, the lordship or fee of a baron, either temporal or spiritual. Originally every peer of superior rank had also a barony annexed to his other titles. But now the rule is not universal. Baronies in their first creation emanated from the King. Baronies appertain also to bishops, as they formerly did to abbots, William the Conqueror having changed the spiritual tenure of frank-almoin, or free alms, by which they held their lands under the Saxon government, to the Norman or feudal tenure by barony. It was in virtue of this that they obtained seats in the House of Lords. The word is common in Ireland for a subdivision of a county.

**Barotse**, or **Marotse**, an important Bantu tribe inhabiting the banks and the regions E. of the Upper Zambezi, from about 14° to 18° S. lat. In Livingstone's time the Makololo were the dominant tribe in these parts of South Africa, but since then they have been almost entirely annihilated by the Bantus, who now occupy the vast territory from the Kabompo river to the Victoria Falls. Formerly they were inhabitants of Mashonaland, where many of them were destroyed by the Matabili, while the others retired into the Upper Zambezi valley. Selous, who has carefully studied them, is of opinion that they are not of pure Bantu origin, but that they commingled in ancient times with the Arabian colonists who built the fortress and temple of Zimbabwe.

**Barouche**, a four-wheeled carriage with a falling top and two inside seats in which four persons can sit, two fronting two.

**Barquisimeto** (bar-kis-ē-mā'to), the fourth in size of the towns of Venezuela, is situated on an affluent of the Tocuyo river, in a fertile and healthy plain, about 1,700 feet above sea level. Founded in 1522, it



became a flourishing town, but was destroyed in 1812 by a dreadful earthquake. The city, which is approached by the German-made railway from the coast to Valencia (1893), has sometimes been the capital of a province; pop. 31,476.

**Barr, Amelia Edith**, an Anglo-American novelist, born in Ulverton, Lancashire, England, March 29, 1831. She was the daughter of the Rev. William Huddleston, and in 1850 married Robert Barr. She came to the United States in 1854, and lived for some years in Texas; but after her husband's death (1867) removed to New York, where her first book, "Romance and Reality," was published in 1872. She is a prolific writer, and her novels are very popular. They include "Jan Vedder's Wife" (New York, 1885); "A Daughter of Fife" (1885); "A Bow of Orange Ribbon" (1886); "A Border Shepherdess" (1887); "Friend Olivia" (1890); "A Sister to Esau" (1891); "Remember the Alamo" and "Prisoners of Conscience" (1897); "I, Thou, and the Other One" (1899), etc.

**Barr, James**, a Canadian author, born in Wallacetown, Ontario, in 1862; was engaged in journalism in that province, the United States, and in London; and under the pen name of ANGUS EVAN ABBOTT has contributed much to magazine literature. Among his separate publications are "American Humorous Verse" in the "Canterbury Series of Poets" (1891), and the American volume in the "International Humorous Series" (1893), the last containing a biographical index of nearly 200 American and Canadian humorists.

**Barr, Robert**, a Scottish author, born in Glasgow, Sept. 16, 1850; he spent his childhood in Canada, drifted into journalism, joined the staff of Detroit "Free Press," and wrote under the name of "Luke Sharp." He went to London in 1881 and founded "The Idler" with Jerome K. Jerome, but retired to devote himself to fiction. He is author of a number of novels, "In the Midst of Alarms" (1894); "The Face and the Mask" (1895); "One Day's Courtship" (1896); "A Woman Intervenes" (1896), and others.

**Barra**, a petty Mandingo kingdom of Western Africa, near the mouth of the Gambia, with an estimated pop. of 200,000, the men being remarkable for their fine proportions. The surface, which is fertile, but rather marshy, is well cultivated. The territory about the mouth of the river belongs to the British, who have built the port of Albreda on the S. bank, from which considerable trade is carried on. The chief town is Barrinding, where the so-called king resides.

**Barra**, an island of the Outer Hebrides, W. coast of Scotland, belonging to Inverness-shire; 8 miles long and from 2 to

5 broad, of irregular outline, with rocky coasts, surface hilly, but furnishing excellent pasture. On the W. coast the Atlantic, beating with all its force, has hollowed out vast caves and fissures. Large herds of cattle and flocks of sheep are reared on the island. The coasts of this and adjacent islands abound with fish, and fishing is an important industry.

**Barracan**, strictly, a thick, strong stuff made in Persia and Armenia of camel's hair, but the name has been applied to various wool, flax, and cotton fabrics.

**Barracand, Leon Henri** (bär-ä-kän), a French poet and novelist, born at Romans, Drôme, May 2, 1844. He gave up the law when a very young man in order to write verses; but he was not much known as a poet until "Dananiel" (1886) appeared, under the pseudonym of LEON GRANDET, followed by a sequel, "Doctor Gal" (1870). He had already, however, attracted attention by some fictions, and was steadily risen in importance as a novelist;—"Yolande" (1867); "Hilaire Gervais" (1885); "The Second Lieutenant's Manuscript" (1887); and "The Cousin" (1888), being perhaps best known. His "Lamartine and the Muse" (1883) was crowned by the French Academy.

**Barrack**, a hut or small lodge. Formerly it was especially used for a humble temporary building of this character, one of many erected to shelter horsemen, as contradistinguished from similar structures, called huts, for foot soldiers. Then it was extended to embrace any temporary erection for a soldier, to whatever arm of the service belonging. The plural, barracks, is now generally applied to a large structure, either erected expressly for the housing of troops or improvised for that purpose.

**Barrackpur**, a native town and military cantonment of Bengal, India; on the E. bank of the Hooghly, and 15 miles up the stream from Calcutta. It is a favorite retreat for Europeans from Calcutta; and to the S. is its park, containing the suburban residence of the Viceroy of India. Two Sepoy mutinies have occurred here, the first in 1824, when a regiment of Bengal infantry refused to go for service in the Burmese War, again in the famous mutiny of 1857. Pop., with Nawabganj (1901) 31,907.

**Barracoon**, a negro barrack or slave depôt, formerly plentiful on the coast of Africa, in Cuba, and Brazil.

**Barracuda**, a fish—the *sphyræna barracuda*, found in the vicinity of the Bahamas and other West Indian islands.

**Barranquilla** (bar-an-kē'la), the principal port of the Republic of Colombia, in the Department of Bolivar, lies near the left bank of the main channel of the Magdalena,



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15 miles distant from the sea. A railway runs to the coast; and the bar at the mouth of the river has been improved so as to enable sea-going vessels to pass up to Barranquilla, which possesses excellent wharfage accommodation. The inland traffic by river steamers is important. The trade is mainly in the hands of Germans. Pop. about 40,000.

**Barrantes, Vicente** (bär-rän'tes), a Spanish writer, born at Badajoz, March 24, 1829. He first studied theology, but in 1848 settled in Madrid to pursue literature; held responsible government offices; became member of the Academy in 1872. Among his works are the stories "Always Late" (1851); "Juan de Padilla," "The Widow of Padilla," and a series of historical studies, dealing with strictly local Philippine Island and Estremaduran topics. His "Tales and Legends" are well chosen and well written; but a work on "The Defects and Dangers of Universal Suffrage" is weak. He died in 1898.

**Barras** (bär-ä'), **Paul François Jean Nicolas, Comte de**, a French Jacobin, born in Provence, in 1755, of an ancient family; served as second lieutenant in the regiment of Languedoc until 1775. He made, about this time, a voyage to the Isle-de-France, the governor of which was one of his relations, and entered into the garrison of Pondicherry. On his return, he gave himself up to gambling and women, and dissipated his fortune. The Revolution broke out. He immediately showed himself an opponent of the Court, and had a seat in the *tiers-état*, while his brother was sitting in that of the nobility. July 14, 1789, he took part in the attack upon the Bastille, and Aug. 10, 1792, upon the Tuileries. In 1792 he was elected a member of the National Convention, and voted for the unconditional death of Louis XVI. He was sent, in 1793, to the South of France, and commanded the left wing of the besieging army under Dugommier, and it was here that he first met Napoleon Bonaparte, then captain of artillery. The patriotic reputation of Barras was so well established that he and Fréron were the only representatives not denounced by the popular societies. Robespierre, however, was no friend of his, and often wished to arrest him. Barras, knowing this, became one of the principal actors of the 9th Thermidor, and put himself at the head of the troops which surrounded Robespierre at the Hôtel de Ville. In 1794 he was named one of the Committee of Public Safety, and became a great enemy to the members of the "Mountain." In February, 1795, he was elected President of the Convention, and, in that capacity, declared Paris in a state of siege, when the Assembly was attacked by the populace. Afterward, when the Convention was assailed, Bonaparte, by Barras' advice, was

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appointed to command the artillery; and that general, on the 13th Vendémiaire (Oct. 5, 1795), decisively repressed the royalist movement. For his services, Barras was now named one of the Directory, and took a prominent part in the changes which that body underwent until Napoleon's *coup d'état*



COMTE DE BARRAS.

on the 18th Brumaire (Nov. 9, 1799), which effectually overthrew the power of Barras and his colleagues. His life, from this date, was, generally speaking, one of retirement. He died in Paris, Jan. 29, 1829. His "Memoirs" appeared in 1895.

**Barrass, Edward**, a Canadian clergyman, born in Durham, England, July 22, 1821; entered the ministry in 1840; removed to Toronto in 1853. He became the assistant editor of the "Christian Guardian," and published, among other works, "A Gallery of Deceased Ministers" (1853); "Class Meetings: Their Origin and Advantages" (1865); "A Gallery of Distinguished Men" (1870); and "Smiles and Tears: or, Sketches from Real Life" (1879).

**Barratry**, a law term applied to (1) the offense committed by the master of a vessel of embezzling or injuring goods committed to his charge for a voyage; (2) the offense of frequently exciting and stirring up lawsuits or quarrels among one's neighbors or in society generally.

**Barré, Isaac** (bä-rä'), a British soldier, born at Dublin in 1726. Gazetted as an ensign in 1746, he became friendly with General Wolfe, under whom he rose to the rank of Lieutenant-Colonel. He was wounded in the cheek at Quebec, was beside Wolfe when he fell, and figures in West's picture of "The Death of Wolfe." He entered Parliament in 1761, and held office successively under Lord Bute, Pitt, Rockingham, and Lord Shelburne. In Pitt's second administration he exposed the corruptions of the



## Barre

ministry, was a strong opponent of Lord North's ministry, and opposed the taxation of America. He died in London, July 20, 1802.

**Barre**, a city in Washington county., Vt., on the Central Vermont, the Barre, and the Montpelier and Wells River railroads; 6 miles S. E. of Montpelier. Barre received a city charter in 1894; and has a wide reputation as one of the most important seats of the granite industry in the United States. The city contains, besides granite quarries, several industrial plants connected therewith; a National and two savings banks; a library; opera house; Goddard Seminary, a home school for young men and women, with four courses of study; Spaulding Graded School; daily and weekly newspapers; an assessed property valuation exceeding \$2,500,000, and a total debt of about \$150,000. Pop. (1900) 8,448; (1910) 10,734.

**Barreiro, Juan Baptista Hernandez**, a Cuban lawyer, born in Havana, about 1842; acquired a liberal education; amassed large wealth in the practice of his profession. He was Professor of Roman Law in the University of Havana for 30 years; and more recently was Dean of the law faculty in the university. In February, 1900, while acting as First Assistant Mayor of Havana, he was appointed a member of the new Cuban Civil Cabinet, and given the portfolio of Public Education.

**Barrel**, a word having many applications, including: I. Anything shaped like a cask. (1) A cask; a vessel bulging in the middle, formed of staves, surrounded by hoops, and with a bung-hole to afford egress to the generally liquid contents. (2) The capacity of such a cask, supposing it to be of the normal magnitude. In one for holding liquids the capacity is usually from 30 to 45 gallons.

II. Anything hollow and cylindrical. The metallic tube which receives the charge in a musket or rifle. With the stock and the lock, it comprises the whole instrument.

III. Anything cylindrical, whether hollow or not. A cylinder, and especially one about which anything is wound.

Technically.—I. Measures. As much as an ordinary barrel will hold. Specially: (1) Liquid measure. In this sense the several liquids have each a different capacity of barrel. A barrel of wine is 31½ gallons; a barrel of oil averages from 50 to 53 gallons. (2) Dry measure. A barrel of flour contains 196 pounds.

II. Mechanics: The cylindrical part of a pulley.

III. Horology: (1) The barrel of a watch. The hollow cylinder or case in which the mainspring works. It is connected with a chain by the fusee, by the winding of which the chain is unrolled from the cylin-

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der, with the effect of winding the main-spring. (2) The chamber of a spring balance.

IV. Campanology: The sonorous portion of a bell.

V. Anatomy: Barrel of the ear: A cavity behind the tympanum, covered with a fine membrane. The belly and loins of a horse or cow are technically spoken of as the barrel.

VI. Nautical: (1) The main piece of a capstan. (2) The cylinder around which the tiller-ropes are wound.

VII. Music: The cylinder studded with pins by which the keys of a musical instrument are moved.

**Barrel Organ**, an organ consisting of a cylindrical barrel with pins, the revolution of which opens the key valves and plays the instrument. The street organ is of this type.

**Barren Grounds**, a large tract in the Northwest Territories of Canada, extending N. from Churchill river to the Arctic Ocean, between Great Bear and Great Slave Lake and Hudson Bay. It largely consists of swamps, lakes, and bare rock.

**Barren Island**, a volcano in the Andaman Sea, about 12° 15' N. lat.; 93° 54' E. long. Its diameter is about 2 miles, with submarine slopes plunging rapidly to a depth of more than 800 fathoms. There is an ancient crater over a mile in diameter, from the center of which a newer cone rises to a height of 1,015 feet. The volcano was active in 1789 and 1803, but is now dormant.

**Barrett, John**, an American diplomatist, born in Grafton, Vt., Nov. 28, 1866; was graduated at Dartmouth College in 1889, and the same year went to the Pacific coast and was engaged in journalism till 1894. During 1894-1898 he was United States Minister Resident and Consul-General at Bangkok, Siam, and, after the expiration of his term of office, represented several American newspapers in Manila, Philippine Islands. After the American victory in Manila Bay he made a special study of conditions in the Philippine Islands, and, returning by way of London, addressed a joint assembly of members of the House of Commons and the London Chamber of Commerce, on the condition of trade in the Far East. After holding several diplomatic appointments to foreign countries, he became Director of the International Bureau of American Republics in 1906. His chief works relate to commercial affairs.

**Barrett, John Kelly**, a Canadian official, born in Hamilton, Ontario, June 5, 1860; received a public school education, and was graduated at Holy Cross College, Worcester, Mass., in 1872. After serving as principal of St. Mary's Model School in Hamilton, he entered the public service principally in the



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line of education. Dr. Barrett became conspicuous in 1890, when the authorities of Manitoba abolished the Catholic schools, and the official use of French in that province, by defending the claims of the Catholic minority and by bringing suit against the city of Winnipeg to test the constitutional power of the Provincial Government in passing the School Act of 1890.

**Barrett, Lawrence**, an American actor, born in Paterson, N. J., April 4, 1838. His first appearance on the stage was in 1853. In 1856 he appeared as Sir Thomas Clifford in "The Hunchback" at Chambers Street Theater, New York city, and in 1857 he supported Mr. Burton, Charlotte Cushman, Edwin Booth, and other eminent actors. He served as a captain in the 28th Massachusetts Infantry in the early part of the Civil War. Later he acted at Philadelphia, Washington, and at Winter Garden, in New York, where he was engaged by Mr. Booth to play Othello to his Iago. After this he became an associate manager of the Varieties Theater, in New Orleans, where for the first time he played the parts of Richelieu, Hamlet, and Shylock. In 1864 he secured "Rosedale" from Lester Wallack, and after appearing in its leading character at New Orleans, began his first tour as a star actor. In 1867 he played at Maguire's opera house in San Francisco, and was then manager of the California Theater till 1870. Late in 1870 he went with Mr. Booth, playing in alternate characters in Booth's Theater. In 1871-1872 he was manager of the New Varieties Theater in New Orleans, and in December, 1872, acted Cassius to Booth's Brutus in New York. During 1873-1874 he made tours through the United States. In 1875 he appeared as Cassius in "Julius Cæsar," in Booth's Theater, and later as King Lear. He was the first actor to appear as Daniel Druce in the United States in Mr. Gilbert's play. In 1882 he brought out "Francesca di Rimini," at the Chestnut Street Theater in Philadelphia. In 1883 this play ran for nine weeks at the Star Theater, in New York. In 1887 he began his first joint engagement with Edwin Booth in Buffalo. Mr. Barrett's last production of a new play was "Guido Ferranti" by Oscar Wilde, which was brought out in 1890, at the Broadway Theater, New York. His last appearance was on March 18, 1891, in the same theater, in the character of Adrian du Mauprat to the Richelieu of Mr. Booth. He died in New York city, March 21, 1891.

**Barrett, Wilson**, an English dramatist, born in Essex, Feb. 18, 1846; son of a farmer; educated at a private school; and entered the dramatic profession in 1863. In 1874 he became manager of the Amphitheater in Leeds, and later lessee of the Grand Theater in Leeds; in 1879 manager of the Court Theater, London; and in 1881, of Princess'

## Barricade

Theater, London. He visited the United States in 1886, and, returning to England in 1887, became manager of the Globe Theater; revisited the United States in 1888, and again in 1889; in 1896 became manager of the Lyric Theater, London; and in 1899, of the Lyceum. His publications include "Pharaoh," "Now-a-Days," "The Daughters of Babylon," "In Old New York," etc. He died July 22, 1904.

**Barrias, Felix Joseph** (bär-yä'), a French painter, born in Paris, Sept. 13, 1822; pupil of Leon Cogniet. His most successful works are "Cincinnatus" (1844); "Sappho" (1847); and "Death of Chopin" (1885). He was awarded the Grand Prix de Rome, 1844; Legion of Honor, 1859; first medal at the Paris Exposition, 1889.

**Barricade**, anything which bars out, blocks up, obstructs, or defends; in military language, a hastily constructed fortification, made of *chevaux-de-frise*, trees, earth, stones, etc., in order to obstruct the progress of an enemy; in marine language, a strong wooden railing, fixed on stanchions, extending across the front of the quarter-deck of a ship of war, during a naval engagement. A barricade is sometimes strengthened with a lining of hammocks, etc., confined in a close roping-netting, to serve as a screen against musketry. Barricades, constructed of the first materials that came to hand, were used in popular insurrections during the Middle Ages. Paris has obtained notoriety as the city in which they have been most frequently employed. In 1358, its streets were barricaded against the Dauphin. The first "Battle of the Barricades" took place on the entry of the Duke of Guise into Paris, May 12, 1588. It was followed, during the War of the Fronde, by another contest of a somewhat similar character, Aug. 26, 1648, when Anne of Austria ordered the arrest of three popular members of the Parliament. In July, 1830, the elder branch of the Bourbons, and in February, 1848, the Orleans branch of the same family were driven from the French throne, after a struggle at the barricades. General Cavaignac, in defense of the Provisional Government, waged a fearful contest with the insurgents, who had erected barricades, June 23-26, 1848, in which he was at length victorious. The killed and wounded amounted to 15,000, and about 8,000 of the rebels were taken prisoners.

Napoleon III. widened and macadamized many of the principal streets of Paris, partly with the express purpose of rendering the successful erection of barricades next to impossible; but in the second siege of Paris (1871), the Communists threw up numbers of strong barricades. There was a remarkable barricade erection in London in 1821. The ministry desired that the body of Queen Caroline should be conveyed out of the coun-



try to Germany, for interment without the populace having the opportunity of making any demonstration. On the matter becoming known, a vast barricade was erected at the point where the Hampstead Road joins the New Road; and as nothing but the use of artillery could have forced the way, the officer in charge of the funeral changed his course. In 1848 and 1849, barricades were successfully carried in Paris, Berlin, Vienna, and Dresden, by taking the defenders in the rear.

**Barrie**, a town and county-seat of Simcoe Co., North Ontario, Canada; on Kempenfeldt bay and the Grand Trunk railroad; 64 miles N. N. W. of Toronto. It is a shipping point for grain; is lighted by gas and electricity; has foundries, machine shops, stove, pump, and woolen factories, tanneries, flour mills, weekly newspapers, and several churches and schools, and a collegiate institute. The town was founded in 1832 and incorporated in 1871. Pop. (1891) 5,550; (1901) 6,549.

**Barrie, James Matthew**, a Scottish author; born in Kurriemuir, Forfarshire, May 9, 1860. He graduated from Edinburgh University in 1882, and went to London in 1885, to engage in journalism. His peculiar talent for depicting Scottish village life and rustic characters with fidelity, pathos, humor, and poetic charm, has brought him fame. "Better Dead" (1887) and "When a Man's Single" (1888) were followed by "Auld Licht Idylls" (1888), and "A Window in Thrums" (1889), which first made him widely known; "An Edinburgh Eleven" (1890); "My Lady Nicotine," humorous essays on smoking (1890); "The Little Minister" (1891); "Sentimental Tommy" (1896); "Margaret Ogilvy" (1896), a biography of his mother; "Tommy and Grizel" (1900); "The Little White Bird" (1902), etc. He has also written numerous short sketches and the following dramatic works: "Walker, London" (1892); "Jane Annie" (1893); and "The Professor's Love Story" (1895). "The Little Minister" was dramatized in 1897, and was played with success in the United States.

**Barrière, Jean François** (bär-yâr'), a French historical writer, born in Paris, May 12, 1786. His energies were first directed to periodical literature; but he subsequently produced "The Court and the City under Louis XIV., Louis XV., and Louis XVI.," besides editing a numerous series of memoirs of personages connected with the Grand Monarch. He died in Paris, Aug. 22, 1868.

**Barrière, Théodore**, a French dramatist, born in Paris, in 1823. In collaboration with others he supplied the French stage with a great number of dramas and comedies, some of which met with much favor,

especially "Bohemian Life" (1848, with Murger); "The Maids of Marble" (1853, with Thiboust), a counterpart to Dumas' "The Camelia Lady," and "The Spurious Men of Honor" (1856, with Capendu), a scathing satire and his masterpiece. He died in Paris Oct. 16, 1877.

**Barrier Reef**, a coral reef which extends for 1,260 miles off the N. E. coast of Australia, at a distance from land ranging from 10 to 100 miles. In sailing from Sydney through Torres Straits vessels have the choice of the inner and outer routes; the former, though narrow, gives a channel of about 12 fathoms deep throughout, and protected from the sea by the reefs themselves; the outer channel is less accurately surveyed and still dangerous.

**Barrier Treaty**, the treaty (1718) by which, when the Spanish Netherlands were ceded to Austria, the Dutch secured the right to garrison several border fortresses of the country at the expense of Austria, to serve as a barrier against France. It was declared void in 1781 by Joseph II.

**Barrili, Antonio Giulio**, an Italian novelist, born in Savona, in 1836. Engaging in journalism when only 18, he assumed the management of "Il Movimento" in 1860, and became proprietor and editor of "Il Caffaro" in Genoa in 1872. He had taken part in the campaigns of 1859 and 1866 (with Garibaldi in Tyrol) and in the Roman expedition of 1867, and sat in the Chamber of Deputies in 1876-1879. One of the most prolific writers of modern Italy. Among his numerous stories are "Elm Tree and Ivy" (1868); "The Vale of Olives" (1871); "As in a Dream," "The Devil's Portrait" (1882); "The Eleventh Commandment," "A Whimsical Wooing."

**Barrington, George**, an Irishman, noted both as an author and as a pickpocket, born in 1755. His most notable act of thieving was the robbing of a Russian prince in Covent Garden Theater. He took from him a gold snuff-box said to be worth \$150,000; but, as the prince refused to prosecute, he was dismissed from trial. In 1790, however, he was transported to Botany Bay under sentence for seven years. At the end of two years his sentence was commuted, and in 1792 he obtained the first warrant of emancipation ever issued. Among his works are "A Voyage to Botany Bay" (1801); "The History of New South Wales" (1802), and "The History of New Holland" (1808). He died about 1840.

**Barrington, John Shute**, an English lawyer and Christian apologist, born in Hertfordshire, in 1678; created first Viscount Barrington in 1720. He was a disciple and friend of Locke, a friendship which is thought to have been brought about by the publication of his (Barrington's) work,



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"The Interest of England," etc. He was devoted to theology and wrote extensively in that science. His chief works have been collected under the title "The Theological Works of the Viscount Barrington." He died in Becket, Berkshire, Dec. 14, 1734.

**Barrington, Sir Jonah**, an Irish jurist, born in County Queens, in 1760; became Judge in the Court of Admiralty, and was a steady opponent of the Act of Union in 1800. As the result of several peculations, upon petition of both Parliamentary houses, he was deprived of his office, and in 1830 he left England. He was the author of "Personal Sketches" (1827); "Historic Memoirs of Ireland" (1832); "The Rise and Fall of the Irish Nation" (1833), etc. He died in Versailles, France, April 8, 1834.

**Barrington, William Wildman**, second Viscount Barrington, born Jan. 15, 1717; was sworn a member of the Privy Council in 1755, and in the same year accepted the office of Secretary of War. In 1761 he was appointed Chancellor of the Exchequer, but in 1765, at the King's express wish, he re-assumed the post of Secretary of War, which he held till 1778, when, in consideration of long public and personal services, he was retired. He died Feb. 1, 1793.

**Barrios, Gerardo**, a Central American statesman, born about 1810; became President of Salvador in 1860. During his administration education, commerce, and public works progressed remarkably, his presidential management being unusually liberal. He was deposed by Duenas as the outcome of the war with Guatemala, and, while endeavoring to bring about a revolution in order to become president again, he was captured and executed, in 1865.

**Barrios, Justo Rufino**, a Guatemalan statesman, born in San Marcos, about 1834; opposed President Cerna in the revolutionary movements of 1867, and was active in overthrowing the *regime* established by that president (1871). Two years later, when Granados took command of the army, Barrios became President and, by successive elections, he held the office till his death. His administration was marked by prosperity and freedom. A war with Salvador resulted from a proclamation intended to bring about the union of all the Central American nations in one republic. In an assault upon Chalchuapa, Barrios, putting himself at the head of a deserted regiment, was killed April 2, 1885.

**Barrister, Barraster, or Barreter**, in England, a member of the legal profession who has been admitted to practice at the bar; a counselor at law. In old law books barristers were styled apprentices, *apprenticii ad legem*, being regarded as mere learners, and not qualified to execute the full office of an advocate till they were of

## Barron

16 years' standing; now a barrister of 10 years is held competent to fill almost any kind of office. No one who has not been called to the bar can plead in the Superior Courts at Westminster, or, as a rule, in any court presided over by a superior judge. Formerly a distinction was drawn between utter (= outer) barristers, who, on public occasions in the Inns of Court, were called from the body of the hall to the first place outside the bar, while the benchers and readers were called inner. In the Inns of Court a distinction was formerly drawn between inner barristers, who on public occasions occupied a place on a raised dais separated from the rest of the hall by a bar, and utter (*i. e.*, outer) barristers, who were called from among the students to the first place outside the bar. The distinction has long been abolished, the term barrister being now used for what were formerly termed inner barristers, while the outer barristers have sunk again into the rank of students, from which they were taken. In Queen Elizabeth's reign the outer barristers were allowed to practice in law courts, but under most other English sovereigns they simply took part in readings and moots at the Inns of Court. A now obsolete regulation, made in 1603, required that no one should be allowed to study for the bar unless he were a gentleman by descent; but, at least since 1762, study for the bar has been open, on certain conditions, to any member of the community. A barrister can be disbarred, appeal, however, being allowed him to the judges. The Irish bar is regulated almost exactly like that of England. The term corresponding to barrister is in Scotland advocate, in the United States counselor at law; but the position of the latter is not quite the same.

**Barron, James**, an American naval officer, born in Virginia in 1769; became Lieutenant in the navy in 1798, and was soon promoted to Captain. He commanded the "Chesapeake" in 1807, and was attacked by the British ship "Leopard" as a result of his refusal to allow the "Chesapeake" to be searched for deserters. The "Chesapeake," which was quite unprepared, discharged one gun previous to striking her colors. She was captured and three alleged deserters were found. Barron was court-martialed and suspended for five years. Upon his restoration, as the outcome of a long correspondence with his personal enemy, Commodore Decatur, a duel was fought and Decatur was killed. Barron became senior officer in the navy in 1839, and died in Norfolk, Va., April 21, 1851.

**Barron, Samuel**, an American naval officer, born in Hampton, Va., about 1763; in 1805 commanded a squadron of 10 vessels in the expedition against Tripoli. On his



## Barros

return to the United States was appointed Commandant of the Gosport Navy Yard, but died immediately afterward, Oct. 29, 1810.

**Barros, João de**, a Portuguese historian, born in 1496. He was attached to the court of King Emmanuel, and after the publication in 1520 of Barros' "Romance," the Emperor Clarimond, urged him to undertake a history of the Portuguese in India, which appeared 32 years later. King John III. appointed Barros governor of the Portuguese settlements in Guinea, and general agent for these colonies, further presenting him, in 1530, with the province of Maranhão in Brazil, for the purpose of colonization. For his losses by the last enterprise the King indemnified him, and he died in retirement, in 1570. Besides his standard work, "Asia Portuguesa," he wrote a moral dialogue on compromise, and the first "Portuguese Grammar."

**Barrosa**, a village of Spain, 16 miles S. S. E. of Cadiz, celebrated in history as the place where General Graham (afterward Lord Lynedoch), on March 5, 1811, with a handful of English troops, gained a decisive victory over the French.

**Barrot, Camille Hyacinthe Odilon** (bä-rō), a French statesman, born at Villefort, Lozère, July 19, 1791. At 19 he pleaded before the ordinary tribunals, and at 23, by a special dispensation, before the Court of Cassation, Paris, and early acquired a high reputation for eloquence. In the political arena also, his oratory soon made him one of the most influential leaders of the liberal opposition. He became president of the "Aide-toi" Society in 1830, and, at the July revolution in that year, was one of three commissioners appointed to conduct the dethroned Charles X. to Cherbourg, on his way to England. On his return he was appointed prefect of the Department of the Seine, and member of the Council of State, but in a few months resigned his offices to lead the opposition to Casimir Périer and the reactionary ministers who followed him. He supported Thiers from his accession to office in March, 1840, to his fall in October, when he resumed his opposition to the ministry of Guizot. He took a conspicuous part in the reform movement of 1847, and spoke eloquently at several of the provincial reform banquets which led to the revolution of February, 1848. Made President by Thiers in his short lived ministry, he advised the King to withdraw his troops and thus remove the last obstacle to the downfall of his throne. In the last sitting of the Chamber of Deputies, he supported the claim of the Count de Paris to the throne, and the regency of the Duchess of Orleans. The February revolution considerably abated his ardor for public liberty. He held office for some time under the presi-

## Barrow

dency of Louis Napoleon, but retired from active political life after the *coup d'état*, Dec. 2, 1851. In July, 1872, he was made a Councilor of State and Vice-President of the Council. He died at Bougival, near Paris, Aug. 6, 1873. His "Mémoires Posthumes" appeared at Paris (4 vols., 1875-1876).

**Barrow**, an artificial mound or tumulus, of stones or earth, piled up over the remains of the dead. Such erections were frequently made in ancient times in our own land, and they are met with also in many other countries both in the Old and New Worlds. In Scotland they are called cairns. When opened they are often found to contain stone cysts, calcined bones, etc. Burial in barrows, commencing amid the mists of remote antiquity, seems to have been practiced as late as the 8th century A. D. One of the finest barrows in the world is Silbury Hill, Wiltshire, near Marlborough. It is 170 feet in perpendicular height, 316 along the slope, and covers about five acres of ground.

**Barrow**, a term applied to three prominent localities of the Arctic Ocean, in honor of Sir John Barrow. (1) Point Barrow, on the N. coast of Alaska, in 71° 23' N. lat. and 156° 31' W. long., long considered as the most northerly spot on the American mainland. (2) Cape Barrow, on the coast of Canada, or Coronation Gulf, is at 68° N. lat., 111° W. long. (3) Barrow Strait, the earliest of Parry's discoveries, leading to the W. out of Lancaster Sound, which Parry's immediate predecessor, Captain, afterward Sir John Ross, had pronounced to be landlocked in that direction. Besides its main course to Melville Sound, Barrow Strait throws off Prince Regent's Inlet to the S. and Wellington Channel to the N. The passage averages about 50 miles in breadth, extending pretty nearly along the parallel of 74° N., from 85° to 100° W.

**Barrow**, a river in the S. E. of Ireland, province Leinster, rising on the borders of the King's and Queen's counties, and after a southerly course joining the Suir in forming Waterford harbor. It is next in importance to the Shannon, and is navigable for vessels of 200 tons for 25 miles above the sea.

**Barrow, Frances Elizabeth**, an American author, born in Charleston, S. C., Feb. 22, 1822, was educated in New York, where she was married to James Barrow. She wrote, under the name of AUNT FANNY, numerous books for children; among them "Six Nightcaps," which has been translated into French, German, and Swedish. Another, "The Letter G" (1864), was widely known and very popular. She also wrote a novel, "The Wife's Stratagem." She died in New York city, May 7, 1894.

**Barrow, Isaac**, an English mathematician and clergyman, born in London, in 1630;



studied at the Charterhouse and at Trinity College, Cambridge, of which he became a fellow in 1649. After a course of medical studies he turned to divinity, mathematics, and astronomy, graduated anew at Oxford, in 1652, and, failing to obtain the Cambridge Greek professorship, went abroad. In 1659 he was ordained; in 1660 elected Greek professor at Cambridge; in 1662 Professor of Geometry in Gresham College; and, in 1663, Lucasian Professor of Mathematics at Cambridge, a post which he resigned to Newton in 1669. In 1670 he was created D. D., in 1672 Master of Trinity College, and in 1675 Vice-Chancellor of Cambridge University. He died in 1677. His principal mathematical works (written in Latin) were (an edition of which was edited by Whewell): "Elements of Euclid" (1655); "Data of Euclid," (1657); "Mathematical Lessons" (1664-1666); "Optical Lessons" (1669); "Lessons in Geometry" (1670); "Works of Archimedes," "Conics of Apollonius," "Spherics of Theodosius" (1675). All his English works which are theological were left in MSS., and published by Dr. Tillotson in 1685. As a mathematician Barrow was deemed inferior only to Newton. He produced in a geometrical form that prelude to the differential calculus which goes by the name of the method of tangents. According to Newton, it asserted the ultimate equality of the ratio of the differences of two ordinates and abscissæ to that of the ordinate and subtangent. Barrow's prelude was in fact what was afterward the fundamental idea of the differentials of Leibnitz, and was so like the previous method of Fermat that Montucla called it Fermat's method simplified.

**Barrow, Sir John**, a notable English writer on travels, born at Dragleybeck, Lancashire, June 19, 1764. His numerous and extended journeys are recounted in "Travels to China," "Voyage to Cochin-China," "Travels in the Interior of Southern Africa," and various diaries, with an accuracy beyond question, and a conscientious devotion to science equaled only by the modesty of his own disparagement of the results of his investigations. He died in London, Nov. 23, 1848.

**Barrow-in-Furness**, an English seaport and Parliamentary borough in Lancashire; opposite the island of Walney. Its prosperity is due to the mines of red hematite iron ore which abounds in the district, and to the railway rendering its excellent natural harbor available. It has several large docks; besides graving docks, a floating dock capable of receiving vessels of 3,000 tons, a large timber pond, etc. There is an extensive trade in timber, cattle, grain and flour; and iron ore and pig iron are largely

shipped. It has numerous blast furnaces, and one of the largest Bessemer steel works in the world. Besides iron works a large business is done in ship building, the making of railway cars and rolling stock, etc. Pop. (1901) 57,584.

**Barrows, John Henry**, an American educator, born in Medina, Mich., July 11, 1847; was graduated at Olivet College in 1867; subsequently studied in Yale College, Union and Andover Theological Seminaries, and at Göttingen; was pastor of the First Presbyterian Church, in Chicago, for 14 years; organized and was president of the World's Parliament of Religions, at the World's Columbian Exposition in Chicago, in 1893. He delivered a course of lectures on Christianity in the principal universities in India, under the patronage of the University of Chicago, in 1896-1897, and became President of Oberlin College in 1898. He published "The Gospels are True Histories" (1891); "Henry Ward Beecher, the Pulpit Jupiter" (1893); "Life of Henry Ward Beecher;" "Christianity the World Religion;" "The World Pilgrimage;" "History of the Parliament of Religions," etc. He died in Oberlin, O., June 3, 1902.

**Barrundia, José Francisco**, a Central American statesman, born in Guatemala, in 1779; was sentenced to death for treason in 1813, but escaped; and became leader of the Revolutionary Party, in 1819. In 1823-1824, as a member of the Constitutional Convention of Central America, he brought forward the decree for the abolition of slavery. He became President of the Central American Republic in 1829; retaining office for something over a year. In 1852 he was again elected President. He came to the United States in 1854, as Minister from Honduras, to propose the annexation of that territory to the United States, but died suddenly before anything was accomplished, in New York city, Aug. 4.

**Barry, Ann Spranger**, an English actress, born in Bath, 1734. She was several times married. Her first great success was in the character of Cordelia, at Drury Lane, London (1767). Her farewell was as Lady Randolph, at Covent Garden (1797). Equal to Mrs. Woffington and Mrs. Cibber in tragedy, she surpassed them both in comedy. As Desdemona she had, during her whole career, no competitor. She died in London, in 1801, and is buried in Westminster Abbey. See BARRY, SPRANGER.

**Barry, Sir Charles**, an English architect, born in London, in 1795. After executing numerous important buildings, such as the Reform Club-house, London, St. Edward's School, Birmingham, etc., he was appointed architect of the new Houses of Parliament, at Westminster, a noble pile, with the execution of which he was occu-



pied for more than 24 years. He was knighted in 1852, and died suddenly in 1860.

**Barry, Comtesse du.** See DU BARRY.

**Barry, Elizabeth,** an English actress, born in 1658; was said to be the daughter of Colonel Barry, a prominent royalist in the Civil War. She made her debut on the stage under the patronage of the Earl of Rochester; and her first performance is said to have been witnessed by Charles II. and the Duke and Duchess of York. Her reputation was won chiefly in the line of tragedy, in the roles of Monimia and Belvidera. She was known as "the great Mrs. Barry;" and is said to have created over 100 roles. She died in London, Nov. 7, 1713.

**Barry, James,** an Irish painter and writer on art, born in Cork, in 1741; studied abroad with the aid of Burke; was elected Royal Academician on his return; and worked seven years on the paintings for the hall of the Society for the Encouragement of the Arts. In 1773 he published his "Inquiry into the Real and Imaginary Obstructions to the Increase of the Arts in England;" and, in 1782, was elected Professor of Painting to the Academy. He was expelled in 1797 on the ground of his authorship of the "Letter to the Society of Dilettanti." His chief painting was his "Victors at Olympia." He died in 1806.

**Barry, John,** an American naval officer, born in Tacumshane, Ireland, in 1745. He settled in Philadelphia, in 1760. When the Revolutionary War broke out he was appointed commander of the "Lexington," with which he captured the British tender "Edward," in 1776. He afterward took command of the "Raleigh," which was captured by the British "Experiment;" but in his next command, the "Alliance," he captured the British ships "Atlanta" and "Trepassy." He was chosen to convey Lafayette and Noailles back to France; and, in 1794 was appointed commodore. He died in Philadelphia, Sept. 13, 1803.

**Barry, John Daniel,** an American novelist, born in Boston, Mass., Dec. 31, 1866. He has written "A Daughter of Thespis;" "The Intriguers;" "Mademoiselle Blanche;" "The Princess Margarethe, a Fairy Tale," etc.

**Barry, Martin,** an English physiologist, born at Fratton, Hampshire, in 1802. He studied at the medical schools of London, and at several on the Continent, and took his degree of M. D. in Edinburgh, in 1833. He wrote much on physiological subjects, and especially on animal development and embryology. He was elected a member of the Royal Society in 1840. In 1844 he was appointed house-surgeon to the Royal Maternity Hospital, Edinburgh. His means being ample, he gave his professional services largely to the poor. In 1853 he settled at

Beccles, in Suffolk, where he died in April, 1855.

**Barry, Spranger,** an Irish actor, the great rival of Garrick, born in Dublin, in 1719. He was brought up as a silversmith; but his matchless form and voice led him to try the stage. He first appeared (1744) at the Theater Royal, Smock Alley, Dublin; and in 1746 was engaged at Drury Lane, London, as alternate to Garrick, in "Hamlet" and "Macbeth." Having aroused Garrick's jealousy by his success as Romeo, he was engaged (1749) at Covent Garden, where his supremacy in "Romeo and Juliet" was generally conceded. He spent 1754-1766 trying to found a theater at Dublin. In 1767 he reappeared at London in the part of Othello. From 1774 till his death he acted at Covent Garden. He died in London, in 1777, and is buried in Westminster Abbey.

**Barry, William Farquhar,** an American military officer, born in New York city, Aug. 18, 1818; graduated at the United States Military Academy in 1838; and first saw active service in the Florida war (1852-1853). In the Mexican War he acted as aide-de-camp to General Worth. At the outbreak of the Civil War he was made chief of artillery, and organized the artillery of the Army of the Potomac. He subsequently became chief of artillery to Sherman, and took part in the march to the sea. In 1865 he was brevetted Major-General. In 1867 he had charge of the Artillery School at Fort Monroe. He was part author of "Engineer and Artillery Operations of the Army of the Potomac, 1861-1862," and of "Tactics for the Field Artillery of the United States." He died near Baltimore, Md., July 18, 1879.

**Barry, William Taylor,** an American statesman, born in Lunenburg, Va., Feb. 5, 1784; graduated at William and Mary College (1803), and soon after was admitted to the bar. In 1810 he became a member of Congress from Kentucky. He served in the War of 1812; and from 1814-1816 was United States Senator from Kentucky. In 1828 he was appointed Postmaster-General under Jackson; and was on his way as Minister to Spain when he died in Liverpool, Aug. 30, 1835. He was the first Postmaster-General who had a seat in the Cabinet.

**Barry Cornwall,** the assumed name of BRYAN WALLER PROCTOR (q. v.).

**Barsabas, Joseph,** surnamed "the Just," one of Christ's early disciples, and probably one of the 70. He was one of the two candidates nominated to fill the vacancy left by Judas Iscariot in the apostleship (Acts i).

**Bar-sur-Aube** (bär-sür-ōb'), a town of France; 30 miles E. of Troyes; notable as the scene of a victory of the allied forces commanded by Schwarzenberg, over the



French, commanded by Macdonald and Oudinot, Feb. 27, 1814. The council which decided the plan of campaign of the allies was held here before the battle, Feb. 25.

**Bar-sur-Seine**, an ancient town of France in the Department of Aube, notable as the scene of a victory of the allied forces over the French, in March, 1814.

**Bart, Barth, or Baert** (bärt), **Jean**, a French sailor, born at Dunkirk, 1650, the son of a poor fisherman. He became captain of a privateer, and, after some brilliant exploits, was appointed captain in the Royal Navy. In recognition of his further services, he was made commodore, subsequently receiving letters of nobility. Brusque, if not vulgar in manner, and ridiculed by the court for his indifference to ceremony, he made the navy of the nation everywhere respected, and furnished some of the most striking chapters in the romance of naval warfare. After the peace of Ryswick, he lived quietly at Dunkirk, and died there while equipping a fleet to take part in the war of the Spanish succession, in 1702.

**Bartas, Guillaume de Salluste du** (bär-tä'), a French soldier, diplomatist, and man of letters, born at Montfort, in Armagnac, in 1544, and died in 1590 of wounds received at the battle of Ivry. His chief poem, "The Divine Week," gives an account of the creation, and is said to have had a considerable influence on Milton's "Paradise Lost." Thirty editions of the work passed through the press in six years. Joshua Sylvester (1563-1618) translated into English "Du Bartas, His Divine Weeks and Works" (1598).

**Bartenstein, Treaty of**, a treaty between Prussia and Russia against France, concluded at Bartenstein, Prussia, April 25, 1807, soon after the battle of Eylau. The objects of the alliance were to re-establish Prussia within the limits of 1805; to dissolve the Rhine Confederation; to restore Tyrol and Venice to Austria; to secure the co-operation of England and Sweden; to aggrandize Hanover at the expense of France; to restore the House of Orange; and to obtain from France indemnities to the Kings of Sardinia and Naples. The terms of this alliance are chiefly important for their similarity to the terms offered Napoleon at Prague (1813).

**Barter**, in commerce and political economy, a term used to express the exchange of one commodity for another, as contrasted with the sale of commodities for money. It is simply a primitive form of exchange carried on in countries in which the use of money has not yet been introduced, or is not prevalent. It was an economic stage through which all communities must have passed. Even yet in many rude countries barter is very common; and European trav-

elers find it convenient to take with them weapons, tools, and ornaments to exchange with the natives for their commodities. In civilized communities barter is a very exceptional thing, having been superseded by the use of money in various forms.

In law, barter, or exchange, as it is now more generally called in law books, is a contract for transferring property, the consideration being some other commodity; or it may be described as a contract for the exchange of two subjects or commodities. It thus differs from sale, which is a contract for the transference of property in consideration of a price in money.

**Barth, Heinrich** (bart), a German African traveler, born in Hamburg in 1821. He graduated at the University of Berlin as Ph. D., in 1844; and set out in 1845 to explore all the countries bordering on the Mediterranean. The first volume of his "Wanderungen durch die Küstenländer des Mittelmeeres," was published in 1849, in which year he was invited by the English Government to join Dr. Overweg in accompanying Richardson's expedition to Central Africa. The expedition set out from Tripoli in February, 1850, and, in spite of the death both of Richardson and Overweg, Barth did not return to Tripoli till the autumn of 1855. His explorations, which extended over an area of about 2,000,000 square miles, determined the course of the Niger and the true nature of the Sahara. The English account of it was entitled "Travels and Discoveries in North and Central Africa" (5 vols., 1857-1858). He died in 1865, leaving unfinished an important work on the African languages.

**Barthélemy, Auguste-Marseille**, (bärtäl'me), a French poet and politician, born in Marseilles in 1796. Educated at the Jesuit College of Juilly, he went to Paris in 1822, and soon made himself famous by a series of vigorous and pointed political satires in verse, directed against the Bourbons, and full of suggestive regrets for the glories of the empire. In "Napoleon in Egypt" (1828), and still more in his elegy for Napoleon's son, "The Son of the Man" (1829), he spoke out his imperialism more boldly, and the latter occasioned his imprisonment on the eve of the revolution of July. His liberation, of course, was immediate; and along with his friend Méry, he celebrated the victory of the people in a poem dedicated to the Parisians, and entitled "The Insurrection." During all the changes which followed, Barthélemy was indefatigable as a brilliant versifier on the political events of the day; though, in his later years, his popularity somewhat declined. He was, from the first, a warm supporter of the second Napoleonic régime. Some of his sayings are memorable, as the oft-quoted "L'homme absurde est celui qui ne change



jamais." He died Aug. 23, 1867, in Marseilles, of which city he was librarian.

**Barthélemy, Jean Jacques**, a French antiquarian; born near Marseilles, Jan. 20, 1716; was educated at the oratory at Marseilles, and was about to prepare himself for holy orders, but becoming disgusted with his teachers, he declined all offers of clerical promotion, and only accepted the title of abbé, in order to show that he belonged to this class. From his youth he loved the study of the ancient languages, including the ancient Oriental tongues, and antiquities more particularly. His indefatigable industry and acuteness soon enabled him to communicate to the learned new discoveries in this branch of study, among which the "Alphabet of Palmyra," published by him in 1754, holds a principal place. In 1747 he was chosen member of the Academy of Inscriptions at Paris, after having been associated, on his arrival in Paris (1744), with the inspector of the Royal Cabinet of Medals. About this time he became acquainted with Count Stainville (afterward the Minister Choiseul), who was on the point of departing as ambassador for Rome, and invited Barthélemy to accompany him thither. Having been appointed director of the Cabinet of Medals in 1753, he accepted the offer, and went in 1754 to Rome. Among his works none is so distinguished for learning and beauty of description as the "Travels of the Younger Anacharsis in Greece," on which he had labored 30 years, and which was translated into English, German, and other languages. He himself was modest enough to call this an unwieldy compilation, while all the learned men of France and foreign countries received it with the greatest applause. Barthélemy, in his advanced age, resolved to compose a complete catalogue of the Royal Cabinet of Medals, but was interrupted in 1788 by the storms of the Revolution. In 1789 he received a place in the Académie Française. When the chief librarian of the national library, the notorious Carra, was executed, Oct. 31, 1793, Barthélemy received the offer of his place; but he refused it, with the hope of passing his remaining days in tranquillity. He died Jan. 30, 1795.

**Barthélemy-Saint-Hilaire, Jules**, a French politician and philosopher; born in Paris, Aug. 19, 1805. On completing his studies he received an appointment in the ministry of finance, being at that time also on the staff of the "Globe" newspaper. After the revolution of 1830 he founded a journal called "Bon Sens," and continued to support the Liberal party in the press. In 1834 he became examiner in French literature at the École Polytechnique, and four years later he was appointed to the chair of Greek and Latin Philosophy in the Col-

ège de France. He played a part on the side of the Moderate party in the revolution of 1848, and was elected to the constituent assembly for Seine-et-Oise. The coup d'état of December, 1852, caused him to forsake political life for a considerable time and to resign his professorship. From this retirement he emerged in 1869. He was shortly afterward sent to the National Assembly as the representative of that department, and during the troublous times of 1870-1871 he was closely associated with M. Thiers. In 1875 he became a life senator, and in the cabinet of M. Jules Ferry, constituted 1880, he was appointed minister of foreign affairs. The chief event of his tenure of this office was the occupation of Tunis. In 1881 he again abandoned public life for study and literary work. He died in Paris, Nov. 25, 1895. His greatest work is his complete French version of "Aristotle" (1837-1893); and among his other writings are "De la Logique d'Aristote" (1838); "Des Védas" (1854); "Du Bouddhisme" (1855); "Letters on Egypt" (1856); "Le Bouddha et sa Religion" (1862); "Mahomet et le Coran" (1865); "De la Métaphysique" (1879); "L'Inde Anglaise" (1887); "Victor Cousin" (1895, 3 vols.); and other works on Hindu religions, philosophy, etc.

**Barthet, Armand** (bär-tā'), a French poet and novelist (1820-1874), best remembered as the author of "The Sparrow of Lesbia" (1849), a comedy in verse, written for the famous Rachel.

**Barthez, Paul Joseph** (bar-tā), a French physician, born at Montpellier, in 1734. At Montpellier he founded a medical school, which acquired a reputation throughout all Europe. Having settled in Paris, he was appointed by the King consulting physician, and by the Duke of Orleans his first physician. The Revolution deprived him of the greatest part of his fortune, and drove him from Paris, but Napoleon brought him forth again, and loaded him in his advanced age with dignities. Among his numerous writings may be mentioned "New Mechanism of the Motions of Man and Animals," "Treatment of Gout," and "Medical Consultor," etc. He died in 1806.

**Bartholdi, Frederic Auguste** (bär-tōl-dē'), a French sculptor, born in Colmar, Alsace, April 2, 1834; received the cross of the Legion of Honor in 1865; principal works: the "Lion of Belfort;" statue of Lafayette, in Union Square, New York; bronze group of Lafayette and Washington, in Paris (1895); and the colossal figure in New York harbor, "Liberty Enlightening the World." He died Oct. 4, 1904.

**Bartholin, Kaspar** (bär-tō-lin'), a Swedish writer, born in 1585. He studied medicine, philosophy, and theology; was



made Doctor of Medicine at Basel in 1610, rector of the University of Copenhagen, in 1618, and Professor of Theology in 1624. His "Institutiones Anatomicæ" was for long a standard text-book in the universities. He died in 1630. His son, THOMAS, born at Copenhagen in 1616, died in 1680, was equally celebrated as a philologist, naturalist, and physician. He was Professor of Anatomy at Copenhagen in 1648; physician to the King, Christian V., in 1670; and Councilor of State in 1675. His sons, KASPAR (born in 1654, died in 1704), and THOMAS (born in 1659; died in 1690), were also highly distinguished — the first as an anatomist, the other as an archæologist.

**Bartholomew, Edward Sheffield**, an American sculptor, born at Colchester, Conn., in 1822; studied in New York and in Rome, where he lived during the latter part of his life. Among his works are "Blind Homer, Led by His Daughter," "Eve," "Youth and Old Age," "Ganymede," and "Evening Star." He died in Naples, May 2, 1858.

**Bartholomew Fair, or Bartlemy Fair**, a celebrated fair, which was long held in Smithfield at Bartholomew-tide. The charter authorizing it was granted by Henry I. in 1153, and it was proclaimed for the last time in 1855.

**Bartholomew, Massacre of St.**, the slaughter of French Protestants in Paris, beginning Aug. 24, 1572. After the death of Francis II., Catherine de' Medici had assumed the regency for her son, Charles IX., then only 10 years old, and was compelled, in spite of the opposition of the Guises, to issue an edict of toleration in favor of the Protestants. The party of the Guises now persuaded the nation that the Catholic religion was in the greatest danger. The Huguenots were treated in the most cruel manner; Prince Condé took up arms; the Guises had recourse to the Spaniards, Condé to the English, for assistance. Both parties were guilty of the most atrocious cruelties, but finally concluded peace. The queen-mother caused the king, who had entered his 14th year, to be declared of age, that she might govern more absolutely under his name. Duke Francis de Guise had been assassinated by a Huguenot, at the siege of Orleans; but his spirit continued in his family, which considered the Admiral Coligny as the author of his murder. The king had been persuaded that the Huguenots had designs on his life, and had conceived an implacable hatred against them. Meanwhile, the court endeavored to gain time, in order to seize the persons of the prince and the admiral by stratagem, but was disappointed, and hostilities were renewed with more violence than ever. In the battle of Jarnac, 1569, Condé was made prisoner and

shot by Captain de Montesquieu. Coligny collected the remains of the routed army, the young Prince Henry de Béarn (afterward Henry IV., King of Navarre and France), the head of the Protestant party after the death of Condé, was appointed commander-in-chief, and Coligny commanded in the name of the Prince Henry de Condé, who swore to revenge the murder of his father. The advantageous offers of peace at St. Germain-en-Laye (Aug. 8, 1570) blinded the chiefs of the Huguenots, particularly Admiral Coligny, who was wearied with civil war. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother; he invited the old Coligny, the support of the Huguenots, to his court, and honored him as a father. The most artful means were employed to increase this delusion. The sister of the king was married to the Prince de Béarn (Aug. 18, 1572), in order to allure the most distinguished Huguenots to Paris. Some of his friends endeavored to dissuade the admiral from this visit; but he could not be convinced that the king would command an assassination of the Protestants throughout his kingdom. On Aug. 22, a shot from a window wounded the admiral. The king hastened to visit him, and swore to punish the author of the villainy; but, on the same day, he was induced by his mother to believe that the admiral had designs on his life. "God's death!" he exclaimed: "kill the admiral; and not only him, but all the Huguenots; let none remain to disturb us!" The following night Catherine held the bloody council which fixed the execution for the night of St. Bartholomew, Aug. 24, 1572. After the assassination of Coligny, a bell from the tower of the royal palace, at midnight, gave to the assembled companies of burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the King of Navarre saved their lives by going to mass, and pretending to embrace the Catholic religion. By the king's orders, the massacre was extended through the whole kingdom; and if, in some provinces, the officers had honor and humanity enough to disobey the orders to butcher their innocent fellow citizens, yet instruments were always found to continue the massacre. This horrible slaughter continued for 30 days, in almost all the provinces; the victims are calculated at 30,000. At Rome, the cannons were discharged, the Pope ordered a jubilee and a procession to the Church of St. Louis, and caused the Te Deum to be chanted. Those of the Huguenots who escaped fled into the mountains and to Rochelle. The Duke of Anjou laid siege to that city, but, during the siege, received the news that the Poles had elected him their king. He concluded a treaty, July 6, 1573, and the king granted to the



Huguenots the exercise of their religion in certain towns. The court gained nothing by the massacre of St. Bartholomew. See HUGUENOTS.

**Bartholomew, St.**, the apostle, probably the same person as Nathanael, mentioned, in the Gospel of St. John, as an upright Israelite, and one of the first disciples of Jesus. The derivation of his name and descent from the family of the Ptolemies is fabulous. He is said to have taught Christianity in the South of Arabia, and to have carried there the Gospel of St. Matthew, in the Hebrew language, according to Eusebius. Chrysostom mentions that he preached in Armenia and Natolia; and a later writer of legends says that he suffered crucifixion at Albania Pyla (now Derbend), in Persia. The ancient Church had an apocryphal Gospel bearing his name, of which nothing has been preserved. The Catholic Church celebrates a feast in his honor, on the 24th of August.

**Bartholomew, St.**, an island, one of the West Indies, in the Leeward group, belonging to France, being transferred by Sweden in 1878. It is a dependency of Guadeloupe. The island has a mountainous surface and is about 24 miles in circumference. The soil is fertile enough to produce fair crops in spite of insufficient moisture. Many vegetables are raised besides bananas, tamarinds, cassia, tobacco, sugar, indigo, cotton, etc. Deposits of zinc and iron are found. The port is not capable of accommodating the largest vessels. The only town is Gustavia, which is on an arm of the sea in the S. W. part of the island.

**Bartholomew's Hospital**, more generally **St. Bartholomew's Hospital**, a celebrated London hospital and medical school, on the S. side of Smithfield, believed to have been founded as far back as A. D. 1102, by Rahere, usually described as having been a minstrel in the court of Henry I. It is still a highly flourishing institution.

**Bartholomew's Tide**, the festival of St. Bartholomew is celebrated on Aug. 24, and St. Bartholomew's tide is the term most nearly coinciding with that date. Two great historical events have occurred on St. Bartholomew's day; one in France, the other in England: (a) On Aug. 24, 1572, Paris disgraced itself by the atrocious and treacherous massacre of the Admiral Coligny and an immense multitude of less distinguished Huguenots. (b) On Aug. 24, 1662, about 2,000 clergymen, unable conscientiously to sign adherence to the Act of Uniformity, had to leave their livings in the Church of England and make way for others who would accept that Act.

**Bartizan**, a battlement on the top of a house or castle; a small overhanging turret

projecting from the angle on the top of a tower, or from the parapet or other parts of a building; or, the battlement surrounding a spire or steeple, or the roof of a cathedral or church.

**Bartlett, Edwin Julius**, an American chemist, born in Hudson, O., Feb. 16, 1851; graduated at Dartmouth College in 1872, and at Rush Medical College in 1879; made Associate Professor of Chemistry in Dartmouth in 1879, and full professor in 1883. He is a member of the American Chemical Society, and the New York Medico-Legal Society, and an honorary member of the New Hampshire Medical Society. He is the author of many papers on chemical subjects.

**Bartlett, Sir Ellis Ashmead**, an English politician, born in Brooklyn, N. Y., of American parents, in 1849; graduated at Christ Church College, Oxford, in 1872; admitted to the bar in 1877; was a member of Parliament from Eye division of Suffolk in 1880-1885; and from Ecclesall division of Suffolk since 1895; was Civil Lord of the Admiralty in 1885-1886, and 1886-1892. He was the author of "The Battlefields of Thessaly" (1897), and brother of William Ashmead Bartlett, who married the BARONESS BURDETT-COUTTS (*q. v.*). He died in London, Jan. 18, 1902.

**Bartlett, Homer Newton**, an American composer, born in Olive, N. Y., Dec. 28, 1846; began his public career when nine years of age, and at 10 composed violin music, piano duos, songs and vocal duets. He has written a large number of anthems, quartets, and glees for vocal rendering, and pieces for the flute, stringed instruments, and military bands and orchestras. His best compositions include a three-act opera, "La Valliere;" a cantata, "The Last Chieftain;" an oratorio, "Samuel," etc.

**Bartlett, John**, an American author and publisher, born in Plymouth, Mass., June 14, 1820; became a publisher in Cambridge in 1836, and senior partner in the Boston publishing house of Little, Brown & Co., in 1878. His works include "Familiar Quotations" (1854; 9th ed., 1891); "New Method of Chess Notation" (1857); "The Shakespeare Phrase-Book" (1882); "Catalogue of Books on Angling, Including Ichthyology, Pisciculture, etc." (1882); "The Shakespeare Index;" "The Complete Concordance to Shakespeare Dramatic Works" (1894), and "Poems." He died Dec. 3, 1905.

**Bartlett, John Russell**, an American author, born in Providence, R. I., Oct. 23, 1805; was educated for a mercantile career. After 1837, he entered the book-importing trade in New York. In 1850, he was appointed one of the commissioners to fix the Mexican boundary. In 1855, he was made Secretary of State of Rhode Island. He wrote various valuable records, genealogies,



local histories, etc. His best known work is his "Dictionary of Americanisms" (1850). He died in Providence, May 28, 1886.

**Bartlett, John R.**, an American naval officer, born in New York in 1843; was appointed an acting midshipman in the navy from Rhode Island in 1859; entered the United States Naval Academy, where he remained till the beginning of the Civil War, when he applied for active duty, and was assigned to the West Gulf Blockading Squadron. He took part in the bombardment and passage of Forts St. Philip and Jackson, and the Chalmette batteries, and the capture of New Orleans and attack on Vicksburg, in June, 1862. He was promoted Lieutenant in 1864; took part in the bombardment of Fort Fisher in December, and the assault on its works in January. Subsequently he was on surveying duty in Nicaragua and on the United States Coast Survey; was promoted to Captain, July 1, 1892; and was retired July 12, 1897. After the declaration of war against Spain, in 1898, he was recalled to active service, and on July 9, succeeded Rear-Admiral Erben as commander of the Auxiliary Naval Squadron, comprising 33 vessels organized for the protection of the Atlantic coast cities. He died Nov. 21, 1904.

**Bartlett, Josiah**, an American physician and statesman, born in Amesbury, Mass., in 1729; was one of the signers of the Declaration of Independence, and a member of the Continental Congress (1775-1776); became Chief Justice of New Hampshire (1788); and first Governor of New Hampshire under the new State Constitution. He died in 1795.

**Bartlett, Samuel Colcord**, an American educator, born in Salisbury, N. H., Nov. 25, 1817; was educated at Dartmouth College, and became a teacher there and at Andover Theological Seminary. He had charge of a church at Monson, Mass.; subsequently becoming Professor of Philosophy in Western Reserve University, Ohio. He afterward became pastor of a church in Manchester, N. H., and later of the New England Church in Chicago. In 1858 he was made Professor of Biblical Literature in the Chicago Theological Seminary, where he remained until 1873, when he spent a year of travel in the East. In 1877 he accepted the presidency of Dartmouth College, which he held until 1892, when he resigned. He was the author of a number of works, including "From Egypt to Palestine" (1879), and also wrote a part of the American edition of "Smith's Dictionary of the Bible." He died in Hanover, N. H., Nov. 16, 1898.

**Bartlett, William Francis**, an American military officer, born in Haverhill, Mass., Jan. 6, 1840; was a student in Harvard University at the outbreak of the Civil War, but left to enter the army; was wounded in

the battle of Ball's Bluff, suffering the loss of a leg; but continued in the service; was twice wounded at Port Hudson; and in the battles of the Wilderness, while leading the 57th Massachusetts Regiment, was again wounded, taken prisoner, and sent to Libby Prison. At the close of the war, he was made a Major-General of Volunteers for distinguished services in the field. He died in Pittsfield, Mass., Dec. 17, 1876.

**Bartlett, William Henry**, an English author and illustrator, born in London, March 26, 1809; illustrated works on America, Switzerland, Palestine, etc.; was the author and illustrator of "Walks About Jerusalem" (1844); "Forty Days in the Desert" (1848); "The Nile Boat" (1849); "Pictures from Sicily" (1853); "The Pilgrim Fathers" (1853), etc. He died Sept. 13, 1854.

**Bartley, Elias Hudson**, an American chemist, born in Bartleyville, N. J., Dec. 6, 1849; graduated at Cornell University in 1873; was an instructor there in 1874-1875; Professor of Chemistry at Swarthmore College, 1875-1878; Lecturer at the Franklin Institute, Philadelphia, in 1877-1878; removed to Brooklyn in 1879; graduated at Long Island College Hospital in 1879; was lecturer there on Physiological and Practical Chemistry in 1880-1885; and then became Professor of Chemistry and Toxicology. He was made chief chemist of the health department of Brooklyn, in 1882. He is the author of several articles in Wood's "Household Practice of Medicine" (1885), and of "A Text-Book of Medical Chemistry."

**Bartok, Ludwig von**, a Hungarian poet and dramatist, born in 1851. He is widely known as a versifier of taste, "Carpathian Songs" being his happiest verse. As a playwright, he is even more distinguished; the comedy of "The Most Beautiful" (1880), and the historical tragedy, "Margareta Kendi," as well as "Anna Thurán," a historical drama, having been frequently acted.

**Bartol, Cyrus Augustus**, an American clergyman, born in Freeport, Me., April 30, 1813; graduated at Bowdoin College in 1832, and at Cambridge Divinity School in 1835; became colleague pastor with Dr. Charles Lowell of the West Church (Unitarian), in Boston, 1837, and full pastor in 1861. His works include "Discourses on the Christian Spirit and Life" (1850); "Discourses on Christian Body and Form" (1854); "Pictures of Europe Framed in Ideas" (1855); "History of the West Church and Its Ministers" (1858); "Church and Congregation" (1858); "Word of the Spirit to the Church" (1859); "Radical Problems" (1872); "The Rising Faith" (1874); "Principles and Portraits" (1880), etc. He died in Boston, Dec. 17, 1900.

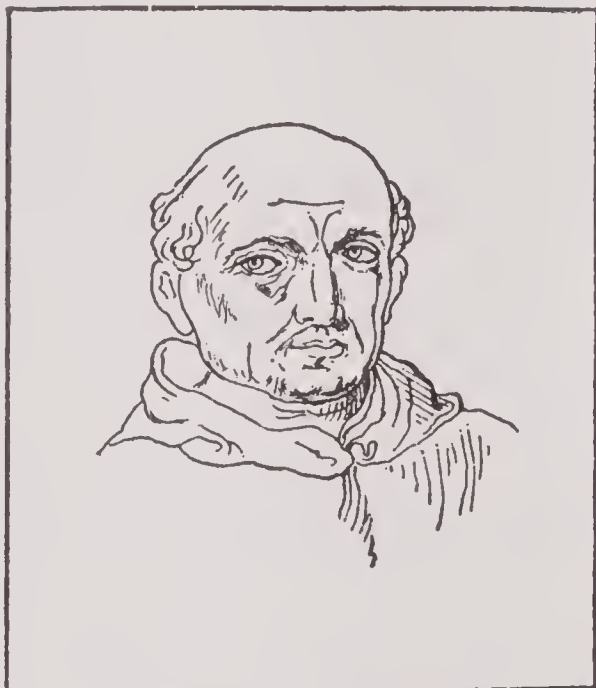
**Bartoli, Adolfo** (bar-tō'lē), an Italian historian, born in Fivizzano, Nov. 19, 1833.



He has long been a recognized arbiter of taste and the elegancies in connection with his country's literature; his "First Two Centuries of Italian Literature" (1870-1880), and "History of Italian Literature" (1878-1889) being masterpieces. In 1874 he became Professor of Italian Literature in the Institute of Florence.

**Bartolini, Lorenzo** (bär-tō-lē'nē), an Italian sculptor, born at Vernio, in Tuscany, in 1777; went to Paris while still a young man. His chief patron was Napoleon, who, in 1808, sent him to Carrara, to establish a school of sculpture. After the battle of Waterloo he repaired to Florence, where he died in 1850. Besides an immense number of busts, he produced several groups, the most celebrated of which are his "Charity" and "Hercules and Lycus."

**Bartolommeo di San Marco, Fra, or Baccio della Porta**, one of the most distinguished masters of the Florentine school of



FRA BARTOLOMMEO.

painting, born at Savignano, in Tuscany, in 1469. His subjects are mostly religious, and the greater part belong to the later period of his life. He was a warm adherent of Savonarola, after whose tragical end in 1500 he took the habit of the cloister. He imparted to Raphael his knowledge of coloring, and acquired from him a more perfect knowledge of perspective. He died in Florence in 1517.

**Bartolozzi, Francesco** (-lot'zē), an Italian engraver, born at Florence in 1725, or, according to others, in 1730. In Venice, in Florence, and Milan, he etched several pieces on sacred subjects, and then went to London, where he received great encouragement. After 40 years' residence in London, he went to Lisbon, on the invitation of the Prince Regent of Portugal, to take the superintendence of a school of engravers, and remained there till his death, in 1813.

**Barton, Andrew**, one of Scotland's first great naval commanders; flourished during the reign of James IV., and belonged to a family which for two generations had produced able and successful seamen. In 1497 he commanded the escort which accompanied Perkin Warbeck from Scotland. After doing considerable damage to English shipping, he was killed in an engagement with two ships which had been especially fitted out against him (1512).

**Barton, Benjamin Smith**, an American naturalist, born in Lancaster, Pa., Feb. 10, 1766; studied the natural sciences and medicine in Philadelphia, Edinburgh, and London (1782-1788), and took his degree at Göttingen. He practiced medicine in Philadelphia, and held successively the chairs of Botany and Natural History, Materia Medica, and Theory and Practice of Medicine in the university there. He became president of many learned societies, was a correspondent of Humboldt, and, among other works, wrote "Elements of Botany" (1812-1814); "Collections for an Essay Toward a Materia Medica of the United States" (3d ed., 1810); and "Flora Virginica" (1812). He died in Philadelphia, Dec. 19, 1815.

**Barton, Bernard**, an English poet, born in Carlisle, Jan. 31, 1784; educated at a Quaker school in Ipswich. He is called the Quaker poet, and is best known because of his friendship with Charles Lamb. His life was spent in Woodbridge. He published "Metrical Effusions," which led to a correspondence with the poet Southey (1812); "Poems by an Amateur" (1818); "Poems," which gained him the friendship of Charles Lamb and Lord Byron (1820); "Napoleon and Other Poems" (1822); "Poetic Vigils" (1824); "Devotional Verses" (1826); "A New Year's Eve and Other Poems" (1828); and — his last work — "Household Verses" (1845). He died in Woodbridge, Suffolk, England, Feb. 19, 1849. His daughter Lucy published "Selections from the Poems and Letters of Bernard Barton" in 1849. His poetry, though deficient in force, is pleasing, fluent, and graceful, animated by a love of nature, and by a pure religious spirit.

**Barton, Clara**, an American philanthropist; born in Oxford, Mass., in 1830; was educated at Clinton, N. Y., and early became a teacher, and founded at Bordentown, N. J., a free school, opening it with six pupils. In 1854 it had grown to 600, when she became a clerk in the Patent Office in Washington. On the outbreak of the Civil War she resigned her clerkship, and became a volunteer nurse in the army hospitals and on the battle-field. In 1864 she was appointed by General Butler to the charge of the hospitals at the front of the Army of the James. She was present at



## Barton

several battles, and in 1865 went to Andersonville, Ga., to identify and mark the graves of Union prisoners buried there, and was placed by President Lincoln in charge of the search for missing men of the Union armies, having already devoted much time to that work at her own expense. She lectured on her war experiences in 1866-1867, and afterward went to Switzerland for her health. On the breaking out of the Franco-Prussian War, in 1870, she aided the Grand Duchess of Baden in preparing military hospitals, assisted the Red Cross Society, and, at the request of the authorities, superintended the distribution of work to the poor of Strasburg, in 1871, after the siege, and in 1872 did a like work in Paris. At the close of the war, she was decorated with the Golden Cross of Baden and the Iron Cross of Germany. On the organization of the American Red Cross Society in 1881, she was made its President, and in that capacity in 1884 had charge of the measures to relieve sufferers from the Mississippi and Ohio floods. In 1883, she was appointed by Governor Butler Superintendent, Treasurer, and Steward of the Reformatory Prison for Women, at Sherborn, Mass. She was Special Commissioner for Foreign Exhibits at the New Orleans Exposition in 1883, represented the United States at the Red Cross Conference in Geneva, Switzerland, in 1884, and was delegate to the International Peace Conference in Geneva the same year. In 1889 she had charge of movements in behalf of sufferers from the floods at Johnstown, Pa.; in 1892 distributed relief to the Russian famine sufferers; in 1896, personally directed relief measures at the scenes of the Armenian massacres; in 1898, at the request of President McKinley, took relief to the Cuban reconcentrados, and performed field work during the war with Spain; and in 1900 undertook to direct the relief of sufferers at Galveston, but broke down physically. She published "History of the Red Cross," "History of the Red Cross in Peace and War," etc.

**Barton, David**, an American legislator, born probably in Waco county, Ky., in 1785; was one of the earliest settlers in Missouri; president of the convention that drew up the State Constitution in 1820; and was a United States Senator from that State in 1821-1831. He died near Boonesville, Mo., Sept. 27, 1837.

**Barton, Elizabeth**, commonly called the "Holy Maid of Kent," was used as an instrument, by the Roman Catholics and adherents of Queen Catharine, to excite the English nation against the proposed divorce of Henry VIII. from his first wife, and the apprehended separation of the English Church from Rome, with which the King then threatened the Pope. Her delirium, in a violent nervous illness, was made use of by

## Bartram

the parson of Aldington, Richard Masters, and by a canon of Canterbury named Bocking, to persuade her that she was a prophetess inspired by God, and destined to prevent this undertaking of the King. Her revelations, published and distributed by the monk Deering, produced such a fermentation among the people that Henry ordered the apprehension and examination of Elizabeth and her accomplices before the Star Chamber. After they had there confessed the imposture, they were condemned to make a public confession, and to imprisonment; and, when it was found that the party of the Queen were laboring to make them retract their confession, they were adjudged guilty of high treason, for a conspiracy against the King, and executed, April 30, 1534.

**Barton, George Hunt**, an American geologist, born in Sudbury, Mass., July 8, 1852; was graduated at the Massachusetts Institute of Technology in 1880; assistant on Hawaiian Government survey, 1881-1883; assistant in Geology in the Massachusetts Institute of Technology in 1883-1884; then Assistant Professor of Geology there; also occupied the corresponding chair in Boston University and the Teachers' School of Science; and was Assistant Geologist of the United States Geological Survey. In 1896 he was a member of the sixth Peary expedition to Greenland. He is a member of the Boston Society of Natural History, the National Geological Society, and the Geological Society of America, and the author of many technical papers.

**Barton, William**, an American military officer, born in Warren, R. I., May 26, 1748; learned the trade of a hatter; but joined the Revolutionary Army soon after Bunker Hill. On the night of July 10, 1777, he performed the exploit which made him famous. Leading 38 men, in four whale-boats, across Narragansett Bay, he surprised and captured the British General, Prescott, at his headquarters, and hurried him away to Washington's camp in New Jersey. Barton received a sword from Congress, and was brevetted Colonel. He was afterward a member of his State Convention which adopted the Federal Constitution. He died in Providence, Oct. 22, 1831.

**Barton, William Paul Crillon**, an American botanist, born in Philadelphia, Pa., Nov. 17, 1786; a nephew of Benjamin Smith Barton; was educated at Princeton College, and in the medical school of the University of Pennsylvania; became Professor of Botany in Jefferson Medical College, in 1815; and was author of "Medical Botany," "Flora of North America," and other works. He died in Philadelphia, Feb. 29, 1856.

**Bartram, John**, an American botanist, born in Chester county, Pa., March 23, 1699;



## Bartram

was called the "father of American botany," and founded at Kingsessing the first botanical garden in America. Linnæus termed him "the greatest natural botanist in the world." He published "Observations on the Inhabitants, Climate, Soil, Diverse Productions, Animals, etc., Made in His Travels from Pennsylvania to Lake Ontario," and a similar volume on Eastern Florida (1766). He died at Kingsessing, near Philadelphia, Pa., Sept. 22, 1777.

**Bartram, William**, an American botanist and ornithologist, born in Kingsessing, Pa., Feb. 9, 1739; a son of John Bartram; spent five years in the Southern States studying natural history, and published the results in "Travels Through North and South Carolina and East and West Florida." He compiled a list of American birds, which was the best of its kind up to the time of Wilson. He died in Kingsessing, July 22, 1823.

**Baru**, a wooly material found at the base of the leaves of a particular palm-tree, *saguerus saccharifer*.

**Baruch**, in Church history, a son of Nehemiah, who was a friend of Jeremiah's, and at least occasionally acted as his amanuensis (Jer. xxxii: 12; xxxvi: 4, 17, 32; xliii: 6; xlv: 1; li: 59). Two apocryphal books or letters have been attributed to him: (a) The first of these was nominally designed to assure the tribes in exile of an ultimate return to their own land. Its date seems to have been the 2d century B. C., while the real Baruch lived in the latter part of the 7th—that is, about 500 years before. (b) The second epistle, or book, was nominally designed to counsel those Jews who were left in Palestine, during the time that their brethren were in captivity abroad, to submit to the Divine will. It was written probably about the same date as the former one—i. e., the 2d century B. C.

**Barus, Carl**, an American physicist, born in Cincinnati, O., Feb. 19, 1856; educated at Columbia College and the University of Würzburg; was Physicist of the United States Geological Survey in 1880–1892; Professor of Meteorology in the United States Weather Bureau, 1892–1893; and Physicist of the Smithsonian Institution, in 1893–1895. He is a member of the National Academy of Sciences; was Vice-President and Chairman of the Section of Physics in the American Association for the Advancement of Science in 1897; and is a corresponding member of the British Association for the Advancement of Science.

**Bary, Heinrich Anton de**, a German physician and botanist, born in Frankfort-on-the-Main, Jan. 26, 1831; noted for his investigations in cryptogamic botany; Professor of Botany at Freiburg in 1855, at Halle, in 1867, and at Strasburg in 1872.

## Baryta

**Barye, Antoine Louis**, a French sculptor, born in Paris, Sept. 24, 1795. He studied engraving with Fourrier and a goldsmith named Beinnais; in 1812, was a topographical engineer, and is supposed to have modeled a number of relief maps now in the French War Office; in 1816 studied drawing with the painter Gros, and sculpture with Basio; and, in 1819, took the second prize for a "Milo di Crotona," which was awarded him at a Concours of the Beaux Arts. From 1823 till 1831 he worked under Fauconnier, jeweler to the Duchesse d'Angoulême. About this time he began to work upon animals, and, in 1831, exhibited the celebrated "Tiger Devouring a Crocodile." He was then employed by M. Le-fuel to make four groups for the pavilion on the Place du Carrousel. He was an officer of the Legion of Honor, a member of the Institute, and a professor at the Jardin des Plantes. He died in Paris, June 25, 1875.

**Baryta**, or **Barytes**, or **Oxide of Barium**, symbol BaO—the earth present in the minerals witherite (carbonate of barium) and heavy spar (sulphate of barium). It may be prepared in several ways: (1) By acting upon the carbonate of baryta, BaCO<sub>3</sub>, by nitric acid, HNO<sub>3</sub>, which causes the disengagement of the carbonic acid, CO<sub>2</sub>, and the nitric acid combining with the baryta forms the nitrate of barium, Ba2NO<sub>3</sub>. On evaporating the latter substance to dryness, and igniting the residue, the nitric acid volatilizes, and leaves the baryta, BaO. (2) Another mode of preparing the same substance is to act upon a solution of sulphide of barium, BaS, by the black oxide of copper, CuO, when an interchange of elements occurs, the sulphur uniting with the copper, producing sulphide of copper, Cu<sub>2</sub>S, and the oxygen with the barium, forming baryta, BaO, which remains dissolved in the water, and, on evaporation, deposits crystals in the hydrated condition, BaH<sub>2</sub>O<sub>2</sub>.8H<sub>2</sub>O. Baryta belongs to the group of alkaline earths, and has the property of acting like an alkali on coloring matters. It has a very harsh taste, is highly caustic, and is very poisonous. The presence of carbonic acid gas may be detected by exposing a solution of baryta to the air, when carbonic acid combines with the baryta and forms a film of white carbonate of barium, BaCO<sub>3</sub>. Baryta exposed to air or oxygen absorbs oxygen, forming peroxide of barium. On this being heated oxygen is liberated and baryta again produced. Till lately it was found impossible to produce oxygen by this simple method, as the action became weak when the process was repeated. But recently it has been found that by carefully removing all carbonic acid gas and water from the air before passing it over the barium, the difficulty is removed, and oxygen is thus



## Baryton

economically produced. The sulphate of baryta,  $\text{BaSO}_4$ , otherwise called ponderous or heavy spar, is found in fissures or cracks in other rocks. It is crystalline, and is sometimes found pure and white, but generally presents a flesh-red color, from the red oxide of iron (rust) incorporated in it. The rust can be got quit of by reducing the sulphate of baryta to a fine powder under rollers or traveling wheels, and subjecting the pulverized material to the action of dilute sulphuric acid, which dissolves the oxide of iron, and leaves the sulphate of baryta as a white, dense powder. The principal use of heavy spar is as a pigment under the name of permanent white; but having little opacity, it cannot be employed by itself, but only when mixed with ordinary white lead. When added to the latter, however, it must be regarded as an adulteration, for the little opacity it possesses renders it of service only as an increaser of the bulk of the white lead. Several mixtures of sulphate of baryta and white lead are manufactured, and are known in commerce. Venice white contains one part sulphate of baryta and one part white lead. Hamburg white contains two parts sulphate of baryta and one part white lead. Dutch white contains three parts sulphate of baryta and one part white lead. The native sulphate of baryta has been employed by the celebrated potter Wedgewood in the manufacture of jasper ware, and for the formation of white figures, etc.

**Baryton** (viola di Bardone), an old chamber instrument, somewhat like the viol di gamba in tone; had a broader finger-board, with six or seven gut-strings, while under the neck there were from nine to 24 strings of brass wire, which were pinched with the point of the thumb, to produce a sound, while the gut-strings were acted on by a bow.

**Basalt**, a word said to have been derived from an African word, and to have meant basaltoid syenite, from Ethiopia or Upper Egypt. In general the name is given to any trap rock of a black, bluish, or leaden gray color, and possessed of a uniform and compact texture.

In a special sense it is a trap rock consisting of augite, feldspar and iron intimately blended, olivine also being not unfrequently present. The augite is the predominant mineral; it is, sometimes, however, exchanged for hornblende, to which it is much akin. The iron is usually magnetic, and is, moreover, often conjoined with titanium. Other minerals are also occasionally present, one being labradorite. It is distinguished from dolerite or dolerite by its possessing chlorine disseminated through it in grains. It is of a very hard, endurable nature, and may be used to advantage in macadamizing roads.

## Bascom

The specific gravity of basalt is 3.00. It so much tends to become columnar that all volcanic columnar rocks are by some people called basalt, which is an error. There are fine columnar basalts at the Giant's Causeway in the N. of Ireland; in Scotland at Fingal's Cave and other parts of the Island of Staffa; and along the sides of many hills in the old volcanic district of Western and Central India. Non-columnar basalts may be amorphous, or they may take the form of volcanic bombs cemented together by a ferruginous paste, or again they may be amygdaloidal. At West Orange, N. J., the face of the First Mountain exhibits basaltic formations, the lines being diagonal and suggesting a huge open fan, with its ribs converging near the ground.

**Bascinet**, or **Basnet**, a light helmet sometimes with, but more frequently without, a visor, in general use for English infantry in the reigns of Edward II. and III., and Richard II.

**Bascom, Florence**, an American educator; daughter of Dr. John Bascom, was educated at the University of Wisconsin, and at Johns Hopkins University, receiving from the first the degree of B. A. and B. L. in 1882, B. S., in 1884, and M. A. in 1887; and from the latter that of Ph. D., in 1892. She was the first woman to whom Johns Hopkins granted a degree, and the first to receive a Ph. D. from any American college. She had much difficulty in securing admission to Johns Hopkins as a graduate student, the only concession to her sex being that she might attend the lectures on geology, and use the laboratory apparatus in that branch. She had previously applied herself to geology, and her thesis on receiving her Ph. D. was on inorganic geology, palæontology and chemistry being minor subjects. Subsequently, she was engaged in teaching; became professor at Bryn Mawr College; and, in 1899, was chosen to supervise the geological survey of Chester county, Pa.

**Bascom, Henry Bidleman**, an American clergyman, born in Hancock, N. Y., May 27, 1796; was licensed to preach in 1813, and made Chaplain to Congress in 1823; President of Madison College, Pennsylvania, in 1827-1829; and of the Transylvania University, Kentucky, in 1842. In 1850 he was made a Bishop of the Methodist Episcopal Church. He edited the "Quarterly Review" from 1846 till 1850. His writings were published in 1856. He died in Louisville, Ky., Sept. 8, 1850.

**Bascom, John**, an American educator and philosophical writer, born at Geneva, N. Y., in 1827. He was President of the University of Wisconsin, in 1874-1887, and in 1900 was Professor of Political Science in Williams College. He has written a number of philosophical works, among them



## Base

"Philosophy of English Literature" (1874); lectures before the Lowell Institute; "Comparative Psychology" (1878); "Sociology" (1887); "An Historical Interpretation of Philosophy" (1893), etc.

**Base**, a word having many applications, of which the following are the most common: 1. Architecture. (a) The part of a column between the bottom of the shaft and the top of the pedestal. In cases in which there is no pedestal, then the base is the part between the bottom of the column and the plinth. (b) A plinth with its moldings constituting the lower part (that which slightly projects) of the wall of a room.

2. Sculpture: The pedestal of a statue.

3. Geometry: (a) The base of an ordinary triangle is its third side, not necessarily the one drawn at the bottom of the diagram, but the one which has not yet been mentioned, while the two others have. (Euclid, book i, Prop. 4, Enunciation.) (b) The base of an isosceles triangle is the side which is not one of the equal two. (Prop. 5, Enunciation.) (c) The base of a parallelogram is the straight line on which in any particular proposition the parallelogram is assumed to stand. (Prop. 35.) It also is not necessarily drawn the lowest in the figure. (Prop. 47.) (d) The base of a cone is the circle described by that side containing the right angle which revolves. (Euclid, book xi, Def. 20.) (e) The bases of a cylinder are the circles described by the two rotary opposite sides of the parallelogram, by the revolution of which it is formed. (Def. 23.)

4. Trigonometry, surveying and map-making: A base or base line is a straight line measured on the ground, from the two extremities of which angles will be taken with the view of laying down a triangle or series of triangles, and so mapping out the country to be surveyed.

5. Fortification: The exterior side of a polygon, or the imaginary line connecting the salient angles of two adjacent bastions.

6. Ordnance: The protuberant rear portion of a gun, between the knot of the cascabel and the basering.

7. Military: That country or portion of a country in which the chief strength of one of the combatants lies, and from which he draws reinforcements of men, ammunition, etc. During the Indian mutiny and War of 1857 and 1858, the base of the operations for the recovery of Delhi was the Punjab.

8. Zoology: That portion of anything by which it is attached to anything else of higher value or signification. (Dana.)

9. Botany: A term applied to the part of a leaf adjoining the leaf-stalk, to that por-

## Base Ball

tion of a pericarp which adjoins the peduncle, or to anything similarly situated.

10. Heraldry: The lower part of a shield, or, more specifically, the width of a bar parted off from the lower part of a shield by a horizontal line. It is called also base-bar, baste, and plain point. ("Glossary of Heraldry.")

11. Chemistry: A metallic oxide which is alkaline, or capable of forming with an acid a salt, water being also formed, the metal replacing the hydrogen in the acid. Organic bases or alkaloids are found in many plants; they contain nitrogen, and are probably substitution compounds of ammonia. Artificial organic bases are called amines. Bases soluble in water render red litmus blue.

12. Dyeing: Any substance used as a mordant.

**Baseball**, a field game, played chiefly in the United States, where it is known as "the national game." It is undoubtedly an evolution of the old Colonial game of "One Old Cat," which was played by three boys—thrower, catcher, and batsman. The latter, after striking at the ball, ran to a goal about 30 feet distant, and on returning to the batsman's position without being put out counted one run or tally. From this early beginning was developed a game called "Town Ball," from which baseball was originated.

As early as 1842 baseball was played in New York city, which place may properly be called the home of the game; but it was not until 1845 that a regular club was organized and a code of rules formulated and published. Other clubs were soon organized, the more prominent being the Gothams, Eagles, and Empires, of New York. The Knickerbocker club continued to make the rules for the game until 1857, when a convention of ball players was held in New York, which resulted in the formation of the National Association of Ball Players. This organization was the governing body of baseball until 1871, when the National Association of Professional Ball Players was formed, since which time the professional element, in the persons of the club proprietors, has been the governing and rule-making body.

Baseball is played on a level field, upon which is outlined a square, which is known as the infield, or "diamond." The term "diamond" is also frequently used to apply to the entire field. The infield is outlined by bases, placed at right angles to each other, on each corner, beginning from the home plate. Following the base-lines, the distance from base to base must be 90 feet. The territory outside the diamond infield is known as the outfield. All that portion of the field outside the base-lines, which extend from home plate to first base and from home plate to third base, all territory



## Baseball

behind the home plate, and all territory outside of a straight line reaching from the outside corner of third and first bases indefinitely to the outfield, is foul ground.

Two teams make up each contest, with nine players on each side. The fielders are known as the pitcher, the catcher, the first baseman, the second baseman, the third baseman, the shortstop, the left fielder, the center fielder, and the right fielder. None of these is required to occupy an exact position except the pitcher, who must be within the pitcher's "box" when pitching the ball to the batter, and the catcher, who must be within the space allotted to him behind the batter. The game begins with the fielders of one team in position and the first batter of the opposing side in his "box" at the home plate. The batter tries to hit the ball anywhere within the fair lines and out of reach of the fielders—in which case it is a "fair" ball—and to reach first base before the ball can be fielded to the first baseman. He then tries, during intervals when the ball is being pitched to the succeeding batsman, or in case the latter hits the ball, to reach second base, and subsequently third base and home base, without being touched by the ball in the hands of a fielder. Should he do so successfully, he scores one run for his side.

While at bat the batsman has three opportunities given to him to hit the ball fairly, and at an unsuccessful attempt a "strike" is called by the umpire. At the third strike the batsman is out if the catcher holds the ball; or, in the event of the catcher missing it, if it is thrown to first base and caught by the baseman before the batsman reaches the base. If the pitcher delivers a ball that the batsman should have struck at—one that crosses home base not lower than the batsman's knee nor higher than his shoulder—the umpire calls a strike on the batsman. A strike is also called on the batsman when he hits the ball into foul territory until he has two strikes called on him; after which there is no penalty for fouling, except in case of a foul ball hit up into the air—called a foul fly—and caught by a fielder before it touches the ground, in which event the batsman is out. If the pitcher delivers to the batsman four balls which do not cross the home plate between the batsman's knee and shoulder, or if he hits the batsman by a pitched ball, the batsman then becomes a base runner and is entitled to take first base without being put out, after which he must take his chances of reaching home base in the usual way. Three men of the side at bat must be put out before the side retires and the team in the field takes its turn at the bat. The game regularly consists of nine full innings, unless the side second at bat has made more runs at the conclusion of the eighth

## Baseball

inning than the side first at bat makes at the end of its ninth. If for some reason a game of less than nine innings is played, whenever the side second at bat has scored more runs in half an inning less than the side first at bat, it shall be declared the winner, provided the side first at bat has completed five full innings at bat. A game is also won if the side last at bat scores the winning run before the third man is out. In case of a tie game play continues until, at the end of even innings, one side has scored more runs than the other; provided that if the side last at bat scores the winning run before the third man is out the game shall terminate.

The implements used are a bat and a ball. The dimensions of the Spalding official National League ball, which is used exclusively in the National League, are specified in the official rules as follows: The ball must weigh not less than 5 nor more than  $5\frac{1}{4}$  ounces avoirdupois, and measure not less than 9 nor more than  $9\frac{1}{4}$  inches in circumference. The bat must be round, not over  $2\frac{3}{4}$  inches in diameter at the thickest part, nor more than 42 inches in length, and entirely of hardwood, except that for a distance of 18 inches from the end twine may be wound around, or a granulated substance may be applied to, the handle. The home base was originally one square foot in size, two sides of which were bounded by the lines from home base to first base and third base, respectively; but to insure greater accuracy by the umpire in judging whether balls cross the home base or not, the corner nearest to the pitcher was squared, thus forming a five-sided figure, the measurements of which are 12 inches on the two sides along the base lines, 17 inches on the side facing the pitcher, and  $8\frac{1}{2}$  inches on the other two sides. The home base must be of rubber and sunk flush with the ground. First, second, and third bases are made of canvas, filled with some soft material, and securely fastened at the other three points of the "diamond." The pitcher's plate is a piece of rubber, 24 by 6 inches, laid parallel to the squared end of the home plate and 60.5 feet from it, and serves to mark the boundary of the pitcher's "box." In delivering the ball to the batsman the pitcher must keep one foot in contact with the plate, and must not raise either foot until in the act of delivering the ball to the bat, nor make more than one step in such delivery.

A baseball uniform consists of shirt, knee trousers, cap, stockings, and shoes, the latter fitted with triangular short blades on sole and heel to prevent slipping. Coats and sweaters, or jerseys, also form part of the equipment, to be used when the players are not in action. The other accessories of the game are of a protective



nature, the catcher being equipped with the greatest number—a mask made of wire, to cover the face; an inflated body protector of canvas and rubber, which is suspended from the neck and strapped at the waist; and a large padded mitt, worn on the left hand (if the catcher is right-handed). The other players are permitted to use a glove or mitt, which, however, with the exception of that used by the first baseman, is restricted as to size and weight, 10 ounces in weight and 14 inches around the palm being the maximum measurements. The size and weight of the glove or mitt worn by the catcher and first baseman are not limited.

The officials of the game consist of an umpire, who decides all plays, and whose authority is absolute, and a scorer, who records the game. Each team has a captain, who directs the movements of the players while on the field and who is the only person permitted to address the umpire, and then only on a question of interpretation of the rules. While a player is a base runner, a member of his team—styled a “coacher”—is permitted to stand near first base or third base to direct the runner’s movements.

#### GLOSSARY OF TERMS

*Inning*—The time at bat of the nine players representing a club in a game. It is completed when three of such players have been legally put out. *Time at bat*—The time at bat of a batsman. It begins when he takes his position and continues until he is put out or becomes a base runner; but a time at bat shall not be charged against a batsman who is awarded first base by the umpire for being hit by a pitched ball, or for the illegal delivery of the pitcher, or on called balls, or when he makes a sacrifice hit. *Base hit*—A hit made when the ball from the bat strikes the ground on or within the foul lines and out of reach of the fielders; when a fair-hit ball is partially or wholly stopped by a fielder in motion, but such player cannot recover himself in time to field the ball to first before the striker reaches that base or to force out another base runner; when the ball is hit with such force to an infielder or pitcher that he cannot handle it in time to put out the batsman or force out a base runner (in a case of doubt over this class of hits, a base hit should be scored and the fielder exempted from the charge of an error); when the ball is hit so slowly toward a fielder that he cannot handle it in time to put out the batsman or force out a base runner. In all cases where a base runner is retired by being hit by a batted ball, or when a batted ball hits the person or clothing of the umpire, the batsman should be credited with a base hit. In no case shall a base hit be scored when a base runner is forced out by

the play. *Sacrifice hit*—A sacrifice hit shall be credited to the batsman who, when no one is out or when but one man is out, advances a runner a base by a bunt hit, which results in the batsman being put out before he reaches first, or would so result if it were handled without error. *Assist*—A term used when a player handles the ball in a play that results in a base runner being put out, or would so result if the play fail through no fault of the assisting player. *Error*—A misplay which prolongs the time at bat of the batsman or allows the base runner to make one or more bases when perfect play would have insured his being put out. *Earned run*—A run made when a player makes the circuit of the bases without the assistance, by errors, of the opposing team; a run is not counted as earned under any circumstances after the opponents in the field have had three chances to retire the side at bat and have not taken advantage of them. *Left on base*—When the third man is declared out in an inning before any base runner, or runners, complete the circuit of the bases, the latter are said to be left on base. This ends any possible chance of their scoring a run for their side, as they cannot resume their places in the next inning. *Stolen base*—When a player advances himself a base unaided by his team mates or misplays by his opponents he is said to “steal” the base. *Base on balls*—When a pitcher delivers to the batsman four balls that, in the judgment of the umpire, did not cross the home base or were below the batsman’s knee or above his shoulder, the batsman is entitled to take first base. *Two-base hit*—When the batsman makes a hit that enables him to reach second base without stopping and without being put out, it is called a two-base hit. *Three-base hit*—Same as two-base hit, except that the base runner reaches third base. *Home run*—When the batsman makes a hit that enables him to make the complete circuit of the bases without stopping and without being put out, thus scoring a run for his side, the run is termed a home run. *Bunt hit*—A legally batted ball, not swung at, but met with the bat and tapped slowly within the infield by the batsman. *Fly ball*—A ball knocked high up in the air, affording a comparatively easy chance for a catch by a fielder. The batsman is out if the fly is caught before touching the ground whether it is on fair or foul territory. *Double play*—When two base runners are put out on a continuous play, the play is called a double play. *Triple play*—When three base runners are put out on a continuous play, the play is called a triple play. *Curve pitching*—A peculiar twist imparted to the ball by the pitcher with the intent to deceive the batsman by making him strike at the ball and miss it, thus causing a strike to be called on him. *Infielders*—The term



## Basedow

applied to the three base players and the shortstop, although the pitcher and catcher are properly infielders, also. *Outfielders*—The left fielder, center fielder, and right fielder. *Battery*—The term applied to the combination of pitcher and catcher, the main attacking force in the game. *Substitutes*—A substitute may take the place of another player at any time during the progress of the game, but the player relieved cannot again enter that game.

Consult: Ward, "Baseball" (1888); and the "Official Baseball Guide," published annually.

A. G. SPALDING.

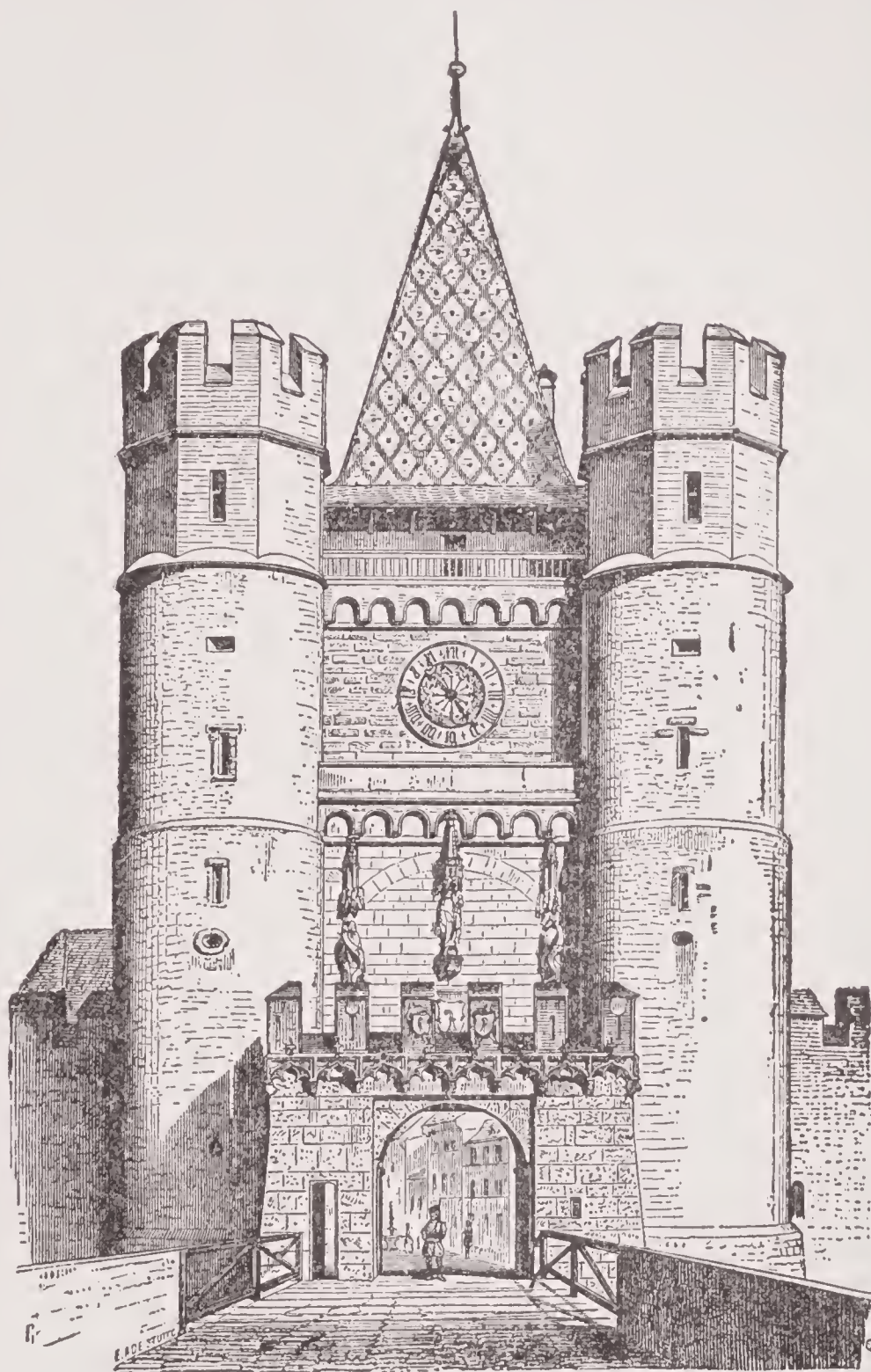
**Basedow, or Bassedau, Johann Bernhard** (bäs'e-dou), a celebrated German

educator; born in Hamburg, Sept. 11, 1723; became one of the most acute thinkers of his day, the problem of education especially enlisting his intellectual powers; and in the famous "Elementary Treatise" (1774), he inaugurated a pedagogical revolution, the work being analogous to that of Comenius in the "Pictured (or Painted) World," and also to the "Émile" of Rousseau. It dealt with organization, methods of instruction, and the preparation of teachers. Its chief theorem was "education according to nature," the application of scientific and vital methods. The numerous works he subsequently prepared were elaborations of the original treatise, and all of vital importance in the history of education. In 1771 he was invited by the Prince of Anhalt-Dessau to establish at Dessau a model institution exemplifying his theories. The result was the "Philanthropinum," as he styled it. In its management he did not attain the practical results for which he had hoped, and he therefore resigned his directorship in 1778. The institution was closed in 1793, but it had been much imitated in Germany and Switzerland, and exerted no small influence. Basedow then turned to theology and published several rationalistic essays. Reference is made to him in Goethe's autobiography. He died in Magdeburg, July 25, 1790. Consult: Barnard, "German Teachers and Educators" (1861); Quick, "Educational Reformers" (1879).

## Basel

**Baseilhac, Jean** (bäs'el-häc), a French surgeon; born in 1703 at Pouyastruc, near Tarbes. He was the inventor of the trocar (*q. v.*) and other appliances, and wrote on surgery. He died in 1781.

**Basel** (bä-zel), or **Bâle** (never BASLE), a canton and city of Switzerland. The canton borders on Alsace on the W. and Baden



THE SPAHLENTHOR AT BASEL.

on the N., has an area of 176 square miles, and a population (1908) of 205,530, nearly all speaking German. The region is located on the northern slope of the Jura Alps, the range attaining here an altitude of more than 3,000 feet. In the valleys is an abundance of orchards and vineyards, and ample pasturage for cattle. It is divided into two half-cantons, Basel city (Basel-Stadt) and Basel country (Basel-Landschaft). The former consists of the city proper and its several precincts, the remaining part of the



## Basel

canton forming Basel-Landschaft, the capital of which is Liestal. The city of Basel is 43 miles N. of Bern, and consists of two parts on opposite sides of the Rhine, and communicating by three bridges, one of them an ancient wooden structure; in the older portions is irregularly built with narrow streets; has an ancient cathedral, founded 1010, containing the tombs of Erasmus and other eminent persons; a university, founded in 1459; a seminary for missionaries; a museum containing the valuable public library, pictures, etc. The industries embrace silk ribbons (8,000 hands employed), tanning, paper, aniline dyes, brewing, etc.; and the advantageous position of Basel, a little below where the Rhine becomes navigable and at the terminus of the French and German railways, has made it the emporium of a most important trade. At Basel was signed the treaty of peace between France and Prussia, April 5, and that between France and Spain, July 22, 1795. Pop. (1900) 111,009.

**Basel, Confession of**, a Calvinistic confession introduced by Ecolampadius at the opening of the Synod of Basel (1531). It was adopted by the Protestants of Basle in 1534. Simple and comparatively moderate in its terms, it occupies an intermediate place between Zwingli and Luther.

**Basel, Council of**, a celebrated Ecumenical council of the Church, convoked by Pope Martin V. and his successor, Eugenius IV. It was opened Dec. 14, 1431, under the presidency of the Cardinal Legate Juliano Cesarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Christian nations under the Catholic Church, to put a stop to wars between Christian princes, and to reform the Church. But its first steps toward a peaceable reconciliation with the Hussites were displeasing to the Pope, who authorized the Cardinal Legate to dissolve the Council. That body opposed the pretensions of the Pope, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the Emperor Sigismund, of the German princes, and of France. On the Pope continuing to issue bulls for its dissolution the Council commenced a formal process against him, and cited him to appear at its bar. On his refusal to comply with this demand the Council declared him guilty of contumacy, and, after Eugenius had opened a counter synod at Ferrara, decreed his suspension from the papal chair (Jan. 24, 1438). The removal of Eugenius, however, seemed so impracticable, that some prelates, who till then had been the boldest and most influential speakers in the Council, including the Cardinal Legate Juliano, left Basel, and went over to the party of Eugenius. The Archbishop of Arles, Cardinal

## Bashan

Louis Allemand, was now made First President of the Council, and directed its proceedings with much vigor. In May, 1439, it declared Eugenius, on account of his disobedience of its decrees, a heretic, and formally deposed him. Excommunicated by Eugenius, they proceeded, in a regular conclave, to elect the Duke Amadeus of Savoy to the papal chair. Felix V.—the name he adopted—was acknowledged by only a few princes, cities, and universities. After this the moral power of the Council declined; its last formal session was held May 16, 1443, though it was not technically dissolved till May 7, 1449, when it gave in its adhesion to Nicholas V., the successor of Eugenius. The decrees of the Council of Basel are admitted into none of the Roman collections, and are considered of no authority by the Roman lawyers. They are regarded, however, as of authority in points of canon law in France and Germany, as their regulations for the reformation of the Church have been adopted in the pragmatic sanctions of both countries, and, as far as they regard clerical discipline, have been actually enforced.

**Basel, Treaty of.** (1) A treaty of peace between Prussia, represented by Hardenberg, and the French Republic, represented by Barthélemy; signed at Basel, April 5, 1795. Prussia agreed to withdraw from the coalition against France, and to give up her possessions W. of the Rhine. A secret article provided for Prussian compensation elsewhere, in case France's claim to the Rhine provinces was ratified by a general peace. (2) A treaty consummated by France with Spain, July 22, 1795, whereby Spain became an ally of France and ceded St. Domingo.

**Basella**, a tropical genus of *chenopodiaceæ*. *B. alba* and *B. rubra* are known in Great Britain as stove biennials. They are plants with twining stems, in common use as pot herbs in the East Indies, and cultivated in China; also sometimes in France as a substitute for spinach. *B. rubra* yields a rich purple dye. The great fleshy root of *B. tuberosa*, a South American twiner, is edible.

**Bashahr**, one of the Punjab Hill States, on the lower slopes of the Himalayas, traversed from E. to W. by the Sutlej; area, 3,320 square miles. The Rajah and upper classes in the S. parts are Rajputs, and the people generally are of the Hindu race, but their observance of Hinduism is very partial. The Rajah pays tribute to the British Government, for which he is required to raise troops in time of war, and by which his sentences of death must be confirmed. Pop. 75,727.

**Bashan**, a rich, hilly district, lying E. of the Jordan, and between the mountains of Hermon on the N., and those of Gilead



and Ammon on the S. The country takes its name ("fat," "fruitful") from its soft and sandy soil. It is celebrated in Scripture for its stately oaks, fine breeds of cattle, and rich pasturage. Modern travelers describe the country as still abounding with verdant and fertile meadows, valleys traversed by refreshing streams, hills crowned with forests, and pastures offering an abundance to the flocks that wander through them. Bashan was assigned, after the conquest of Og and his people, to the half tribe of Manasseh. From it came the Greek name Batanæa, in modern Arabic El-Bottein. But this latter only included its S. part. The ancient Bashan covered the Roman provinces named Gaulonites, Trachonites, Auranites, Batanæa, and Ituræa.

**Bashee, or Bashi.** See BATANE ISLANDS.

**Bashford, James Whitford**, an American clergyman, born in Fayette, Wis., May 27, 1849; graduated at the University of Wisconsin in 1873, and at the Theological School of Boston University in 1876; became instructor of Greek at the University of Wisconsin in 1874, president of the Wesleyan University of Ohio in 1889, and a bishop in 1904. His works include "Science of Religion," published sermons, and contributions to periodical literature.

**Bashi Bazouks**, a body of irregular troops in the service of the Turkish Sultan. They are principally of Asiatic races, and formed a contingent of the Turkish army during the Russian War, 1853-1856. As light cavalry they are considered excellent, far surpassing the Cossacks in courage and powers of endurance. Dr. William H. Russell, in describing these "wild cavaliers," says: "It would have been difficult to find more picturesque looking scoundrels if the world was picked for them from Scinde to Mexico. Many of them were splendid looking fellows, with fine, sinewy legs, beautifully proportioned muscular arms, and noble, well set heads of the true Caucasian mold; others were hideous negroes from Nubia, or lean, malignant looking Arabs, with sinister eyes and hungry aspect; and some were dirty Marabout fanatics from Mecca, inflamed by the influence of their hadji, or pilgrimage."

**Bashkirs, Baschkirs, or Bashkeers**, a Tartar tribe of Russia, where they occupy a portion of the governments of Orenburg, Perm, and Viatka. These people are in Asia generally called Istiuks or Ischtiuks, and they live principally in tents, and on the produce of the chase, troubling themselves but little with agriculture, except in winter, which they pass in their villages. It is in their territory that the rich gold and platina mines exist. They are Mohammedans and pay no taxes, but all are held under military service to guard the frontier.

Their number is about 200,000, of whom 70,000 are enrolled on the same footing as the Cossacks of the Don.

**Bashkirtseff, Marie** (bäsh-kërts'ef), a Russian author, born in Russia in 1860; came of a noble and wealthy family, went to Italy to study singing, and to Paris to study art. Her fame rests on her private "Journal," which seems to have been written with ultimate publication in view. She died in Paris in 1884.

**Basic Slag**, the slag or refuse matter which is obtained in making basic steel, and which from the phosphate of lime it contains is a valuable fertilizer.

**Basil**, a labiate plant, *ocimum basilicum*, a native of India, much used in cookery, especially in France, and known more particularly as sweet or common basil. Bush or lesser basil is *O. minimum*; wild basil belongs to a different genus, being the *calamintha clinopodium*.

**Basil I.**, The Macedonian, Emperor of the East, was of low origin, but obtained employment at the court of the Emperor Michael III., became his chamberlain, murdered his rival, Bardas, was associated in the empire, then murdered Michael, and succeeded him in 867. Though he had risen by a series of crimes, he governed wisely, made many reforms in the administration and in the army, and compiled a body of laws called the Basilica, which, augmented by his son and successor, Leo the Philosopher, were in force till the fall of the empire. Basil I. deprived Photius of the See of Constantinople, and restored Ignatius; but on the death of the latter he recalled Photius. He successfully carried on war with the Saracens. Died in 886.

**Basil II.**, Emperor of the East, was son of Romanus II., and with his brother, Constantine, was first associated in the empire by John Zimisceus, and succeeded him in 976. His long reign was a series of wars with his rivals, Bardas, Sclernus, and Phocas, with the Saracens, and with the Bulgarians. In 1014, after a great victory over the latter, having 15,000 prisoners, he had 99 out of every 100 deprived of their eyes, and thus sent home. This horrible cruelty caused the death of Samuel, King of the Bulgarians. The war ended in 1019, by the complete conquest of Bulgaria. Died in 1025.

**Basil, St.**, surnamed THE GREAT, Bishop of Cæsarea, in Cappadocia, where he was born about 326. He was studying at Athens in 355, and there became the friend of Gregory, afterward Bishop of Nazianzero. After extensive travels, St. Basil retired to the Desert of Pontus, and there founded an order of monks. He succeeded Eusebius in the See of Cæsarea in 370, and by his oppo



## Basilan

sition to Arian doctrines greatly offended the Emperor Valens. His constitution being much impaired by the austerities of a monastic life, he died in 380.

**Basilan**, the largest island of the Sulu Archipelago, Philippine Islands. Basilan is of oblong form, about 36 miles long and situated S. of Mindanao. It is separated from Mindanao by a strait only 9 miles wide. This island is very mountainous, and most of it is covered by virgin forests. The soil is extremely rich and produces a variety of valuable crops, including cotton, coffee, sugar, chocolate, tobacco, indigo, and spices of all sorts. Basilan has about 15,000 inhabitants and three excellent harbors. The name Basilan is also applied to the whole group of 34 adjacent islets. The leading port is Isabela, on Basilan Strait.

**Basilean Manuscripts**, two manuscripts of the Greek New Testament now in the library of Basel. (1) A nearly complete uncial copy of the Gospels of the 8th century; (2) a cursive copy of the whole New Testament except the Apocalypse, 10th century.

**Basilian Liturgy**, that form for celebrating the Eucharist drawn up toward the close of the 4th century by Basil the Great, still used in the Greek Church.

**Basilian Monks**, monks who strictly follow the rules of St. Basil, chiefly belonging to the Greek Church.

**Basilica**, originally the hall or courtroom in which the King administered the laws made by himself and the chiefs who formed his council. Of the vast size of some of these buildings we may form a conception from the accommodation which must have been required for the tribunal alone, where, in addition to the curule chair of the pretor, and space required by the suitors and their advocates, seats had to be provided for the judges or jurymen, who occasionally amounted to as many as 180. When the Christian religion was made the State religion in Rome many of these buildings were given up to the new sect; the arrangement of that portion of the interior where the official business was conducted easily lending itself to the Christian ritual. In some of the oldest basilicas in Rome, *e. g.*, in the subterranean Church of San Clemente, the early development of the Christian arrangement from the Roman is still to be seen. Many of the oldest and most splendid of the Roman churches are built on the plan of the basilica, and are called basilicas in consequence. The original church, on the site of which St. Peter's is built, was a basilica, and hence the name is often applied to the present church, which is not, strictly speaking, a basilica.

**Basilicata**, the ancient Lucania, in South Italy, composed solely of the province of

## Basilides

Potenza; so called after the Emperor Basilius II., who reconquered it from the Saracens and Lombards in the 11th century. It is mountainous, several peaks rising to upward of 4,500 feet (Monte Pollino, 7,375 feet). The Apennines here divide into two parts, which branch off to the E. and W. From these the rivers, Bradano, Basento, Salandrella, Agri, and Sinni, take their source, and, after draining this fertile district, fall into the Gulf of Taranto in the Ionian Sea. There are also many lakes, some of volcanic origin. The chief are Monticchio, Pesole, Maorno, and Santa Palagina. The bulk of the people are poor and ignorant, and talk a dialect called basilisco. Its coast line being for the most part marshy, and, as a consequence, unhealthful, the province derives next to no commercial benefit from it. Nevertheless, there are works of amelioration in progress or projected under the Acts of 1882 and 1886. The railway runs across the territory from N. W. to S. E., where there is a junction at Metaponto with the lines from Reggio and Brindisi. There are, moreover, other lines in course of construction or projected. Notwithstanding the great fertility of the soil agriculture is backward, and emigration to South America comparatively large. The products are varied. On the slopes of the Apennines, forests and pasture grounds are numerous, and the chestnuts plentiful. But even in the mountain valleys the vine is grown. In the vast plains that extend to Apulia and Calabria wheat is the principal product, while toward Melfi and the neighborhood of Melfi it is noted for its excellent wine. The orange and lemon grow well nearer the coast. Among other products are cotton, flax, silk, honey, wax, liquorice, dried fruit, saffron, tobacco, etc. Mineral springs are many, chiefly sulphurous. There are marble quarries at Avigliano, Latronico, Muro, Lucano, and Picerno; chalk at Mauro Forte and Montemuro; transparent quartz at Lagonegro; tufa at Matera; and excellent lignite at San Chirico Raparo and Rotonda. Area, 3,845 square miles; pop. (1906) 490,705.

**Basilicon**, a name of several ointments, the chief ingredients of which are wax, pitch, resin, and olive oil.

**Basilicon Doron** (the royal gift), the title of a book written by King James I. in 1599, containing a collection of precepts of the art of government. It maintains the claim of the King to be sole head of the Church. Printed at Edinburgh, 1603.

**Basilides** (-dēz), an Alexandrian gnostic who lived under the reigns of Trajan, Adrian, and Antoninus, but the place of his birth is unknown. He was well acquainted with Christianity, but mixed it up with the wildest dreams of the gnostics, peopling the earth and the air with multi-



## Basiliscus

tudes of *æons*. His disciples (Basilidians) were numerous in Syria, Egypt, Italy, and Gaul, but they are scarcely heard of after the 4th century. Many of his fantastic speculations bear greater resemblance to the doctrines of Zoroaster, and in some points to Indian philosophy, than to the religion of Jesus. The first principle of all things is the unborn and unknown Father, from whom emanated in succession *nous* ("mind"), *logos* ("the word"), *phronēsis* ("understanding"), *sophia* ("wisdom"), and *dynamis* ("power"). From the last sprung *dikaïosynē* ("justice") and *eirēnē* ("peace"), and these seven with the Father formed the first Ogdoad, or octave of existence which originated the first heaven. From them emanated other powers which created the second heaven, and so on through the whole circle of emanations, which amount to 365, the mystic number so often inscribed on the symbolie stones in the Gnostic schools. Each of these angelic powers governs a world. There are, consequently, 365 worlds, to each of which Basilides gave a name. The *archōn* or head of the 365th, or lowest world, rules the material universe, which he also created. He is the God or Jehovah of the Old Testament, and when the earth was divided among the rulers of the material universe, the Jewish nation fell to the share of himself, who was the prince of the lowest class of angels. But wishing to absorb all powers himself, he strove against the other angels, the result of which was the loss of the true religion, to restore which the Supreme God sent *Nous*, the first emanation, who became incarnate in Jesus at his baptism.

**Basiliscus**, an emperor of the East; lived in the 5th century. He was the brother of the Emperor Leo's wife, Verina. As commander of a large armament sent against Genseric, chief of the Vandals, he was signally defeated in 468. In 474 he usurped the throne and was proclaimed emperor by the Senate. His reign was short and turbulent and in 476 he was defeated, and imprisoned by Zeno. He died in 477.

**Basilisk**, a fabulous creature formerly believed to exist, and variously regarded as a kind of serpent, lizard, or dragon, and sometimes identified with the cockatrice. It inhabited the deserts of Africa, and its breath and even its look was fatal. The name is now applied to a genus of saurian reptiles (*basiliscus*), belonging to the family *iguanidæ*, distinguished by an elevated crest or row of scales, erectible at pleasure, which, like the dorsal fins of some fishes, runs along the whole length of the back and tail. The mitered or hooded basilisk (*B. mitratus*) is especially remarkable for a membranous bag at the back of the head, of the size of a small hen's egg, which can be inflated with air at pleasure. The other

## Basket Ball

species have such hoods also, but of a less size. To this organ they owe their name, which recalls the basilisk of fable, though in reality they are exceedingly harmless and lively creatures. The *B. amboinensis* is a native of the Indian Archipelago, where it is much used for food. It frequents trees overhanging water, into which it drops when alarmed.

**Basilus.** See BASIL.

**Basin**, in physical geography, the whole tract of country drained by a river and its tributaries. The line dividing one river basin from another is the watershed, and by tracing the various watersheds we divide each country into its constituent basins. The basin of a loch or sea consists of the basins of all the rivers which run into it. In geology a basin is any dipping or disposition of strata toward a common axis or center, due to upheaval and subsidence. It is sometimes used almost synonymously with formation to express the deposits lying in a certain cavity or depression in older rocks. The Paris basin and London basin are familiar instances.

**Baskerville, John**, an English printer and type-founder, born in 1706; settled at Birmingham as a writing-master; subsequently engaged in the manufacture of japanned works; and in 1750 became a printer. From his press went highly prized editions of ancient and modern classics, Bibles, prayer books, etc., all beautifully printed works. He died in 1775.

**Basket**, originally a light and airy vessel made of plaited osiers, twigs, or similar flexible material, much used in domestic arrangements. The baskets made by the old inhabitants of Great Britain were so good that they became celebrated at Rome, and were called by a Latin name which was confessedly only their native appellation pronounced by foreign lips. Martial thus speaks of them: "*Barbara de pictis venit bascauda Britannis*" ("The barbarian basket came from the painted Britons"). By barbarian he probably meant made by foreigners, as contradistinguished from Romans, and did not mean in any way to impeach the excellence of the manufacture. Mr. Freeman ("Old English History for Children") instances basket as one of the few Welsh words in English, and points out that the small number that do exist are mainly one sort of words which the women, whether wives or slaves, would bring in. From this and other facts, he infers that in what at the end of the 6th century had become England, the prior inhabitants had been all but extirpated by the Anglo-Saxon invaders.

**Basket Ball**, an indoor game played upon a circumscribed space on a floor, usually by five players on each side. At each end



## Baskett

of this playing space a basket is placed at a height of about 10 feet. The ball is round, somewhat lighter than a foot-ball, and is passed from one player to another by throwing, or striking with the hands only; the ultimate object being to lodge it in the opponent's basket, which action counts one point. The rules as to interference, playing out of bounds, etc., are adapted from those of foot-ball.

**Baskett, James Newton**, an American zoologist, born in Kentucky, Nov. 1, 1849; graduated at the Missouri State University in 1872. He has devoted himself to the study of comparative vertebrate anatomy, with ornithology as a specialty. In 1893 he presented a paper on "Some Hints at the Kinship of Birds as Shown by Their Eggs" at the World's Congress of Ornithologists in Chicago. Among his publications are "The Story of the Birds," "The Story of the Fishes," "The Story of the Amphibians and Reptiles," "The Story of the Mammals," "At You-All's House" (a novel); "As the Light Led" (a novel), etc.

**Basking Shark**, a shark, called in English also the sun fish and the sail fish, and by zoologists *sclachus maximus*. As its name *maximus* imports, it is the largest known shark, sometimes reaching 36 feet in length, but it has little of the ferocity seen in its immediate allies. It is called basking because it has a habit of lying motionless on the water, as if enjoying the warmth of the sun. It inhabits the Northern seas, but is occasionally found on the shores of England.

**Basle.** See BASEL.

**Basques**, or **Biscayans** (in their own language, *Euscaldunac*), a remarkable race of people dwelling partly in the S. W. corner of France, but mostly in the N. of Spain adjacent to the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. They preserve their ancient language, former manners, and national dances, and make admirable soldiers, especially in guerrilla warfare. Their language is highly polysynthetic, and no connection between it and any other language has as yet been made out. There are four principal dialects, which are not only distinguished by their pronunciation and grammatical structure, but differ even in their vocabularies. As no ancient Basque literature has been preserved, it is impossible to determine what changes the language has undergone. The extant literature contains proverbs, lyrics, and historical ballads and crude forms of dramatic writings.

As a race, the Basques are proud, independent and patriotic and have preserved many of their ancient and peculiar customs and characteristics. In the Basque provinces in Spain there are small parlia-

## Bas=Relief

ments that negotiate through deputations with the representatives of the crown. The entire race numbers about 600,000 and occupies in Spain the provinces of Biscay, Guipuzcoa, and Alava; in France parts of the departments of the Upper and Lower Pyrenees, Ariège, and Upper Garonne.

**Basra.** See BASSORA.

**Bas=Relief** (in Italian, *basso-rilievo*), that is, low relief, as applied to sculpture; a representation of one or more figures, raised on a flat surface or background, in such a manner, however, as that no part of them shall be entirely detached from it. *Alto-rilievo*, or high relief, is that in which the figures project half of their apparent circumference from the background. *Mezzo-rilievo*, or middle relief, is a third species, between the two. But, generally speaking, the first term is made to comprehend both the others. The term itself was invented in Italy, about the 11th or 12th century, on the revival of the arts; for the Greeks called such works simply carved (*anaglypta*); and to what is now called high relief they only applied the term rounded (*toreutikē*).

Bas-relief is particularly allied to architecture, and under its dominion, since any considerable work of this kind must be made for the pediment, frieze, or panel of a building, or for some other architectural work, such as a tomb, sarcophagus, pedestal, or column. Bas-reliefs seem to have been invented in the earliest ages by the Egyptians, for the whole of their ancient monuments are covered with them, being executed in the same way as the hieroglyphics on their sepulchral chambers, obelisks, and temples. This has been finely illustrated by the drawings and models of the tomb of Sethi I., originally discovered near the ancient Thebes, by Belzoni, and which has since become familiar to many persons; all the walls of that extraordinary excavation being covered with thousands of figures in low relief, colored, and exhibiting the religious and warlike ceremonies of that wonderful people. Bas-reliefs, too, are found in India, decorating the subterraneous temples of Ellora and Elephanta in an astonishing profusion. The subjects are, of course, sacred, and in the style of drawing resemble very strongly those of the Egyptian monuments, but are evidently inferior, having larger heads and disproportioned bodies and limbs. Both these temples have been well illustrated and described by Thomas Daniell, R. A., and Captain Sealey; and for further information, their respective works may be consulted. The Persians, too, like other ancient nations, employed bas-relief as a figured writing, thereby recording and representing the symbols of the power and energy of the Divinity, their own religious ceremonies, and warlike achievements. The sculptures still existing on the ruins of the



palace of Persepolis and the royal tombs accord in many striking particulars with those taken to England by Belzoni. In both the figures are arranged in lines, either horizontal or perpendicular, to suit the double purpose of decoration and description. In both of them the natives of Egypt are distinguished by the hood with lappets, the miter, the full hair artificially curled, the close tunic, the apron of papyrus; the Hindus, by the necklaces, bracelets, and anklets; the Hebrews, by their long beards, and hair in spiral ringlets, their caps, full tunics, with regular folds and large sleeves. The Medes, again, by their close tunics; while the Persians themselves, in many particulars, resemble the Hebrews. The comparison may be easily made by looking over the prints in Sir Robert Ker Porter's "Travels in Persia," and those in Le Bruyn's "Travels," and then the engravings of Denon's and Belzoni's large works.

Since it has been well observed that the Greeks commenced in works of art precisely where the Egyptians left off, we find that the early bas-reliefs of Greece resemble pretty accurately those of Egypt. The objects are represented in the same hard and simple manner, and the marbles taken to England from the temple of Ægina serve to fill up the history of sculpture, in the interval between its first introduction into Greece and its full development under Phidias, at Athens, when that glorious work, the Parthenon, was produced under the auspices of Pericles.

The draperies in these early bas-reliefs are thin and meager, showing the forms of the body and limbs, the folds regular, small, and distinct, consisting chiefly of perpendicular and zigzag lines. Some of the head-dresses consist of small curls, very like the fashions of barbarous nations; and in a bronze patera in the British Museum, the club of Hercules is ornamented with spiral flutes, like one brought by Captain Cook from the Sandwich Islands.

The best examples of bas-relief now in existence are to be found within the walls of the British Museum. We mean, of course, those of the Elgin Marbles, which are executed in this manner. And in the same collection are the tombstone of Xanthippus, and a man curbing a horse, both conjectured to be of the age of Phidias, and which formed part of the Townley collection. In the collection of the Marquis of Lansdowne is a Greek bas-relief of Calchas, the size of life. At Wilton there is a beautiful representation of the Death of Meleager, and a small but curious Hercules and Æglé; a bas-relief composed of mosaic in natural colors, which is supposed to be unique. The celebrated Barberini vase, formerly in the possession of the Duke of Portland, is of dark blue glass, bearing figures in bas-relief of white enamel or glass of admirable work-

manship. Fragments of bas-reliefs of similar materials have been found in the ruins of Cæsar's palace, at Rome, where they had been fixed in the walls. The two triumphal columns of Trajan and Antonine are covered with bas-reliefs, containing several thousand figures (the first, indeed, has 2,500 human figures, according to Vasi), without reckoning horses, elephants, mules, and the implements of war.

**Bass**, in music. (1) The string which gives a bass sound. (2) An instrument which plays the bass part; especially of the violoncello or bass-viol, and the contrabasso or double bass. Both this and the previous sense are found in the following example: (3) The lowest of the principal human voices; those higher in pitch being, respectively, baritone, tenor, alto or contralto, mezzo-soprano, soprano. (4) The portion of a choir singing the bass part; also the portion of a string band playing the bass part. (5) The lowest instrument of any class or family of instruments; as bass clarinet, bass flute, bass horn, bass trombone, bass tuba, bass viol or base viol. (6) The string of lowest pitch on a string instrument having deep sounds. (7) Bass clef: The lowest sign of absolute pitch used in music; the F clef.

A fundamental bass: The supposed generator or foundation of any harmonic combination. Thus C is said to be the fundamental base of the chord G, C, E.

Thorough or continuous bass: Originally the bass part figured for the player on a harpsichord or organ. Hence, the art of adding chords to a figured bass; the art of harmony.

**Bass**, the name of a number of fishes of several genera, but originally belonging to a genus of sea fishes (*labrax*) of the perch family, distinguished from the true perches by having the tongue covered by small teeth and the preoperculum smooth. *L. lupus*, the only British species, called also sea-dace, and from its voracity sea-wolf, resembles somewhat the salmon in shape, and is much esteemed for the table, weighing about 15 pounds. *L. lineatus* (*roceus lineatus*), or striped bass, an American species, weighing from 25 to 30 pounds, is much used for food, and is also known as rock-fish. Both species occasionally ascend rivers, and attempts have been made to cultivate British bass in fresh water ponds with success. Two species of black bass (*micropterus salmoides* and *M. dolomieu*), American fresh water fishes, are excellent as food and give fine sport to the angler. The former is often called the large mouthed black bass, from the size of its mouth. Both make nests and take great care of their eggs and young. The *centropristis nigricans*, an American sea fish of the perch family, and weighing



two to three pounds, is known as the sea-bass.

**Bass, Edward**, first Protestant Episcopal Bishop of Massachusetts, born in Dorchester, Nov. 23, 1726; graduated at Harvard in 1744; was ordained in England in 1752; and became pastor of the church at Newburyport, Mass. During the Revolution he omitted from the church service all reference to the royal family and the British Government. For this he was expelled from the Society for Propagating the Gospel. In 1797 he was consecrated Bishop of Massachusetts, and finally also of New Hampshire and Rhode Island. He died in Newburyport, Mass., Sept. 10, 1803.

**Bass, Michael Arthur.** See BURTON.

**Bass, Michael Thomas**, an English brewer, born in 1799. He became head of the Burton brewing firm of Bass & Co., upon the death of his father, and was a member of Parliament from 1848 to 1883. His benefactions were very numerous, and included the building and endowing of St. Paul's, Burton, the total expenditure on the parish being about £100,000; and recreation grounds, a free library, and swimming baths for Derby, at a cost of £37,000. Of simple tastes, he declined more than once a baronetcy and a peerage. He died in 1884.

**Bassano** (bäs-ä'no), a commercial city of North Italy, province of Vicenza, on the Brenta, over which is a covered wooden bridge. It has lofty old walls, an old castle, various industries, and an active trade. Near Bassano, Sept. 8, 1796, Bonaparte defeated the Austrian General Wurmser.

**Bassano, Hugues Bernard Maret, Duc de**, a French publicist and statesman, born at Dijon, in 1763. On the first outburst of the French Revolution he enthusiastically embraced its principles, published the "Bulletin de l'Assemblée," and soon after was appointed editor of the "Moniteur." He became acquainted with Bonaparte, and was made by him *Chef de Division* in the ministry of foreign affairs. In 1811, Maret was created Duke de Bassano, and appointed Minister of Foreign Affairs; and in 1812 he conducted and signed the treaties between France, Austria, and Prussia, preparatory to the fatal expedition to Russia. When the Emperor was sent to Elba, in 1814, Bassano retired from public life; but immediately after Napoleon's return he joined him, and was very nearly being taken prisoner at Waterloo. On the Emperor's final overthrow, the Duke was banished from France, but at the Revolution of July, 1830, he was recalled, and restored to all his honors. In 1838 he was made Minister of the Interior, and President of the Council, but the ministry of which he formed a part survived only three days. Died in 1839.

**Bassano, Jacopo, or Giacomo da Ponte**, an Italian painter, born at Bassano, in 1510. In early life he went to Venice, where he studied the great works of Parmegiano, Titian, and Bonifazio. He spent the rest of his life at his native place. His first productions had much grandeur of conception and excellence of color, but he afterward painted in a coarser and lower style. He treated even sacred subjects with a vulgar familiarity. Bassano worked rapidly, and his paintings are very numerous. There are three of them in the National Gallery, London. Died in 1592.

**Bassein.** (1) A thriving town in Burma, India, on the left bank of the Bassein river, one of the mouths of the Irawadi, 75 miles from the sea, but accessible to the largest ships. It is an important center of the rice trade, has considerable trade with Madras, and in a military view also is important, as it completely commands the navigation of the stream. It was captured by the British in 1852. Pop. (1891) 30,177. The district of Bassein has an area of 6,848 square miles, and a pop. (1891) of 475,002. (2) Bassein, a decayed town of 10,500 inhabitants, 28 miles N. of Bombay. Ceded to the Portuguese in 1534, it was a place of much importance as late as 1720, when the population was 60,000; its remains still point to former splendor. In 1765 it was wrested from the Portuguese by the Mah-rattas, and in 1780 surrendered to the British after a 12 days' siege.

**Basselin, or Bachelin, Olivier** (bäs-lan'), a French poet, born in the Val-de-Vire, Normandy, about 1350; presumably died there about 1419. His career has been investigated with some pains because of the assertion that the vocabulary of theatrical and poetical literature is indebted to him for the word vaudeville. It would appear he was a cloth-fuller or presser, with a mill in his native vale, which brought him in quite a revenue. He was much given to versified narration and iteration of convivial themes, in rhymed fragments dubbed *vaux-de-vire* in honor of the poet's purlieus. In the "Book of New Songs and Vaux-de-Vire" (1610) appears a collection of these bacchanalian stanzas, the most touching of which is addressed by the singer "To My Nose," the rubescence thereof being tastefully and exquisitely celebrated.

**Basselisse Tapestry** (bäs-lēs'), a kind of tapestry wrought with a horizontal warp.

**Basses-Alps** (bäs-älp), (Lower Alps), a Department of France, on the Italian border. See ALPS.

**Basses-Pyrenees** (bäs-pēr-nā'), (Lower Pyrenees), a French Department, bordering on Spain and the Bay of Biscay. See PYRENEES.



**Basset**, a game at cards, played somewhat similar to the modern faro. It is of Venetian invention, and was formerly much played in France. Louis XIV. issued some very severe decrees against it, after which it was played under the name of *pour et contre*.

"Some dress, some dance, some play; not to forget  
Your piquet parties, and your dear basset."  
— Rowe.

It is played as follows: The banker deals the cards in pairs, and each punter, or player, has a *livret* of 13 cards, from which he selects one or more, and stakes on them. The principle of the game depends upon the corresponding card in the banker's pack turning up in an odd or an even place. When a player wins, he may either take his money or go on, risking his stake and gains. The first time this is done it is called *paroli*, or double; the second time, *sept et le va*, seven and it goes; the third time, *quinze et le va*, fifteen, etc.; the fourth time, *trente et le va*, thirty-one, etc.; and on the fifth risk, *soixante et le va*, sixty-three, etc. In all cases the odds are greatly in favor of the banker: it is 1.023 to 1 against the player winning ten successive games.

**Basset**, a name used with some latitude in France for any very short-legged dogs, but especially for various breeds of sporting dogs resembling (though considerably larger than) the dachshund, known in France as *basset Allemand*, as distinguished from *basset Français*. They may be divided into straight legged and crooked legged, and these again into rough haired and smooth haired. They vary in color, but are frequently, like foxhounds, tan on the head, and black and white on the body. Bassets (or basset hounds) are used for tracking deer, boars, etc., and driving them out of coverts; and are best known as companionable pets.

**Basse-Terre** (bäs-tär'), (French, low-land), the name of the capitals of St. Christopher's and of Guadeloupe in the West Indies.

**Basset-Horn**, a musical instrument, the tenor of the clarionet family, having more than three octaves in its compass, extending upward from F below the bass stave. It differs from the shape of the clarionet mainly in having the bell mouth, which is made of metal, recurved.

**Bassett, James**, a Canadian-American missionary, born in Glenford, Ontario, Jan. 31, 1834; was graduated at Lane Theological Seminary in 1859; served as a chaplain in the Union army in 1862-1863; and afterward held Presbyterian pastorates in New Jersey until 1871, when he went as a missionary to Persia under the direction of

the Presbyterian Board. There he gained a thorough knowledge of the people; and by publications and personal efforts finally obtained the establishment of a United States legation in Persia. He was the first American to visit the tomb of the Caliph Haroun al Raschid. He has written "Among the Turcomans" (1880); "Hymns in Persian" (1884); "Persia, the Land of the Imams" (1886); and "Grammatical Note on the Simnuni Dialects of the Persian" (1884).

**Bassett, John Spencer**, an American historian, born in Tarboro, N. C., Sept. 10, 1867; graduated at Trinity College, Durham, N. C., in 1888, and took a Ph. D. at Johns Hopkins in 1894. His works include "Constitutional Beginnings in North Carolina," "Slavery and Servitude in the Colony of North Carolina," "Anti-Slavery Leaders of North Carolina," "Slavery in the State of North Carolina," "The War of the Regulation," etc. In 1906 he became Professor of History in Smith College, Mass.

**Bassi, Laura Maria Caterina** (bäs'sē), an Italian lady, distinguished for her learning, born in Bologna, Oct. 29, 1711; received a doctor's degree on account of her attainments, and delivered public lectures on experimental philosophy. She also lectured in the Philosophical College, where she was appointed professor. Her correspondence, with the most eminent scholars of Europe, was very extensive. She married Guiseppe Verrati in 1738 and had several children. She died Feb. 20, 1778.

**Bassi, Ugo**, a Barnabite monk, and distinguished Italian patriot, born in Cento, in the Roman States, in 1804, of an Italian father and Greek mother. He was much distinguished among the brethren for his extraordinary learning and talents. The liberality of his political opinions, however, rendered him obnoxious to the Papal Court, and he was sent into a sort of exile in Sicily, from which he only returned on the accession of Pius IX., in 1846. On the breaking out of the Lombard Revolution in 1848, he greatly distinguished himself by his valor in battle, and his untiring services in the hospitals. On the capitulation of Treviso, he went to Venice, where he fought in the ranks against her Austrian besiegers. Thence he went to Rome, and joined Garibaldi's legion as chaplain. On the fall of Rome, he was one of those who followed Garibaldi when he made a last attempt to fight his way to Venice, which still held out against the Austrians. The little band was, however, dispersed and cut up by Austrian troops, and Garibaldi himself escaped with great difficulty. Bassi was taken prisoner, carried to Bologna, and condemned to death Aug. 18, 1849. Bassi was the author of a work on "The Church After the Image of



Christ," and an unfinished poem called "Constantine, or the Triumph of the Cross." His talents were universal. He was an accomplished musician and composer, wrote his own language in remarkable perfection, and was a perfect master of Greek, Latin, English, and French. He was equally remarkable for his personal beauty, and his eloquence as an improvisatore, while his memory was so prodigious that he is said to have been capable of reciting the whole of Dante's "Divina Commedia."

**Bassia** (named after Fernando Bassi, curator of the botanic gardens at Bologna), a genus of plants belonging to the order *sapotaceæ* (sapotads). It consists of large trees which grow in the East Indies. *Bassia latifolia* (broad leaved bassia) is common in some parts of India. It is called the mohra or moho tree. The flowers have a heavy, sickening smell, and an intoxicating spirit is distilled from them. *B. butyracea* is the Indian butter tree. The African butter tree, that of Mungo Park and Bruce, is also a bassia.

**Bassompierre, François de** ((bäs-ômp-yâr'), a marshal of France, born in Harouel, in Lorraine, in 1579. At the age of 20 he went to the French court, where he gained the favor of Henry IV. Appointed Colonel of the Swiss Guards after the King's murder, he was raised to the rank of Marshal, in 1622; was sent on embassies to Spain, Switzerland, and England; and bore an active part in the siege of La Rochelle. He became, however, an object of suspicion and dislike to Richelieu, who caused him to be cast into the Bastille in February, 1631, from which he was not liberated until 1643, after the death of Richelieu. He himself died in 1646. Bassompierre was an accomplished courtier, extravagant in luxury, and excessively addicted to gallantries. At the time of his arrest he destroyed 6,000 love-letters.

**Bassoon** (so called from its similarity in appearance to a bundle of sticks). (1) A reed instrument of the double reed class, forming in ordinary orchestras the tenor and bass of the wood wind band. It has a compass of about three octaves, commencing at the note B flat below the bass stave. (2) An organ stop of a quality of tone similar to the orchestral instrument. (3) A series of free reeds on a harmonium or kindred instrument, of a like quality of tone.

**Bassora, or Bussora**, a town of Asiatic Turkey, on the W. bank of the Euphrates, here called the Shat-el-Arab, 56 miles from its mouth in the Persian Gulf. The river, which is navigable to this point for ships of 500 tons, is divided into a number of channels, and, by evaporation and frequent overflowing, makes the climate very unhealthy. Most of the houses are low huts,

built of unburned bricks. The population, once 150,000, had sunk in 1854 to 5,000, but the establishment of the English Tigris and Euphrates Steamship Company has altogether changed the prospects of Bassora and the town now probably contains at least 40,000 inhabitants, most of them actively engaged in commerce, notably in the exchange of the productions of Turkey and Persia for Indian and European goods, particularly articles of British manufacture. Bassora was founded in 636 by the Caliph Omar, and soon became one of the most famous and opulent cities of the East. The possession of it has been the subject of many contests between the Turks and the Persians. It is a place of great note in the history of Arabic literature.

**Bassora Gum**, a gum brought from Bassora; supposed to be derived either from a cactus or a mesembryanthemum.

**Bassorin**, a kind of mucilage found in gum tragacanth, which forms a jelly with water, but does not dissolve in it. A clear, aqueous looking liquid, apparently of the nature of bassorin, exists in the large cells of the tubercular roots of some terrestrial orchids of the section *ophyreæ*. It is formed of minute cells, each with its cytoblast; the whole being compactly aggregated in the interior of the parent cell.

**Bass Rock**, a remarkable island rock of Haddingtonshire, Scotland, near the mouth of the Firth of Forth, 2 miles from Canty Bay, and  $3\frac{1}{4}$  miles E. N. E. of North Berwick. Confronted by the ruins of Tantallon Castle, and composed of volcanic greenstone and trap tuff, it is about a mile in circumference, nearly round, and 313 feet high. It is inaccessible on all sides except the S., where it shelves down to the water, and there the landing is difficult, almost impossible when there is any swell. On the W., N., and E., the cliffs rise sheer out of the sea. They are denized by countless numbers of solan geese and other birds, which give the rock a snowy appearance in the distance. A cavern tunnels the rock from W. to E., and is accessible at low tide. In 756 St. Balthere or Baldred died in a hermitage on the Bass Rock; in 1316 it came into the possession of the Lauder family. In 1671 Charles II. purchased it for £4,000, and within its dreary dungeons many of the most eminent of the Covenanters were confined during his and James II.'s reign. The Bass was the last spot in the British Islands which held out for the Stuarts. Four young Jacobite prisoners had the address to capture, and, with 12 more who joined them, to hold it for King James, from June, 1691, till April, 1694, against all the forces which William III. sent against them; at last the spirited little garrison surrendered on honorable terms,



## Bass Strait

and only from a consciousness of failing provisions. In 1701 the fortifications were demolished. Five years afterward the Bass passed into the possession of Sir Hew Dalrymple, to whose descendant it now belongs.

**Bass Strait**, a channel beset with islands, which separates Australia from Tasmania, 120 miles broad, discovered by George Bass, a surgeon in the Royal navy, in 1798.

**Bassville, Nicolas Jean Hugon de**, a French journalist and diplomatist. As editor of the "Mercure National" he attracted attention to himself and was appointed Secretary to the Legation at Naples, in 1792. Soon after this he was dispatched to Rome, where he was killed, in 1793, by the populace for attempting, under orders of the French Government, to oblige all French residents to wear the tricolor cockade. The death of Bassville has furnished the subject for many compositions both in prose and verse, in French and Italian.

**Basswood**, the American lime tree or linden (*tilia americana*), a tree common in North America, yielding a light, soft timber.

**Bast**, (1) The inner bark of the lime or linden tree, used in Russia and elsewhere for making mats. (2) A rope made from this material. (3) Anything similar; also a strong, woody fiber derived from two palms, *attalea funifera* and *Icopoldiana piassaba*, and used for making brooms and brushes.

Cuba bast: The fibers of *paritium elatum*, a mallow-wort. It is used for tying up plants in gardens, or binding together cigars.

**Bast**, in Egyptian mythology, a goddess represented with a cat head or lioness head. Bubastis, in Egypt, was the city where she held a high place, similar to that of Neith in Sais. Nearly a million Egyptians made annual pilgrimages to her shrine. Great numbers of bronze images of Bast were purchased in Bubastis.

**Bastar**, a feudatory State of British India, joined with the Chanda district of the Central Provinces. It has an area of 13,062 square miles. Pop. (1891) 310,884.

**Bastard**, an illegitimate child. The Romans distinguished two kinds of natural children — *nothi* the issue of concubinage, and *spurii*, the children of prostitutes; the former could inherit from the mother, and were entitled to support from the father; the latter had no claims whatever to support. The Athenians treated all bastards with extreme rigor. By the laws of Solon, they were denied the rights of citizenship. A law of Pericles ordered the sale of 5,000 bastards as slaves. What rendered these regulations more severe was that not only the issue of concubinage and adultery, but all children whose parents were not both

## Bastard

Athenians, were considered bastards at Athens. Thus Themistocles, whose mother was a native of Halicarnassus, was deemed a bastard. The law, as might be expected, was often set aside by the influence of powerful citizens. Pericles himself had it repealed in favor of his son by Aspasia, after he had lost his legitimate children by the plague. The condition of bastards has been different in different periods of modern history. Among the Goths and Franks, they were permitted to inherit from the father. Thierry, the natural son of Clovis, inherited a share of his father's conquests. William the Conqueror, natural son of Robert I., Duke of Normandy, and of Arlette, daughter of a furrier of Falaise, inherited his father's dominions. He called himself Wilhelmus, cognomento Batardus. The celebrated Dunois styled himself, in his letters, the Bastard of Orleans. In Spain, bastards have always been capable of inheriting. The bastardy of Henry of Traustamare did not prevent his accession to the throne of Castile. In France, the condition of bastards was formerly very different in the different provinces. The *code civil* thus fixes their rights: If the father or mother leave legitimate descendants, the bastard is entitled to one-third of the portion he would have inherited had he been a lawful child; if the father or mother die without descendants, but leave ascendants, or brothers or sisters, then he is entitled to one-half of such a portion; if the father or mother leave no ascendants nor descendants, nor brothers nor sisters, he is entitled to three-quarters of such a portion; and if the father or mother leave no relations within the degrees of succession, he is entitled to the whole property. These regulations do not apply to the issue of an incestuous or adulterous connection.

By the common law of England, a child born after marriage, however soon, is legitimate, or at least he is presumed to be so; for one born in wedlock, and long enough after the marriage to admit of the period of gestation, may still be proved illegitimate, in case of absence and non-access of the husband, and under some other circumstances. According to the common law, a bastard is not the heir of any one; and, on the other hand, his only heirs are his children born in wedlock, and their descendants. According to the Roman law, one born out of wedlock might be legitimated by subsequent marriage and acknowledgment of his parents. In 1236 the English prelates proposed the introduction of the Roman law, in this respect, into England, to which the nobility made the celebrated reply, *Nolumus leges Angliæ mutare* (We are unwilling to change the laws of England). The Roman law has been long adopted in Scottish law, and in that of some of the United States.



## Bastard Bar

**Bastard Bar**, more correctly *baton sinister*, the heraldic mark used to indicate illegitimate descent. It is a diminutive of the bend sinister, of which it is one-fourth in width, coupé or cut short at the ends, so as not to touch the corners of the shield.

**Bastia**, the former capital of Corsica; is picturesquely situated on the slope of a mountain, rising from the sea in the form of an amphitheater, in the N. E. part of the Island, 95 miles N. N. E. of Ajaccio. Its streets are narrow and crooked, its harbor somewhat difficult of access, yet it has considerable shipping. Antimony mining, boat building, iron founding, tunny, and coral fishing are carried on; besides, there is some trade in oil, wine, and fruit. Population (1901) 25,425. Bastia was founded in 1383 by the Genoese Leonello Lomellino, and was the seat of the Genoese governors for 400 years. It has several times been in the hands of the English, who, under Admiral Hood, last captured the town in 1794, after an obstinate and protracted siege. When Corsica was divided into two French Departments, it was made the capital of one; but when both were united in 1811, the seat of government was transferred to Ajaccio.

**Bastian, Adolf**, a German traveler and ethnologist, born in 1826. His travels have embraced various parts of Europe, the United States, Mexico, Peru, Australia and New Zealand, Southern and Western Africa, Egypt, Arabia, India, Southeastern Asia, the Asiatic Archipelago, Japan, China, Mongolia, Siberia, etc. His numerous writings throw light on almost every subject connected with ethnology or anthropology, as well as psychology, linguistics, non-Christian religions, geography, etc. One of his chief works is "Die Völker des östlichen Asien" ("Peoples of Eastern Asia," 6 vols., 1866-1871). He died in 1905.

**Bastian, Henry Charlton**, an English biologist, born in Truro in 1837. He was educated at Falmouth and at University College, London, where he was Assistant Curator in the Museum in 1860-1863. He obtained the degree of M. A. in 1861, from the University of London, graduating subsequently in medicine at the same university (M. B. 1863, M. D. 1866). In 1864-1866 he was a medical officer in Broadmoor Criminal Lunatic Asylum, and in the latter year was appointed Lecturer on Pathology and assistant physician in St. Mary's Hospital. In 1867 he became Professor of Pathological Anatomy in University College, subsequently he was also Professor of Clinical Medicine, and he has recently been appointed to the chair of medicine and clinical medicine. Apart from numerous contributions to medical and other periodicals, and to Quain's "Dictionary of Medicine," he has written "The Modes of Origin of Lowest Organisms (1871); "The Begin-

## Bastille

nings of Life" (1872); "Evolution and the Origin of Life" (1874); "Lectures on Paralysis from Brain Disease" (1875); and "The Brain as an Organ of Mind" (1880), which has been translated into French and German. He has been an advocate of spontaneous generation.

**Bastien-Lepage, Jules** (bäst-yen' le-päzh), a French painter, born at Damvilliers, Nov. 1, 1848; studied under Cabanel, and early began to attract notice by his impressionist, but strong and real, pictures in the Salon. Some of his more important works were "In Spring," "The First Communion," "The Shepherds," "The Wheat-field," "The Beggar," and "Joan of Arc Listening to the Voices." Striking portraits were those of his grandfather, his father and mother, Sarah Bernhardt, André Theuriet, and the Prince of Wales. He died at the height of his fame, Dec. 10, 1884.

**Bastille**, properly means any strong castle provided with towers, but as a proper name is applied to a famous castle which once existed in Paris, in which State prisoners and other persons arrested by *lettres de cachet* were confined. It was founded by Hugues d' Aubriot in 1369, and completed by the addition of four towers in 1383. The *lettres de cachet* mentioned above were issued in the name of the king, but the names of the individuals were inserted by the ministers, who were the depositaries of these letters. Of the origin of this custom we may perhaps find the explanation in Montesquieu's "Esprit des Lois," where it is said, "Honor is the virtue of monarchies, and often supplies its place." A nobleman was unwilling to be dishonored by a member of his family. Filial disobedience and unworthy conduct were probably not more uncommon among the nobility of France than elsewhere. But in each case fathers and relations often requested the confinement of the offender, till the head of the family should express a wish for his release. At first this privilege was limited to the chief families of the country. The next step was that the ministers of government considered themselves entitled to the same privileges as heads of families among the nobility. If an offense was committed in their offices or households, which, if known, would have cast a shadow on the ministers themselves, they arrested, *motu proprio*, the obnoxious individuals, and often made use of their privilege to put out of sight persons whose honest discharge of duty had excited their displeasure, or who were acquainted with facts disgraceful to the ministers themselves. It sometimes happened that no further examination of the prisoners was held, and the cause of their detention nowhere recorded. In such cases an individual remained in prison sometimes 30 or 40 years, or even till his death, be-



## Bastion

cause succeeding officers took it for granted that he had been properly confined, or that his imprisonment was required for reasons of State.

The invention of the *lettres de cachet* immediately opened the door to the tyranny of ministers and the intrigues of favorites, who supplied themselves with these orders, in order to confine individuals who had become obnoxious to them. These arrests became continually more arbitrary, and men of the greatest merit were liable to be imprisoned. On July 14, 1789, the Bastille was surrounded by a tumultuous mob, who first attempted to negotiate with the governor, Delaunay, but this failing attacked the fortress. For hours they continued the siege without being able to effect more than an entrance into the outer court of the Bastille, but at last the arrival of some of the Royal Guard with a few pieces of artillery forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the Hôtel de Ville he was torn from his captors and put to death. The next day the destruction of the Bastille commenced. A bronze column has been erected on its site. The event considered by itself was of no great national importance, but it marked the beginning of the French Revolution.

**Bastion**, a projecting mass of earth or masonry at the angle of a fortification, having two faces and two flanks, and so constructed that every part of it may be defended by the flank fire of some other part of the fort. The flanks of adjacent bastions are connected by a curtain. The distance between two such flanks is termed the gorge. A detached bastion is called a lunette. Also: (a) A composed bastion is one which has two sides of the interior polygon very irregular, with the effect of making the gorges also irregular. (b) A cut bastion is one which has a re-entering angle instead of a point. (c) A deformed bastion is one in which the irregularity of the lines and angles prevents the structure from having a regular form. (d) A demi-bastion is a bastion composed of one face only, with but a single flank and a demi-gorge. (e) A double bastion is a bastion raised on the plane of another one. (f) A flat bastion is one erected in the middle of a curtain when the latter is too long to be protected by the bastions at its ends. (g) A hollow bastion is one hollow in the interior. (h) A regular bastion is one so planned as to possess the true proportion of its faces, flanks, and gorges. (i) A solid bastion is one solid throughout its entire structure.

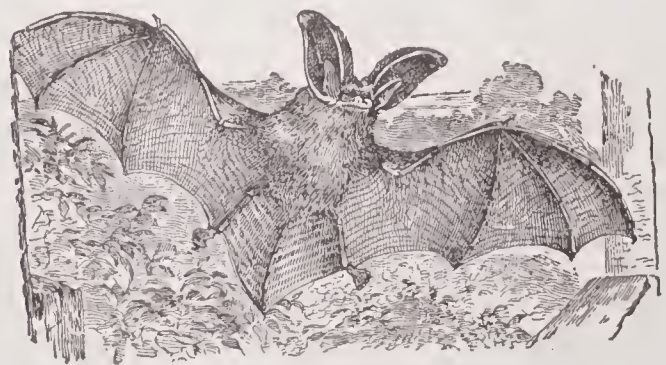
**Bastwick, John**, an English physician and political writer, born in 1593. He studied at Cambridge, traveled all over Europe, and finally settled at Colchester as a physician. In 1637 he was condemned by the

## Bat

Star Chamber for his books against the Roman Church, viz., "Eleuchus Papismi," and "A New Litany;" and was, like Prynne and Burton, his fellow prisoners, sentenced to pay a heavy fine, to be set in the pillory, have his ears cut off, his cheeks and forehead branded, and be imprisoned for life. He was sent to Sicily, and kept there till released by the Long Parliament, when he had a reward of \$25,000 allowed him for his sufferings. He died about 1650.

**Basutoland**, a native province and British South African possession, between the former Orange Free State, Natal, Griqualand East, and Cape Colony. The Basutos belong chiefly to the great stem of the Bechuanas, and have made greater advances in civilization than perhaps any other South African race. In 1866 the Basutos, who had lived under a semi-protectorate of the British since 1848, were proclaimed British subjects, their country placed under the government of an agent, and, in 1871 it was joined to Cape Colony. In 1879 the attempted enforcement of an act passed for the disarmament of the native tribes caused a revolt under the chief Moirosi, which the Cape forces were unable to put down. When peace was restored Basutoland was disannexed from Cape Colony (1884), and is now governed by a resident commissioner under the High Commissioner for South Africa. Basutoland has an area of about 10,300 square miles, much of it covered with grass, and there is but little wood. The climate is pleasant. Capital, Maseru. The chief products are wool, wheat, mealies, and Kaffir corn. The natives keep large herds of cattle. The revolt in Basutoland led by Masupha came to an end Feb. 1, 1898, and Masupha was fined 200 head of cattle, banished from his stronghold at Thaba Bosigo, and deposed from his chieftainship. Pop. (1904) 349,000, almost all native, as European settlement is prohibited.

**Bat**, the common name of all animals of the class mammalia which are furnished with true wings, and so are capable of really flying or propelling themselves in the air.



LONG-EARED BAT.

They were all included by Linnæus in the genus *vespertilio*. It is very interesting to compare the organs of flight in bats with those of birds, both as to the points in which



they agree and those in which they differ. They beat the air, as birds do, with their anterior members; but, the requisite extension of surface is not obtained by quills, but by a great elongation of the arms and fingers, upon which a thin membrane is stretched, folding close to the body, by means of their joints, when the wing is not in use. Bats were placed by Linnæus in his order primates, along with monkeys and lemurs, with which they agree in their pectoral teats and in other characters, particularly of the organs of reproduction. In one genus (*dysopus*) there is an additional resemblance to the primates in the partially opposable thumbs of the hind feet, and a trace of this character is to be found in the fore thumbs. Bats are now, however, generally placed by naturalists in the order *cheiroptera*, although, like many other ani-



SKELETON OF A BAT.

mals of that great order, most of them are by no means exclusively carnivorous. Upward of 130 species have been described, and there is great probability that the actual number existing is very much greater. Bats walk or creep awkwardly upon the ground, one side of the body being jerked forward, and then the other; yet they run with considerable celerity. There is a common notion that they cannot rise easily from a level surface, but must find some eminence from which to throw themselves. Of the fallacy of this any one will soon be convinced who gets a bat and places it on the floor. Bats commonly produce one or two young at a birth. Fossil remains of *cheiroptera* are occasionally found in Eocene rocks, but owing to the delicacy of the bones great difficulty has been experienced in the determination of the genera and species.

**Batalha** (bä-tä'la), a town of Portugal, district of Leira, on the Liz river. It contains a Dominican monastery, which was begun in 1388 and completed in 1515. The monastery church has the proportions of a cathedral, with lofty, but not over-artistic

interior. The Founder's Chapel opens to the S. In this chapel is an elaborate octagonal lantern, and the royal tombs. Behind the choir is the uncompleted chapel of Dom Manuel, which is massive in design and marked by a richly ornamented surface. The same style is found in the cloister, whose arches have an intricate tracery paralleled nowhere else. The monastery as a whole exemplifies the Portuguese florid pointed style.

**Batane Islands** (bä-tän'), a group of small islands in the extreme N. of the Philippine Archipelago, over which, and Calayan, nearby, American control was established in March, 1900, with Teofilo Costillejo as the first American governor. The Batanes are bounded on the N. by Bashi Channel, which divides the Philippines from the Japanese insular territory, and have an area of 125 square miles and a population estimated at 9,500. The principal islands in the group are Itbayal, Basay, Saptan and Hujos. Santo Domingo de Basco, the principal town and port, is about 500 miles from Manila, and has a population of about 3,000. The other large towns are San Bartolome de Calayan, pop. 1,722; San Carlos de Mari-gatao, pop. 1,229; San José de Ibana, pop. 1,951; Santa Maria de Mayan, pop. 1,855; and San Vicente de Saptan, pop. 1,753. Under Spanish rule Santo Domingo was the residence of a political military governor, a judge and an attorney-general. The new governor is a Filipino who resided in Aparri, Luzon, and who greatly aided Generals Wheaton, Lawton and Young in quelling the insurrection in the N. part of the island and made Aguinaldo a fugitive.

**Batangas** (ba-tan'gas), a province on the S. coast of Luzon Island, Philippines; also the capital of the province. The city has an excellent harbor, and prior to the war between the United States and Spain was the seat of a large commerce. The province is one of the richest sugar growing districts in the Philippines; but the industry is far inferior to its possibilities owing to the lack of proper machinery and modern methods of treatment. It is also notable for its large production of cocoanut oil, the larger part of which is used for domestic purposes, chiefly lamp oil and lubricating machinery. Such of it as is exported to Europe, after being solidified, is manufactured into soap and candles. Pop. (United States census, 1903), province, 257,715; city, 33,131.

**Batavi**, an old Teutonic people who inhabited a part of the present Holland, particularly the island named from them Insula Batavorum (modern Betuwe), which is formed by the branch of the Rhine that falls into the sea near Leyden, by the Waal, and the Meuse. Their country extended



## Batavia

southward across the Waal. Under Augustus they became allies of the Romans, and earned for their fidelity the honorable title of friends and brothers of the Roman people, and were permitted to choose their commanders from among themselves. Their cavalry were famous, and were often employed by the Romans.

**Batavia**, properly the name of the island occupied by the ancient Batavi, became at a later date the Latin name for Holland and the whole kingdom of the Netherlands. The name Batavian Republic was given to the Netherlands on their new organization, May 16, 1795, and they continued to bear it till they were converted into the kingdom of Holland, under Louis Bonaparte, June 8, 1806.

**Batavia**, a city and seaport of Java, on the N. coast of the island, the capital of all the Dutch East Indies. It is situated on a wide, deep bay, the principal warehouses and offices of the Europeans, the Java bank, the exchange, etc., being in the old town, which is built on a low, marshy plain near the sea, intersected with canals and very unhealthful; while the Europeans reside in a new and much healthier quarter. Batavia has a large trade, sugar being the chief export. It was founded by the Dutch in 1619, and attained its greatest prosperity in the beginning of the 18th century. Its inhabitants are chiefly Malay, with a considerable admixture of Chinese and a small number of Europeans. Pop. (1906) 138,551.

**Batavia**, a village and county-seat of Genesee co., N. Y., on Tonawanda creek and several railroads; 37 miles E. of Buffalo. It is in an agricultural region; contains manufactories of ploughs and harvesters, carriage wheels, shoes, guns and forgings, and other industries; and has the State Institution for the Blind, the Dean Richmond Memorial Library, a National bank, newspapers, and an assessed property valuation of over \$6,500,000. Pop. (1910) 11,613.

**Batie, Anselme Polycarpe** (bä-bě'), a French jurist and politician, born in Seisan, May 31, 1828; first belonged to the faculties of law at Dijon and Toulouse; but, in 1862, he became Professor of Constitutional Law at Paris. Elected to the National Assembly (February, 1871), he became one of the leaders of the Monarchist party. In Broglie's reactionary cabinet (1873) he was made Minister of Public Instruction. After 1876 he was a member of the Senate. He wrote "Turgot, Philosopher, Economist, and Administrator" (1860); "Course of Political Economy" (1864); "New Course of Political Economy" (1865); "The Public Credit" (1865); "Summary of the Course of Public and Administrative Law" (1885), and "Theoretical and Practical Treatise on Public and Administrative

## Bate

Law" (1885). He died in Paris, June 30, 1887.

**Batchelder, Richard Napoleon**, an American military officer, born in Lake Village, N. H., July 27, 1832; entered the Union army at the beginning of the Civil War; and was brevetted Brigadier-General, United States Volunteers, March 13, 1865; became Brigadier-General and Quartermaster-General, United States Army, June 26, 1890; and was retired July 27, 1896. He was awarded a Congressional medal of honor for distinguished gallantry during the Civil War. He died Jan. 4, 1901.

**Batcheller, George Sherman**, an American jurist; born in Batchellerville, N. Y., July 25, 1837; graduated at Harvard University; was admitted at the bar in 1858; entered the Union army at the beginning of the Civil War; was taken prisoner at Harper's Ferry, and exchanged in 1863; was then appointed Deputy Provost-Marshal-General of the Department of the South; and, in 1865-1870, was Inspector-General on the staff of Governor Fenton of New York. In 1858, 1872 and 1873 he was elected to the State Assembly; and, in 1875, was appointed one of the judges of the newly organized Supreme Court of Egypt for a term of five years. In 1883 he became President of the International Tribunal of Egypt; in 1889, Assistant Secretary of the United States Treasury; in 1890, United States Minister-Resident, and Consul-General to Portugal; and in 1897, a member of the International Tribunal of Egypt again. In the last year he received from King Humbert the decoration of the great cordon of the Order of the Crown of Italy, in recognition of his services as President of the Universal Postal Congress which met in Washington in May, 1897. He died in 1908.

**Batchian, or Batjan**, one of the Moluccas, W. of the southern peninsula of the large island of Halmahera or Gilolo. Area, 835 square miles; pop. about 11,000. It belongs to the Dutch residency of Ternate, consists of two peninsulas joined by a narrow isthmus, and has many mountains. Batchian produces gold, copper, much coal, sago, cocoanut trees, rice, cloves, and fine timber.

**Bate, William Brimage**, an American legislator, born near Castalian Springs, Tenn., Oct. 7, 1826; received an academic education; became a Mississippi river steamboat clerk; served through the Mexican War; was graduated at the Lebanon Law School in 1852; elected Attorney-General of the Nashville district in 1854; and was Presidential Elector in 1860. In the Civil War he rose from private to the rank of Major-General in the Confederate army, and was three times dangerously wounded. He was an Elector-at-Large for Tennessee



## Bateman

on the Democratic ticket in 1876; was elected Governor in 1882 and 1884; and a United States Senator in 1887, 1893, and 1899. He died March 9, 1905.

**Bateman, Kate Josephine**, an American actress, born in Baltimore, Md., Oct. 7, 1842. About 1851 she and her sister Ellen began to act, they being known as the Bateman Sisters. Kate began, in 1861, to play Juliet, Pauline, etc., but was especially successful in Leah. She became rich and famous, and, having married George Crowe, an English physician, identified herself with the management of a London theater.

**Bates, Alfred E.**, an American military officer, born in Monroe, Mich., July 15, 1840; graduated at the United States Military Academy in 1865; commissioned a Second Lieutenant in the 2d Cavalry; promoted to First Lieutenant, Oct. 19, 1865; transferred to pay department with the rank of Lieutenant-Colonel, Jan. 7, 1897; promoted Colonel and Assistant Paymaster-General, March 31, 1899; and Brigadier-General and Paymaster-General, July 12, following. He served for several years as military attache to the United States Embassy in London, and was a Brigadier-General of Volunteers in the war with Spain in 1898.

**Bates, Arlo**, an American author, born in East Machias, Me., Dec. 16, 1850. He graduated from Bowdoin in 1876, when he engaged in literary work in Boston, and afterward became Professor of English Literature in the Massachusetts Institute of Technology. He is author of poems and novels, including "The Pagans" (New York, 1884); "A Lad's Love;" "The Wheel of Fire" (1885); "The Philistines" (1888); "Berries of the Brier" (1886), poems; "Talks on Writing English;" "Talks on the Study of Literature" (1897); "The Puritans;" "Under the Beech Tree," etc.

**Bates, Charlotte Fiske**, an American poet and miscellaneous prose-writer, born in New York city, Nov. 30, 1838. She was educated in Cambridge, Mass.; assisted Longfellow in compiling "Poems of Places;" edited the "Cambridge Book of Poetry and Song" (Boston, 1882); "The Longfellow Birthday Book;" and "Seven Voices of Sympathy;" has contributed to magazines; and has published "Risk and Other Poems" (1879). She was married in 1891 to Adolphe Rogé, who died in 1896.

**Bates, Clara Doty**, an American author, born in Ann Arbor, Mich., in 1838. She lived in Chicago and published many juvenile books, also "From Heart's Content" (1892). She died in 1895.

**Bates, David**, an American poet, born about 1810. He was the author of the well-known poem "Speak Gently." In 1848 his poems were published under the title, "The

## Bates

Eolian." He died in Philadelphia, Pa., Jan. 25, 1870.

**Bates, Edward**, an American lawyer, born in Belmont, Va., Sept. 4, 1793. Having settled in Missouri, he served in the Legislature and Constitutional Convention, and in Congress in 1827-1829. He was Attorney-General of the United States in Lincoln's first administration; and had been a candidate for the presidential nomination in 1860. He died in St. Louis, Mo., March 25, 1869.

**Bates, Harriet Leonora (Vose)**, better known as ELEANOR PUTNAM, an American story and sketch writer, wife of Arlo Bates, born in 1856; wrote "A Woodland Wooing;" "Old Salem" (1886); with her husband, "Prince Vance," etc. She died in 1886.

**Bates, Henry Walter**, an English naturalist, born in Leicester, Feb. 18, 1825. In 1848 he began an exploration of the Amazon region in Brazil. He published "Naturalist on the River Amazons" (1863); a "Handbook of Central and South America," etc. He died in London, Feb. 16, 1892.

**Bates, John Coalter**, an American military officer, born in St. Charles co., Mo., Aug. 26, 1842; educated at Washington University, St. Louis; entered the regular army as a Lieutenant in the 11th United States Infantry, May 14, 1861; served on the staff of General Meade from the battle of Gettysburg to the close of the war; promoted Captain, May 1, 1863; Major, May 6, 1882; and Colonel of the 2d United States Infantry, April 25, 1892. On May 4, 1898, he was appointed a Brigadier-General of Volunteers; on July 8, was promoted Major-General for his services in the Santiago campaign; on April 13, 1899, was honorably discharged under this commission, and on the same day was recommissioned a Brigadier-General of Volunteers. In February, 1899, he was appointed Military Governor of the province of Santa Clara, Cuba, and in April following, was ordered to duty in the Philippines, where he several times greatly distinguished himself in the latter part of that year and the early part of 1900. In March, 1900, he was assigned to the command of the department of Southern Luzon, and for his services was promoted Major-General, U. S. A., June 9, 1902; Lieutenant-General and Chief of Staff in 1906.

**Bates, Joshua**, an American financier, born in Weymouth, Mass., in 1788; entered the counting house of William Gray & Son, of Boston, at the age of 15, and later was sent to Europe as their agent. In 1828 he became a member of the house of Baring Brothers & Co., in London, and subsequently its senior partner. In 1854 he was appointed umpire to the joint British and American Commission for the settlement of



## Bates

claims arising from the war of 1812. Mr. Bates was the principal founder of the Boston Public Library, and in 1852, the first year of its existence, he made it a gift of \$50,000, and later gave it 30,000 volumes. He died in London, Sept. 24, 1864.

**Bates, Katharine Lee**, an American story writer, poet, and educator, born in Falmouth, Mass., Aug. 12, 1859; was called to the chair of English Literature in Wellesley College in 1891; has edited collections of ballads, etc.; and written juvenile stories, including "Rose and Thorn" (Boston, 1889); also "The English Religious Drama" (New York, 1893), and "The College Beautiful and Other Poems" (1887).

**Bates, Samuel Penniman**, an American historian, born in Mendon, Mass., Jan. 29, 1827; graduated at Brown University, in 1851; principal of Meadville Academy, Pa.; Superintendent of Schools in Crawford county, Pa., 1857-1860; Deputy State Superintendent of Schools, 1860-1866; and State Historian, 1866-1873. Among his publications are the "Lives of the Governors of Pennsylvania," and works on "Education" and the "Civil War."

**Bates College**, a co-educational institution in Lewiston, Me.; organized in 1864, under the auspices of the Free Baptist Church; reported at the end of 1899: Professors and instructors, 21; students, 340; volumes in the library, 21,000; grounds and building valued at \$200,000; endowment, \$353,000; income, \$31,000; number of graduates, 904; president, George C. Chase, D. D.

**Batfish**, a fish found in the waters of Florida and the West Indies; noted for its peculiar shape. Its ventral and pectoral fins resemble the legs of a frog. It has a small mouth, and rough skin, with bony tubercles. It has no commercial value.

**Bath**, city, port of entry, and county-seat of Sagadahoc co., Me., on the Kennebec river, and the Maine Central railroad; 12 miles from the ocean and 35 miles S. of Augusta. It is admirably situated as a commercial port; has regular steamboat connections with Boston and Portland; is principally engaged in ship building, both wood and iron; and has manufactories of brass and iron goods, oil cloth, shoes, and lumber. The Bath Iron Works have built the gunboats "Machias" and "Castine," the ram "Katahdin," and several of the new torpedo boats for the navy. Bath has a large coastwise and foreign trade in ice, coal, lumber, hay, iron, and steel; and contains 4 National banks, public library, a costly system of water works, and property valued at \$7,000,000. Pop. (1910) 9,396.

**Bath**, a village and county-seat of Steuben Co., N. Y.; on the Cohocton creek, and several railroads; 36 miles W. of Elmira. It

## Bath and Bathing

is the seat of the New York State Soldiers' and Sailors' Home, the Davenport Home for Orphan Girls, and Haverling Academy; is principally engaged in agriculture; and has manufactories of shoes, sash and blinds, harness, etc. Pop. (1900) 4,994.

**Bath**, a city of England, in Somersetshire, on the Avon, which is navigable for barges from Bristol; is beautifully placed among the hills, and the houses are built of freestone, obtained from the neighborhood. The Abbey Church ranks as one of the finest specimens of perpendicular Gothic architecture. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day; and the baths are both elegant and commodious. The temperature of the springs varies from 109° to 117° F. They contain carbonic acid, chloride of sodium and of magnesium, sulphate of soda, carbonate and sulphate of lime, etc. Bath was founded by the Romans, and called by them *Aquæ Solis* (waters of the sun). Among the Roman remains discovered here have been some fine baths. The height of its prosperity was reached, however, in the 18th century, when Beau Nash was leader of the fashion and master of its ceremonies. Since then, though it still attracts large numbers of visitors, it has become the resort of valetudinarians chiefly. Jointly with Wells it is the head of a diocese, and returns two members to the House of Commons. Pop. of municipal borough (1901) 49,817.

**Bath and Bathing.** The use of the bath is primarily for purposes of cleanliness, but it also subserves various other useful ends. Bathing undoubtedly took place first in rivers and in the sea, but men soon learned to enjoy this pleasure in their own houses. Even Homer mentions the use of the bath as an old custom. When Ulysses enters the palace of Circe, a bath is prepared for him, after which he is anointed with costly perfumes, and dressed in rich garments. In later times, rooms, both public and private, were built expressly for the purpose of bathing. The public baths of the Greeks were mostly connected with the gymnasia, because a bath was taken immediately after the athletic exercises. The Romans imitated the Greeks in this matter, and built magnificent baths in which both males and females could bathe (in separate divisions), and warm or cold baths could be taken; such establishments, indeed, were so extensive that even their ruins excite admiration.

**The Cold Bath.**—The first effect of the cold bath (at a temperature say from 50° to 70°) is to produce a shock to the nerves of the skin. In the case of the cold bath as ordinarily used, the application is short, and the more near to the temperature of 50° F. the water is the shorter it must



be. Following the first action is reaction, during which the blood returns to the skin, the blood-vessels of which relax, and a pleasant sensation of glow, spreading rapidly over the surface, is experienced. This reaction is aided by rapid friction of the skin, as by towels, and if, after drying, the body is quickly clothed and exercise engaged in, the total effect of the bath is stimulat-

presence in the muscles is the cause of the feeling of weariness. After prolonged labor, or a long fatiguing walk, or prolonged exposure to damp and cold, or after, for example, the exertion of much dancing, nothing is so restorative and refreshing as a warm bath. When employed for such purposes, the person should end with a spray or douche, or simple sponge of tepid water (70°) if he is about to go to bed, or with a warm spray, quickly reduced to cold, before dressing to go out. Warm baths are largely employed in feverish affections of children for promoting the action of the skin; and they are a safe resort in the convulsions of children, cold being at the same time applied to the head.

The hot bath (temperature 102° to 110°) acts in a more pronounced way upon the heart and nervous system than the merely warm bath. If very hot it powerfully excites the

heart, whose action, indeed, it may stimulate to violence. The brain is also influenced by the more copious flow of blood through it, due to the vigorous action of the heart. These effects, however, are largely counterbalanced by the increased flow of blood to the skin. But the prolonged use of hot baths is weakening, and the temporary strain thrown upon the heart and blood-vessels and brain would be hurtful to many. The bather should be immersed to the chin; the hair is damped with cold water, and a thin cold cloth is wrapped about the head. Cold water may be drunk if desired. The bath should last 20 minutes, or less if oppression is felt. It should conclude, as directed for warm bath, with tepid douche or sponging, or with warm spray quickly reduced to cold. The hot bath should not be used in the morning or early part of the day, or at any time except before going to bed, unless the person is properly cooled down before dressing and going out.

The hot-air bath is one of the most powerful ways of stimulating the activity of the skin. The person, unclothed, is placed in an apartment which is heated by means of furnaces, the air being dry. In a longer or shorter time, according to the heat of the air and the condition of the bather, the perspiration bursts out upon the skin, becoming very copious, so that the whole body is bathed in sweat. A very high temperature may be borne so long as the air is quite dry, for the sweat passes rapidly off from the body in the form of vapor, removing a large quantity of heat, and thus the temperature of the body does not rise, unless the air is very hot, when the heat of the body usually increases by two or three degrees. The same high temperature could not be borne



INTERIOR OF BATH IN ANCIENT ROME.

ing, inducing a feeling not only of warmth but also of vigor. The length of time the cold may be applied without interfering with the setting in of a proper reaction depends on the individual. A mere instant's immersion is sufficient for some, others can bear several minutes, while some could not bear complete immersion of the body at all, a feeling of coldness and shivering lasting for hours after it. Obviously for such persons the full cold bath is not suitable, and the cold wet towel, cold wet sponge, wet sheet, etc., may be used instead, and may gradually lead up to the full cold plunge, which may thus be made tolerable and enjoyable.

The cold bath is not usually suitable for the old and the delicate. The action of the cold water may be intensified by showering it or spraying it on the body by means of various arrangements of pipes, etc. The morning or early part of the day is the suitable time for all such kinds of baths. Persons who are thus habituated to the use of cold water are less susceptible to the influence of cold and can stand longer exposure than others.

Tepid baths (temperature 85° to 95°) produce neither depression nor excitement, and are therefore suited for all. They are the best when prolonged immersion is desired, as in the treatment of chronic skin and nervous diseases.

The warm bath (temperature 96° to 104°) is particularly serviceable in removing feelings of fatigue. It should quicken only slightly the circulation, and bring an additional quantity of blood to the skin. It is by this means that it removes the tired feeling from exhausted muscles, for it promotes the removal from the tissues of the waste products, which have accumulated during the period of activity, and whose



if the air were moist, as in the case of a vapor bath, for then the air is saturated or nearly so with moisture and cannot take up more, or can take up very little. Marked oppression, difficulty of breathing, fullness in the head, faintness, etc., would then speedily arise. When the air is quite dry, however, a high temperature, for example, that of  $180^{\circ}$  F., can usually be endured with ease, and even above  $212^{\circ}$ . Not only the activity of the skin, but the action of the heart and of breathing are greatly increased. It is thus not suited for everyone, certainly not in its full form for anyone with weak heart or vessels, and for very full-blooded persons.

*The Turkish Bath.*—The hot-air bath is usually obtained with other accessories in the form of the Turkish bath. This bath was adopted by the Turks from the Romans, who derived it from the Greeks. The bather enters the dressing-room (Roman *vestiarium*) which is heated to an ordinarily comfortable temperature. Beyond this room there are, in the fully-equipped Turkish baths, three rooms, separated from the dressing-room by well-padded doors. The first of these corresponds to the Roman *tepidarium*, the warm room, in which the temperature is from  $115^{\circ}$  to  $120^{\circ}$ ; beyond this and separated from it by heavy curtains is the hot room, or *calidarium*, in which the temperature ranges from  $120^{\circ}$  to  $140^{\circ}$ ; and still beyond is the hottest room, called also the flue room, corresponding to the Roman *laconicum*. Here the temperature is not below  $150^{\circ}$ , usually  $175^{\circ}$  to  $180^{\circ}$ , but may be  $200^{\circ}$  and upward. Every Turkish bath has at least two rooms beyond the dressing-room, one in which the temperature may readily be raised to  $140^{\circ}$  or thereby, and one beyond it in which the highest temperatures may be obtained.

When a full Turkish bath is taken the following is the usual course: The bather undresses in one of the curtained recesses of the dressing-room, girds a towel or similar cloth round his loins, and carrying a bath-towel over the arm passes into the warm room. Here he stays only long enough to wet the hair with cold water, and perhaps drink of it, and then passes on, straight through the hot room, into the hottest room. Spreading his towel over a chair he reclines on it, wets his head with cold water, and drinks at his pleasure, but not too copiously, of cold water, which the attendant will bring him. Here he remains 5 or 10 minutes. By this time the whole body will be bedewed with perspiration; and the bather passes out into the room next in temperature, the hot room, where he reclines for another 10 or 15 minutes. Then he passes to the warm room, lower in temperature than the former, and here he reclines till the attendant is ready for him,

when he proceeds to the washing room. Here he lies on a table and the attendant goes over the whole body, rubbing the surface, and thus removing all loose effete skin, grasping and kneading the muscles, bending joints and so on. He is then rubbed over with soap, scrubbed and washed down, and lastly douched with warm and then tepid and cold water. From this room the bather passes out quickly, plunges through a cold bath, and regains the dressing-room, where he is quickly dried down with warm dry towels. He is then enveloped in a dry bath-towel, and so attired he lies down on his couch in the dressing-room, covered over with a light rug or blanket, till his skin assumes its natural degree of warmth. When the skin is cool and dry, usually in 15 or 20 minutes, the bather dresses quietly and deliberately, and may then go out. The ordinary duration of the full bath, from the flue room to the washing room, is from 40 minutes to an hour. The full bath, however, is suited chiefly for those accustomed to it, for the healthy and robust.

The vapor bath acts upon the body much as the hot-water bath does, but it acts more powerfully, though the effect of the heat is not so quick since vapor is a slower conductor of heat than water. This bath can, therefore, be borne hotter than a water bath, but the high temperature cannot be borne long, for the vapor does not permit of the loss of heat from the body as hot air does. The temperature of the vapor bath cannot be comfortably endured above  $120^{\circ}$  F. The vapor bath is characteristic of the Russian baths. It is taken in a chamber filled with vapor, which is thus not only applied to the surface of the body but also inhaled. This makes it still more oppressive. It may be used, however, in a simple form, in which the vapor is not breathed, by the person sitting on a chair, surrounded from the neck downward by blankets, which envelop the chair also and hang to the ground. Under the chair is placed a shallow earthenware or metal dish, containing boiling water to the depth of 3 or 4 inches. Into the water are placed a couple of red-hot bricks. Or under the chair may be placed a spirit-lamp; supported above it being a shallow pan containing boiling water. Such baths are very useful for catarrh, for rheumatic and neuralgic pains, sciatica, etc., as well as for cases where excessive action of the skin is desired to relieve deeper organs, for example the kidneys. Ten to 15 minutes are long enough for exposure in the vapor bath.

*Sea-Bathing.*—Ordinary sea-bathing is of course cold, and produces the stimulating effects described in regard to the cold bath. There is besides the additional stimulus due to the salt, so that sea-bathing acts as an invigorating tonic. It is not, however, suit-



ed for everyone, and is taken much too indiscriminately. It is also indulged in without due precaution. It is a very common error for persons to remain in the sea too long, the result being shivering, blueness of the skin, difficulty in recovering warmth, headache, etc. Persons who are anæmic — that is, of deficient quality of blood — ought not to indulge in sea-bathing without advice, and failing advice had better try first a salt-water bath at home. Persons who have suffered from any internal complaint ought also to refrain. The best time for sea-bathing is in the morning. It should never be indulged in immediately after a meal, when the business of digestion is going actively forward. A good time is before lunch or early dinner, for which the brisk walk home after the bath will prove an excellent appetizer. Neither should sea-bathing be engaged in immediately after very active exercise, when the body is in a state of very active perspiration or in a condition of fatigue. At the same time, moderate exercise before the bath is unobjectionable, and the body ought to be comfortably warm. The person should undress quickly and plunge in bodily, wetting the whole body at once. During the bath exercise should be active, as in continued swimming. Children, because of the little resisting power of their bodies are readily depressed by sea bathing. They may be gradually accustomed to it; but they ought not to be forcibly immersed to their aversion and terror. Sea-baths may be imitated at home by the addition of common salt or sea salt to water. The benefits of open-air bathing — sea or river — are not limited, of course, to the action of the water, but are increased by the action of the fresh air, the respiration of which is stimulated by the bath, and by the exercise in the open air invariably indulged in afterward.

There are many kinds of medicated baths, which have, or are supposed to have, special properties, valuable for diseased conditions, because of containing various saline substances dissolved in them. Such baths may be artificially prepared by the addition of the salts to the water, or natural mineral waters may be used for the purpose. Mud-baths are recommended for special reasons.

Various arrangements are employed for accentuating the effect of the water, whether used hot or cold, or for applying it to particular parts of the body. The spray bath is one well-known variety of bath. The douche is a jet of water directed upon some part of the body through a 1½ inch pipe, the force of the water, quantity discharged, and temperature being capable of modification. It at first lowers the vitality of the part to which it is applied, but reaction sets in quickly, so that its whole effect is stimulating, quickening tissue change. The douche may be used hot or cold, or one after the other in rapid succession, a change which

is most stimulating of all. In old-standing complaints, thickenings about joints, stiff joints, etc., it is a very useful application. In the case of the descending douche, the pipe is 10 to 15 feet above the floor level, and for the horizontal douche the pipe is 4 feet above floor level. In the former case it is played first on the spine, and then shoulders, hips, arms and legs in succession. At the close it is directed on to the chest and head, the force of the water being broken by the hands. In the latter case the back, chest, arms, and legs are douched in the order named, while the patient rubs himself vigorously. Before beginning the head is wet with cold water, and is douched last, the force of the water being broken. The process should last scarcely two minutes.

The sitz-bath or hip-bath is a means of limiting the application of the water to the hips and neighboring parts. The form of the bathing-tub is such that the person has the bath in the sitting posture, the limbs and upper part of the body being out of the bath. The sitz-bath, hot or cold according to circumstances, is in much use for abdominal and liver complaints, and specially for feminine ailments. Its soothing effects, used hot, in such disorders are marked.

Altogether the use of the bath, in association with treatment by medicine, is of the highest value in numerous disorders, rheumatic, gouty, digestive, febrile, etc. In particular, the Turkish bath, under due superintendence, may produce surprising results, from checking a simple cold upwards.



COLLAR AND BADGE OF THE ORDER OF THE BATH.

**Bath, Order of the**, in heraldry, etc., an order of knighthood, so called because the recipients of the honor were required formerly to bathe the evening before their creation. It was instituted by Henry IV. in 1399, and, falling into disuse, was revived by George I. in 1725. Under George IV.,



## Bath Brick

its regulations were modified, and now there are various subdivisions of the order, viz., Knights Grand Cross of the Bath (G. C. B.), Knights Commanders of the Bath (K. C. B.), and Companions of the Bath (C. B.). Under each of these classes there are now a military and a civil (meaning a civilian) sub-class. The ribbon worn by the Knights of the Bath is crimson, with the Latin motto, "*Tria juncta in uno*" = three (England, Ireland, and Scotland, or their floral emblems) joined in one.

**Bath Brick**, an artificially manufactured brick, of the usual form, but formed of calcareous earth. It is used for cleaning knives and various kinds of metal work.

**Bath Bun**, a bun, richer than a common one, and generally without currants.

**Bath Chair**, a small carriage or chair on wheels, drawn by a chairman, and intended for the conveyance of invalids or others for short distances. So called because either originally or principally used at Bath, where the steepness of many of the streets rendered such conveyances especially useful.

**Bathometer**, an instrument for measuring the depth of sea beneath a vessel without casting a line. It is based upon the fact that the attraction exerted upon any given mass of matter on the ship is less when she is afloat than ashore, because of the less density of sea water as compared with that of earth or rock.

**Bathori** (bă'tō-rē), a Hungarian family, which gave Transylvania five princes, and Poland one of its greatest kings. The more important members were: (1) STEPHEN, born in 1532, elected Prince of Transylvania in 1571, on the death of Zapolya, and in 1575 King of Poland. He accomplished many internal reforms, recovered the Polish territories in possession of the Czar of Muscovy, and reigned prosperously till his death in 1586. (2) SIGISMUND, nephew of Stephen, educated by the Jesuits, became waiwode, or Prince of Transylvania in 1581, shook off the Ottoman yoke, and had begun to give hopes of reigning gloriously when he resigned his dominions to the Emperor Rudolph II., in return for two principalities in Silesia, a cardinal's hat, and a pension. Availing himself, however, of an invitation by the Transylvanians, he returned, and placed himself under the protection of the Porte, but was defeated by the Imperialists in every battle, and finally sent to Prague, where he died almost forgotten, in 1613. (3) ELIZABETH, niece of Stephen, King of Poland, and wife of Count Nadasdy, of Hungary. By means of large bribes, she induced an old man servant and two female servants to kidnap and convey to her, either by stratagem or force, young girls from the neighboring country, whom she slowly put to death in the dungeons of her castle by

## Baths of Diocletian

the most horrible tortures. It is related, that, on a certain occasion, having violently struck one of her victims, the blood spurted up into her own face, and, as she fancied, left the skin whiter when it was wiped off. An infernal idea instantly possessed her. She invited to a grand banquet all the young girls round about, and caused 300 of them to be put to death, being under the impression that a bath of blood would renew her youth. So monstrous a story is probably exaggerated, but it at least shows that she was believed capable of it. Inquiry was at length made into the appalling rumors, when it was discovered that this female fiend had murdered, in cold blood, not fewer than 650 maidens. The domestics who assisted her were either beheaded or burned alive. The Countess, who merited certainly the greater punishment, died quietly in 1614, in her fortress of Esej, where she had been confined for life.

**Bath-sheba**, the wife of Uriah. David first committed adultery with her, then caused her husband to be slain, and afterward took her to wife. These sins displeased Jehovah, who sent the prophet Nathan to David, with the parable of the ewe lamb. David bitterly repented, but yet was punished. Bath-sheba was the mother of Solomon, whose succession to the throne she took pains to secure. She is afterward mentioned in the history of Adonijah, in the title of Psalms li, and among the ancestors of Christ (Matt. i: 6).

**Baths of Agrippa**, the earliest of the Roman thermæ; erected by Marcus Agrippa in the reign of Augustus. It stood in the Campus Martius, about 20 feet behind the Pantheon. In 1881, on the removal of some houses, ruins were found of a great hall paved with marble and lined with fluted columns.

**Baths of Caracalla**, one of the most magnificent of the Roman thermæ; in the S. E. part of the city; 2,300 men could bathe in it at the same time. It was begun in 206 A. D. by Caracalla, and completed by Severus. There were stadia for the athletes, galleries for the exhibition of paintings and sculpture, libraries, conversation halls, lecture rooms, etc. The mechanical skill displayed in its construction was very great. The ruins which still remain are among the most remarkable in Rome. Many masterpieces were found here.

**Baths of Diocletian**, the most extensive of the Roman thermæ; in the N. E. part of the city, and covering most of the ground between the Porto Collina and the Porta Viminalis. Over 3,000 persons could bathe in it at the same time. It contained a library, picture gallery, odeum, etc. Michael Angelo transformed the great hall of the Tepidarium into a nave for the Church of S. Marie degli Angeli. One of the laconica



## Baths of Titus

(hot rooms) forms the vestibule of the church.

**Baths of Titus**, a structure on the Esquiline hill in Rome; built by the Emperor Titus. Considerable ruins are found N. E. of the Coliseum.

**Bath Stone**, a species of English limestone, also called bath-oolite and roe-stone, from the small rounded grains of which it is composed. It is extensively worked near Bath for building purposes. When just quarried, it is soft, but though it soon becomes hard on exposure to the atmosphere, and is of handsome appearance, it is not very durable.

**Bathurst, Allen, Earl**, an English statesman, a zealous opponent of the measures of Sir Robert Walpole's ministry, and the intimate friend of Bolingbroke, Pope, Addison, and the other great writers of the time. Born in 1684; died in 1775.

**Bathurst, Henry, Earl**, son of the preceding, born in 1714. He was made, in 1771, Lord High Chancellor of England, and was author of the "Theory of Evidence," etc. He died in 1794.

**Bathurst, Henry, Earl**, son of the second Earl, a prominent Tory statesman, after whom various capes, islands, and districts were named; born May 22, 1762; in 1807 became President of the Board of Trade; in 1809, Secretary for Foreign Affairs; and in 1812, Secretary for the Colonies, a post held by him for 16 years. He was also President of the Council under Wellington, 1828-1830. He died in 1834.

**Bathurst Island**, on the North Australian coast, belonging to South Australia, separated from Melville Island by a narrow strait; triangular in shape, with a wooded area of about 1,000 square miles. Also an island in the Arctic Ocean, discovered by Parry, E. of Cornwallis and W. of Melville Island, 76° N., 100° W.

**Bathybius**, a peculiar slimy matter dredged up in the North Atlantic, in 1857, from a depth of 6,000 to 25,000 feet, by the crew of the "Cyclops," when examining what has since been called the telegraph plateau, for the deposition of the Atlantic telegraph cable. Specimens of this viscous mud, examined by Prof. Huxley in 1858, were re-examined by him with higher microscopic power in 1868, when he came to the conclusion that they contained a protoplasmic substance apparently existing in masses over wide areas of ocean bottom. Minute bodies, which he had before called coccoliths, of two forms, were believed to stand to the gelatinous protoplasm in the same relation as the spicula of sponges to the softer parts of the animal. Professor Haeckel, after examining the slimy substance, adopted the views of Professor Huxley, and attributed the origin of the proto-

plasmic substance, though not dogmatically, to spontaneous generation. It was named after him, by Prof. Huxley, *bathybius haeckelii*. The naturalists of the exploring vessel "Porcupine," in 1868, stated that they had found bathybius alive, but considered it to be derived from sponges, etc. Those of the "Challenger," however, failed to find it in the parts of the ocean which they dredged over, and propounded the hypothesis that the bathybius was nothing more than a precipitate from the sea water by the alcohol in which the specimens had been preserved. Subsequently, Dr. Bessels, of the American exploring ship "Polaris," considered that he had found masses of undifferentiated protoplasm in the Greenland seas. The subject is still one of scientific investigation.

**Bathymetry**, the art of measuring depths in the sea, especially for the purpose of investigating the vertical range of distribution of plants and animals. An extensive series of such bathymetric measurements was made by H. M. S. "Challenger" (1872-1876), the deepest made being at 4,575 fathoms. In February, 1900, Lieutenant-Commander H. M. Hodges, of the United States surveying ship "Nero," reported to the Secretary of the Navy that in surveying for a proposed telegraphic cable line between Honolulu and Manila, by way of Guam and Yokohama, he had encountered the greatest ocean depths on record; two casts showing 5,160 fathoms (30,960 feet), and 5,269 fathoms (31,614 feet) respectively.

**Batiste**, a fine linen cloth, made in Flanders and Picardy, named after its inventor, Batiste, of Cambray.

**Batlle, Lorenzo**, an Uruguayan statesman; born in Montevideo in 1812; commanded a body of infantry in the nine years' siege of Montevideo; was minister of war in 1866-1868; president of the republic in 1868-1872, when he resigned the office and resumed his place as general in the army.

**Batn-el-Hajar** (bat'en-el-hä-yär') (Womb of Rocks), a stony district of Nubia, stretching along the Nile in the neighborhood of the third cataract. The Nile, in the upper portion of the district, is often forced by the approaching rocks into a very narrow channel, and its navigation is frequently interrupted by small islands, rocks, and rapids. The granite hills in some parts attain a height of 2,000 feet above the river.

**Baton**, a short staff or truncheon, in some cases used as an official badge, as that of a field marshal. The conductor of an orchestra has a baton for the purpose of directing the performers as to time, etc. In heraldry, what is usually called the bastard bar, or bar sinister, is properly a baton sinister.



## BATRACHIANS AND OTHER AMPHIBIANS

FIG.

1. Ringed Siphonops.
2. Tree Frog.
3. Common Frog.
4. Skeleton of Frog.
5. Egg-carrying Frog.
6. Fire-bellied Frog.
7. Toad.
8. Horned Frog.
9. Pipa or Surinam Toad.
10. Spotted Salamander.
11. Spectacled Salamander.
12. Waltel's Salamander.
13. Newt.
14. Giant Salamander.
15. Axolotl—larval stage.
16. Axolotl—perfect animal.
17. Amphiuma.
18. Proteus.
19. Siren.

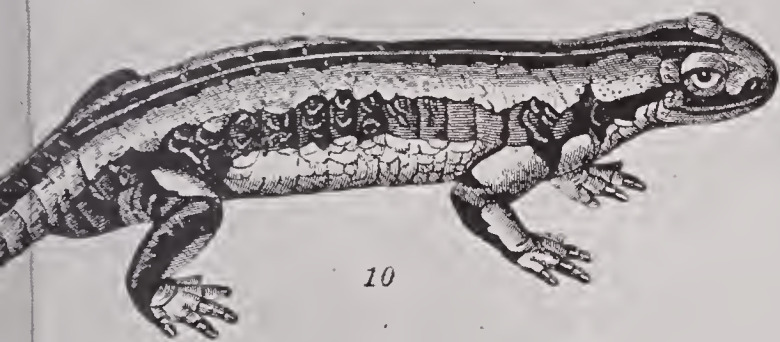








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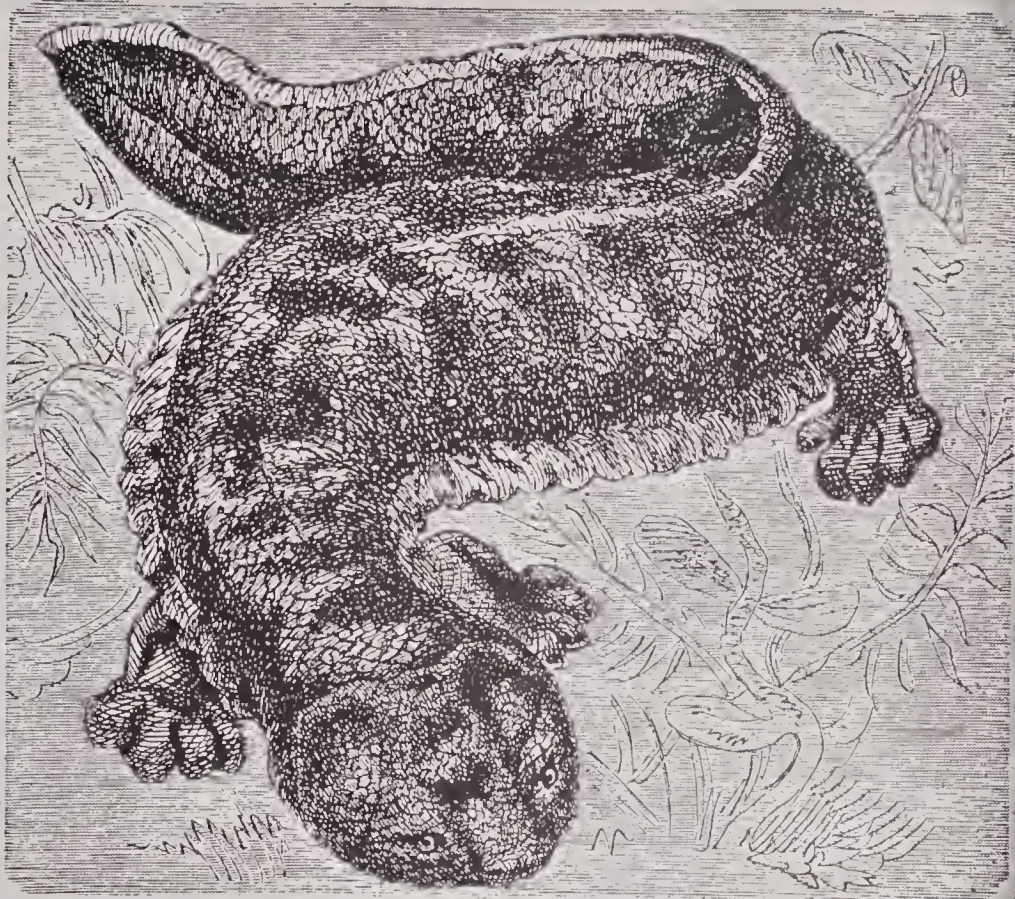
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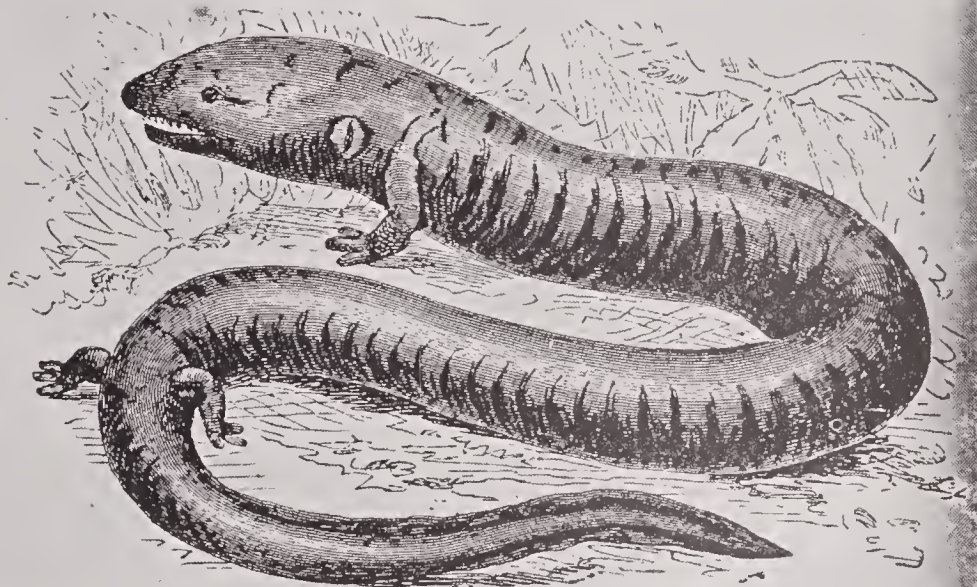
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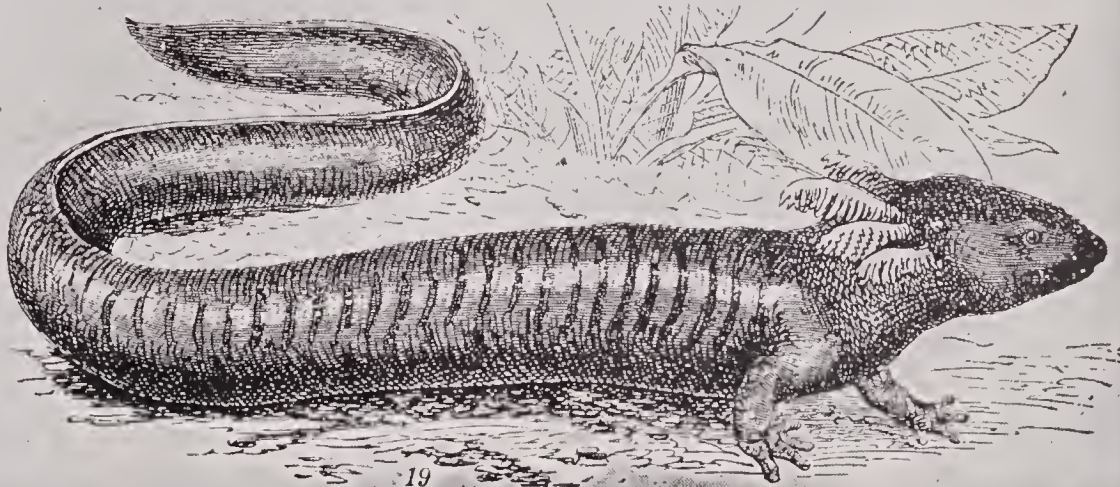
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## Batoni

**Batoni, Pompeo** (bä-tō'nē), an Italian painter, born at Lucca, in 1708. His works, the best of which are "Simon the Sorcerer Contending with St. Peter," and "Mary



BATONI'S MARY MAGDALEN.

Magdalen," are celebrated for their truthfulness, character, and coloring. He died in 1786.

**Baton Rouge** (-rōzh), city, capital of the State of Louisiana and of East Baton Rouge parish; on the Mississippi river, and several railroads; 89 miles N. W. of New Orleans. It is built on a bluff on the E. bank of the river, and commands a fine view of the surrounding territory. Architecturally, it possesses much interest, because of the mixture of French and Spanish styles. The Capitol is a structure in the Elizabethan style, showing also Gothic windows and battlemented towers. Baton Rouge contains the State University, occupying the old United States Arsenal, the State Agricultural and Mechanical College, the State Asylum for the Deaf, Dumb and Blind, the State Penitentiary, an insane asylum, two orphans' homes, a collegiate institute, and other institutions. The city has National and State banks; several daily and weekly newspapers; a large trade with the surrounding cotton and sugar growing regions; and a property valuation of \$2,000,000. It was here, on Jan. 26, 1861, that the State Convention adopted the ordinance of secession; on May 7, 1862, the city was taken by the United States forces; on Aug. 5, following, a determined Confederate attack was repulsed; and the city was held by the Union troops till the close of the war. Baton Rouge was the capital of the State from 1847 to 1864, when the seat of government was removed to New Orleans, whence, on March 1, 1882, it was again located in this city, where it has since remained. Pop. (1900) 11,269; (1910) 14,894.

**Batoo, or Batu, Khan**, an early Mongolian chief and conqueror. He sacked Moscow and terribly defeated the Hungarians.

## Batrachians

**Batoum, or Batum** (ba-tom'), a port on the E. coast of the Black Sea, acquired by Russia by the Treaty of Berlin, on condition that its fortifications were dismantled and it were thrown open as a free port. It rapidly grew to be the main outlet for Transcaucasia; its harbor was enlarged for alleged commercial reasons; an arsenal was built outside it; it was connected by a military road with Kars; and, finally, in July, 1886, the Russian government declared it to be a free port no longer. Its importance as a naval and military station to Russia is unquestionably great, and it will probably rank as one of the strongest positions on the Black Sea. The water is of great depth close inshore, and the shipping lies under protection of the overhanging cliffs of the Gouriel Mountains. Pop. (1897) 28,512.

**Batrachians**, according to the system of Cuvier, an order of reptiles, of which the frog (in Greek *batrachos*), may be considered as the type; but modern naturalists have separated the *Batrachia* from the reptiles proper, and the term is now employed either as synonymous with *Amphibia*, the *Amphibia* being regarded as forming a separate class of the vertebrata; or the term *batrachia* is applied (as by Huxley) in a narrower sense to an order of this class, including the frogs and toads, or the tailless amphibians. Hence the name *Anoura* is sometimes given to this order, from *an*, the Greek negative prefix, and *oura*, the Greek word for a "tail." The *Amphibia*, or *Batrachia* in the wider sense, are so far from being really allied to the *Reptilia* that by Huxley they have been arranged along with the fishes to form the group *Ichthyopsida*, one of the three primary sections into which he divides all vertebrata, while he puts the reptiles in the class *Sauropsida* along with the birds. One marked distinction between the batrachians and the reptiles is that the former have invariably gills at some period of their life while the latter have not. The chief characters of the batrachians in the narrower sense, that is the frogs and toads and perhaps the extinct labyrinthodon, are as follows: In the larval stage the animals have both gills and a tail, the young living in the water like fish, but these organs are absent in the adult stage, in which two pairs of limbs are present, the respiration then being purely aerial and carried on by means of lungs; the skin is soft and devoid of scales; the dorsal vertebræ are procœlous (that is, concave in front); no ribs proper are present, but only long transverse processes which serve instead; teeth are sometimes wanting altogether, but generally the upper jaw at least is furnished with small teeth; the hind



## Batta

limbs are generally longer and more powerful than the fore limbs and are usually webbed for swimming; the radius and ulna in the fore limb, and the tibia and fibula in the hind limb are ankylosed into one bone; the spinal column is short (consisting of 10 vertebræ in the frogs); the tongue is soft and fleshy. The common frog and toad are the batrachians best known, and the development of the former, from the familiar "tadpole" stage to the perfect animal, is a most interesting and instructive study. The *Anoura* are usually divided into three sections *Ranidæ*, the frogs, *Bufonidæ*, the toads, and *Pipidæ*, the Surinam toads. A number of these forms are shown in the accompanying illustration. Fig. 4 exhibits the skeleton of a frog, *a* being the scapula, *b* the united tibia and fibula, *c* the femur, *d* the tarsus, *e* the carpus, *f* the united radius and ulna.

**Batta**, a country in the N. of Sumatra, which stretches between Sinkell and Tabuyong, on the W. side of the island, and the Bila and the Rakan on the E. side. The whole pop. is estimated at about 300,000. The soil is fertile, and produces chiefly camphor, gum, benzoin, cassia, cotton, and indigo. The natives practise cannibalism. A knowledge of reading and writing is common; bark or bamboo staves are used in place of books, being written on from bottom to top. Their literature treats chiefly of witchcraft, riddles, stories, etc. There are three dialects.

**Batta**, a province in Africa, formerly an independent State, now subject to Kongo. Principal towns, Batta and Cangon.

**Battalion**, an assemblage of companies; the tactical and administrative unit of infantry—that is, the first body that is, as a rule, used independently, and commanded by a field officer (major or lieutenant-colonel). In the United States army eight companies of cavalry and artillery and 10 of infantry constitute a battalion; each infantry regiment has one battalion and those in the cavalry and artillery have two.

English battalions are formed of 10 companies for administrative, and eight for tactical purposes. The first 25 regiments have two battalions, the remainder, originally of one battalion each, are linked in pairs, according to their territorial derivation. Linked battalions are interchangeable as regards officers, and each shares the honors and advantages of the other. Two regiments of rifles have four battalions each, and the three regiments of the guards, seven battalions in all. The peace strength of a battalion is about 400 men, but varies; its war strength in the field is 1,000 men, with one lieutenant-colonel, two majors, eight captains, 16 subalterns, four officers of the regimental staff (adjutant, paymaster, quartermaster, and medical officer), and 50 sergeants. The corporals and lance-corporals

## Battering Ram

fall in with the privates in the ranks, and, therefore, number among the rank and file.

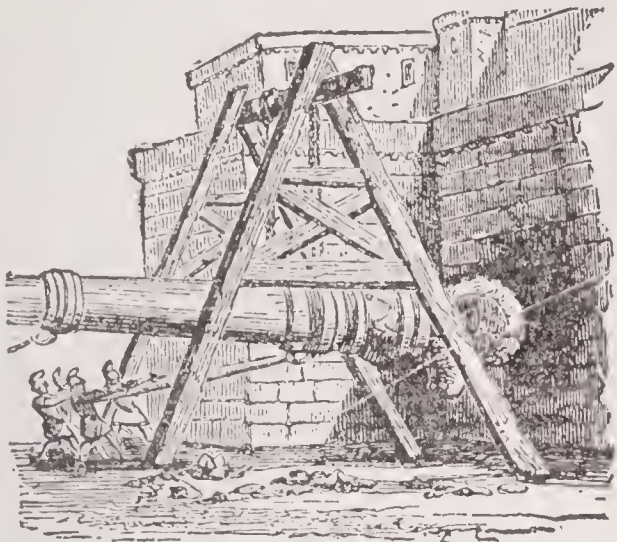
The French infantry is divided into (1) infantry of the line; (2) regiments of zouaves; (3) regiments of tirailleurs Algériens; and (4) battalions of chasseurs à pied. The 144 regiments of infantry of the line have each four battalions; a battalion (which is divided into four field companies), consisting of 12 commissioned officers, 54 non-commissioned officers, and 264 soldiers—in all 330 men, raised in time of war to 1,000 men. The regiments of zouaves have, in peace, 612 men in a battalion, and in war, 1,000. The tirailleurs Algériens, who in time of peace are stationed in Algeria, have, in peace, 652 men in a battalion, and in war, 1,000 men. Finally, the chasseurs à pied have, in peace, 468 men, and in war, 1,000 men.

In Germany, with the exception of the 116th (Hesse) Regiment, the 148 line regiments have three battalions. The yägers are formed into 26 separate battalions. To each line regiment is attached a landwehr regiment of two battalions, and these latter bear the same number as the regular regiments to which they are affiliated. The five Prussian Guard regiments have 22 officers and 678 men per battalion in peace time, the remaining regiments having 18 officers and 526 men per battalion, and the yägers, 22 officers and 526 men. On mobilization for war, all battalions are raised to a strength of 22 officers and 1,000 men, with a regimental staff of one commandant, one extra field officer, and one aide-de-camp. Pioneer battalions are practically field engineer bodies, and are divided into pontoniers (for bridging), and sappers and miners (for siege operations, demolitions, or the construction of artificial defenses). They have each three field and one dépôt company; the former comprising 15 officers and 650 men.

**Battering Ram**, an ancient military contrivance used for battering down walls. It existed among the Assyrians, and is seen depicted on a number of the bas-reliefs discovered by Layard or other explorers. This engine of war was known to the Greeks also. The simplest form was a beam supported and swung by the soldiers themselves. In its most perfect form among the Romans, it consisted of a pole or beam of wood, sometimes as much as 80, 100, or even 120 feet in length. It was suspended by its extremities from a single point, or from two points in another beam above, which lay horizontally across two posts. When at rest it was level, like the beam above it. When put in action against a wall, it was swung horizontally by men who succeeded each other in constant relays, the blow which it gave to the masonry at each vibration being rendered all the more



effective that one end of it was armed with iron. This, being generally formed like a ram's head, originated the name *aries* (ram), by which it was known among the Romans, and battering-ram, by which it was after-



BATTERING RAM.

ward known. A roof or shed covered it to protect the soldiers who worked it, from hostile missiles, and to facilitate locomotion it was often placed on wheels.

**Battersea**, a suburban district of London, in Surrey, in a low situation on the S. bank of the Thames, nearly opposite Chelsea, with a fine public park extending over 185 acres. The district is associated with the names of Pope and Bolingbroke, and with the Wellington-Winchelsea duel. Pop. borough, (1901) 168,896.

**Battery**, in law, the unlawful beating of another, or even the touching him with hostile intent. It is legitimate for a parent or a master to give moderate correction to his child, his scholar, or his apprentice. A churchwarden, or beadle, may gently lay hands on a person disturbing a congregation. A person, also, who is violently assailed by another may strike back in self defense. He may do so also in defense of his property. But to strike anyone in anger, however gently, without these justifications, exposes one to the liability to be prosecuted for assault and battery, the assault being the menacing gesture and the battery the actual blow. Wounding and mayhem are a more aggravated kind of battery.

In military usage. 1. Breaching (siege) battery: One placed as close as possible to the object to be destroyed; as the stone revetment of a fortress.

2. Counter or direct (siege) battery: One intended to crush the opponent's fire by an equal number of heavy guns.

3. Cross batteries: Two batteries playing on the same point from two different positions.

4. Elevated (siege) battery: One in which the gun platforms are on the natural level of the ground.

5. Enfilading battery: One which is placed on the prolongation of the line occupied by the enemy.

6. Fascine battery: One made of fascines.

7. Floating battery: A heavily armed and armored vessel intended for bombarding fortresses and not for sea cruising.

8. A gabion battery: One built up of gabions.

9. Half sunken battery: One in which the terreplein is sunk two feet below the level of the ground.

10. Masked battery: One that is concealed from view of the enemy by brushwood or the non-removal of natural obstacles in front until it is ready to open fire.

11. Mortar battery: One without embrasures in the parapets, and the platform is horizontal. The shells are fired over the parapet at an angle of 45°.

12. Open batteries: Those which are not protected by earthen or other fortifications.

13. Ricochet battery: One in which the guns are placed on the prolongation of the front of an enemy's battery, so that by firing low charges the shot or shell may be made to bound along inside the work and dismount the guns.

14. Sand-bag battery: One constructed in rocky or sandy sites of sand-bags filled with earth or sand.

15. Screen (siege) battery: One in which the actual gun battery is protected by a low earthen screen placed parallel to, and a short distance from, the main battery.

16. Sunken (siege) battery: One in which the gun platforms are sunk three feet below the surface.

17. A certain number of artillerymen united under the command of a field officer, and the lowest tactical unit in the artillery. In a battery there are gunners who work the guns, and drivers who drive the horses by which these guns are transported from place to place. Batteries are usually distinguished as horse, field, and garrison. The first two consist of six guns each.

(1) Horse batteries are those in which the gunners are carried partly on the carriages and partly on horses.

(2) Field batteries are those in which all the gunners are carried on the carriages; and these are divided again into (a) mountain, and (b) position batteries.

(3) Garrison batteries are those bodies of foot artillerymen who have to serve and mount the heavy guns in forts or coast batteries.

**Battery**, in physics. See ELECTRICITY.

**Batteux**, Charles (bä-tè), a noted French æsthetician, born in Vougiers, May 6, 1713; became Professor of Rhetoric and Humanities in 1750, and later of Greek and Roman Philosophy, at the Royal College of



Paris. In 1761 he was elected to the French Academy. Batteux may be styled the founder of French art philosophy, for he was the first to apply to poetry and the creative arts the formula: imitate the beauty of nature. His teaching greatly influenced Lessing and other German art critics. Among his works are "The Ethics of Epicurus" (1750); "History of the First Causes" (1769); "The Fine Arts Reduced to One Principle" (1746), and "Course of Belles-Lettres, or Principles of Literature" (1747-1750). He died in Paris, July 14, 1780.

**Batthyanyi** (bä-tē-yä'nē), one of the oldest and most powerful of the noble families of Hungary, which traces its origin as far back as the invasion of Pannonia by the Magyars, in 884 A. D., and has given to Hungary many distinguished warriors, statesmen, and churchmen. The surname is derived from lands obtained in the 14th century. Count CASIMIR BATTHYANYI, a member of the principal branch of the family, was born June 4, 1807. He was Minister of Foreign Affairs in Hungary during the insurrection in 1849, in which he also distinguished himself as a military governor. After the catastrophe of Vilagos, he fled, along with Kossuth, into the Turkish territory, where he remained till 1851. He then went to France, and died at Paris, July 13, 1854. Count LOUIS BATTHYANYI, belonging to another branch of the same family, and born at Presburg, in 1809, having espoused the national cause, yet seeking to maintain the connection with Austria and his allegiance to the Austrian sovereign, was appointed President of the Ministry, when Hungary obtained a ministry of its own, in March, 1848. His ability was not equal to the goodness of his intentions, and the circumstances in which he was called to act were very difficult and embarrassing. He did not hold the office long, and afterward took part in public affairs, chiefly as a member of the Diet, and with great moderation. Yet, after the Austrians entered Pest, he was arrested in January, 1849, and on Oct. 6 was executed by sentence of martial law. His condemnation was unexpected, and awakened the more sympathy, because all men regarded it as unjust. His estates, which were valued at £400,000, were confiscated, but were restored to his family in 1867; and in 1870 his body was removed, and interred anew, with great pomp and solemnity. A Prince BATTHYANYI (1803-1883), occupied for 45 years a prominent position on the turf, winning the Derby in 1876.

**Battik**, an ornamental production of the natives of the Dutch East Indies, who decorate their clothing with it; also made in The Hague for local use and export. A piece

of linen is taken and all kinds of designs are outlined upon it with a pencil. When the design is completed, the ornamented parts of the fabric are covered with a liquid which possesses the quality of stiffening after being applied. The parts not ornamented are dyed the color desired. After the entire fabric has been ornamented in this manner, it is boiled in hot water so as to take the hard stuff out of the battik. The dyed parts will then hold the dye and the battik is ready. The Hague people were the first to introduce battik into Europe. It is made on linen, silk, velvet, and leather, and is exported to all the principal cities of Europe.

**Battle.** The object of war may be obtained in two different ways: either one party forces the enemy, by skillful maneuvers, marches, demonstrations, the occupation of advantageous positions, etc., to quit the field (which belongs to the province of strategy); or the hostile masses approach each other so that a battle becomes necessary to determine which shall keep the field. Troops may either meet by design or by chance. When they meet by chance, and are thus obliged to fight, it is called a rencontre. The rules for ensuring a successful issue, whether they respect the preparations for the conflict, or the direction of the forces when actually engaged, belong to tactics, in the narrower sense of the word. Strategy also shows the causes which bring armies together, and produce battles without any agreement between the parties. It may be sufficient to say, in general, that armies in their marches (and consequently in their meeting) are chiefly determined by the course of the mountains and rivers of a country. In ancient times and the Middle Ages the battle-ground was often chosen by agreement, and then the battle was a mere trial of strength, a sort of duel; but, in our time, such trifling is done away with. War is now carried on for the real or pretended interest of a nation, or a ruler who thinks or pretends that his interest is that of the nation. Wars are not undertaken for the purpose of fighting, and battles are merely the consequence of pursuing the purpose of the war. They arise from one party's striving to prevent the other from gaining his object. Every means, therefore, of winning the battle is resorted to, and an agreement can hardly be thought of. In this respect a land battle is entirely different from a naval battle. The former is intended merely to remove an obstacle in the way of gaining the object of the war; the destruction of the enemy, therefore, is not the first thing sought for. But the object of a naval engagement is, almost always, the destruction of the enemy; those cases only excepted, in which a fleet intends to bring supplies or



reinforcements to a blockaded port, and is obliged to fight to accomplish its purpose.

As the armies of the ancients were not so well organized as those of the moderns, and the combatants fought very little at a distance, after the battle had begun maneuvers were much more difficult, and troops, when actually engaged, were almost entirely beyond the control of the general. With them, therefore, the battle depended almost wholly upon the previous arrangements, and the valor of the troops. Not so in modern times. The finest combinations, the most ingenious maneuvers, are rendered possible by the better organization of the armies, which thus, generally at least, remain under the control of the general. The battle of the ancients was the rude beginning of an art now much developed. It is the skill of the general, rather than the courage of the soldier, that now determines the event of a battle.

Battles are distinguished as offensive and defensive. Of course, a battle which is offensive for one side is defensive for the other. Tacticians divide a battle into three periods—that of the disposition, that of the combat, and the decisive moment. The general examines the strength, reconnoiters the position, and endeavors to learn the intention of the enemy. If the enemy conceals his plan and position, skirmishes and partial assaults are often advisable, in order to disturb him, to obtain a view of his movements, to induce him to advance, or with the view of making prisoners, who may be questioned, etc. Since the general cannot direct all these operations in person, officers of the staff assist him; single scouts or small bodies are sent out, and spies are employed. Every means is made use of for obtaining information regarding the enemy, or the ground on which the battle is likely to take place. According to the knowledge thus acquired, and the state of the troops, the plan of the battle, or the disposition, is made; and here military genius has an opportunity to display itself. To the disposition also belongs the detaching of large bodies which are to coöperate in the battle, but not under the immediate command of the chief. The plan of the battle itself, the position of the troops, etc., is called the order of battle. This is either the parallel, or the inclosing (if the enemy cannot develop his forces, or you are strong enough to outflank him), or the oblique. When each division of troops has taken its position, and received its orders, and the weaker points have been fortified (if time allows it), the artillery placed on the most favorable points, all chasms connected by bridges, villages, woods, etc., taken possession of, and all impediments removed as far as possible (which very often cannot be done, except by fighting), then comes the second period—that of the engagement.

The combat begins, either on several points at a given signal, as is the case when the armies are very large, and a general attack is intended, as, for instance, at Leipsic, where three fire-balls gave the signal for battle on the side of the allies; or by skirmishes of the light troops, which is the most common case. The artillery endeavors to dismount the batteries of the enemy, to destroy his columns, and, in general, to break a passage, if possible, for the other troops. The forces, at the present day, are brought into action mostly in open order, and not, as formerly, in long but weak lines. Here the skill of the commanders of battalions is exerted. Upon them rests the principal execution of the actual combat. The plans and orders of a general reach only to a certain point; the chiefs of battalions must do the great work of the battle. Before the battle, the general places himself at a point from which he can see the conflict, and where he can easily receive reports. A few men are near him as his bodyguard; others take charge of the plans and maps; telescopes are indispensable. He often sends one of his aides to take command of the nearest body of cavalry, in order to execute a new movement quickly. He receives the reports of the generals under him; disposes of the troops not yet in action; strengthens weak points; throws his force on the enemy where he sees them waver; or changes, if necessary, with a bold and ingenious thought, the whole order of battle. The general now uses every means to bring on the third period of the battle—the decisive movement.

In the Austro-German campaign of 1866, and the still more important Franco-German campaign of 1870, great changes were developed both in strategy and tactics. The changes in strategy were due chiefly to the ease with which the general could direct detached bodies of troops over a wide area by means of the telegraph, and the facility with which troops, provisions, and ammunition could be moved from point to point by railway. The changes in tactics, again, arose chiefly from the longer range and quicker firing capacity of modern rifles, and the greater importance attached to the massed firing of long-range breech-loading artillery. See ARMY: NAVAL FLEETS: NAVY.

**Battle**, a town in Sussex, England, 6 miles N. W. of Hastings. Encircled on three sides by wooded hills, it consists of one street extending along a valley from N. W. to S. E. Till recent years Battle was noted for its manufacture of gunpowder, known as Battle powder. An uninhabited heathland then, Senlac by name, it received its present name from the battle of Hastings, fought here on Oct. 14, 1066, when the Normans, led by William the Conqueror, overthrew the old English monarchy under King



## Battle

**Harold.** William, to commemorate his victory, founded in 1067, on the spot where Harold fell, a splendid Benedictine Abbey, which was endowed with all the land within a league of it, and had the privileges of a sanctuary. The probably fabulous original roll of the Conqueror's barons deposited in it was said to have perished in the burning of Cowdray House in 1793; and the 10 copies extant have all been grossly tampered with. The existing decorated and perpendicular buildings occupy three sides of a quadrangle—two sides in ruins, the third converted at the dissolution into a private dwelling-house. The abbey was bought in 1857 by Lord Harry Vane, afterward Duke of Cleveland. Pop. (1901) 2,996.

**Battle, Burrill Bunn**, an American jurist; born in Hinds county, Miss., July 24, 1838; graduated at Arkansas College in 1856 and in law at Cumberland University in 1858; admitted to the bar, 1858; entered the Confederate army in 1861, and participated in several battles. After the war he served in the legislature and practised until 1885, when he became an Associate Justice of the Supreme Court of Arkansas.

**Battle, Cullen Andrews**, an American military officer; born in Powelson, Ga.; June 1, 1829; studied at Brownwood Institute, La Grange, and was graduated at the University of Alabama; admitted to the bar in 1852 and practised till 1860; was a Breckenridge and Lane presidential elector, and accompanied William L. Yancy in his canvass of Alabama. At the outbreak of the Civil War he entered the Confederate army, and during the war was wounded seven times, promoted Brigadier-General on the field of Gettysburg, and Major-General in October, 1864. After the war he devoted most of his time to journalism in Newbern, N. C. He died in 1905.

**Battle, Kemp Plummer**, an American educator; born in Franklin Co., N. C., Dec. 19, 1831; graduated at the University of North Carolina in 1849; was a member of the State Convention of North Carolina in 1861 that passed the ordinance of secession; State Treasurer, 1866–1868; president of the University of North Carolina, in 1876–1891; and afterward Professor of History there. His works include: "History of the Supreme Court of North Carolina;" "History of Raleigh, North Carolina;" "Trials and Judicial Proceedings of the New Testament;" "Life of General Jethro Sumner," as well as numerous writings on the history of North Carolina.

**Battle, Trial by, or Wager of** (original spelling, *battel*), a barbarous method of deciding in the court of last resort, by personal combat, all civil and criminal questions turning on disputed matters of fact. The practice seems to have been immemorially in use among the Northern nations;

## Battle Axe

the Burgundians reduced it to stated forms about the end of the 5th century; from them it passed to the Franks and Normans, and through William the Conqueror came to be established in England. It was used (1) in courts-martial, or courts of chivalry and honor; (2) in appeals of felony; and (3) upon cases joined in a writ of right—the last and most solemn decision of real property. In civil actions the parties at variance appointed champions to fight for them, but in appeals of felony they had to do so themselves. The weapons were batons of an ell long, and a four cornered target. The combat went on till the stars appeared in the evening, unless one of the combatants proved recreant and cried *craven*. If he did so, or if his champion lost the battle, Divine Providence was supposed to have decided that his cause was bad. If the one who thus failed was appellant against a charge of murder, he was held to have done the felonious deed, and without more ado was hanged. Henry II. struck the first blow at the system of trial by battle by giving the defendant in a case of property the option of the Grand Assize, then newly introduced. The last trial by battle in the Court of Common Pleas at Westminster was in 1571, the last in the provinces in 1638. The case of *Ashford v. Thornton*, in 1818, having led to a judicial duel of the old type, the Act 59 George III., chapter 46, passed in 1819, finally abolished trial by battle. Montesquieu traces both dueling and knight errantry back to the trial by battle.

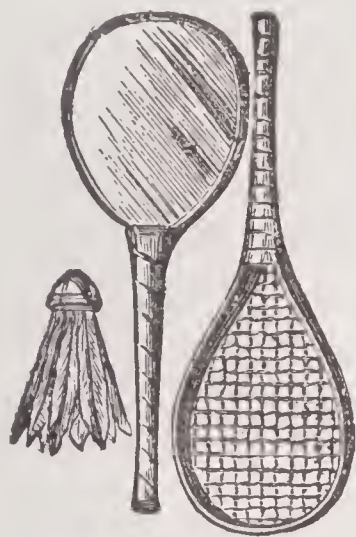
**Battle Axe**, a weapon much used in the early part of the Middle Ages, particularly by those who fought on foot. It was not uncommon, however, among the knights, who used also the mace, a species of iron club or hammer. Both are to be seen in the different collections of old arms in Europe. The Greeks and Romans did not employ the battle axe, though it was found among contemporary nations. In fact, the axe is one of the earliest weapons, its use as an instrument of domestic industry naturally suggesting its application for purposes of offense; but, at the same time, it has always been abandoned as soon as the art of fencing, attacking, and guarding was cultivated; because the heavier the blow given with this instrument, the more will it expose the fighter. It never would have remained so long in use in the Middle Ages, had it not been for the iron armor, which protected the body from everything but heavy blows. In England, Ireland, and Scotland, the battle axe was much employed. At the battle of Bannockburn, King Robert Bruce, clave an English champion down to the chin with one blow of his axe. The Lochaber axe remained a formidable weapon in the hands of the Highlanders till recently, and was used by the old city guard of Edinburgh.



## Battle Creek

**Battle Creek**, a city in Calhoun co., Mich.; at the junction of Kalamazoo river and Battle creek, and on several railroads. It is in an agricultural, fruit growing and sandstone quarrying region. It contains a college, the headquarters, and the publishing house of the Seventh-Day Adventists; Battle Creek Medical College; division offices of the Grand Trunk railway; and what is said to be the largest sanitarium in the world. The city is an attractive summer

resort, with more than 75 lakes in its immediate vicinity. It has a National bank; numerous daily, weekly and monthly periodicals; an assessed property valuation of over \$5,000,000; and a total debt of about \$200,000. Pop. (1890) 13,197; (1900) 18,563; (1910) 25,267.



BATTLEDORE AND SHUTTLECOCK.

**Battledore** and **Shuttlecock**, a popular game invented in the 14th century. The implements are

a bat shaped like a tennis racket and strung with gut or covered with parchment, and a shuttlecock consisting of a cork stuck with feathers, which is batted to and fro between the players. See BADMINTON.

**Battleford**, a town in the new province (1905) of Saskatchewan, Canada; at the junction of the Saskatchewan and Battle rivers; on the Canadian Pacific railway; 90 miles from Saskatoon. It is memorable as the center of the insurrection headed by the half breed, Louis Riel, in 1885.

**Battle-Ground**, a town in Tippecanoe co., Ind., where the famous battle of Tippecanoe was fought between the United States troops under General Harrison and the Indians under Tecumseh and his brother, "The Prophet," on Nov. 7, 1811.

**Battlement**. (1) A wall or rampart built around the top of a fortified building, with interstices or embrasures to discharge arrows or darts, or fire guns through. (2) A similar erection around the roofs of churches and other Gothic buildings, where the object was principally ornamental. They are found not only upon parapets, but as ornaments on the transoms of windows, etc. (3) A wall built around a flat roofed house, in the East and elsewhere, to prevent any one from falling into the street, area, or garden.

**Battle Piece**, a painting which represents a battle, exhibiting large masses of men in action. The armor of the ancients, and the whole array and action of their

## Batuecas

battles, afford subjects much more favorable to the artist than the straight lines or condensed columns and the firearms of the moderns. A painter of battle pieces ought to have an accurate knowledge of the appearance of horses and men, and, if possible, to have seen a battle, as few persons are able to form from hearsay an accurate idea of such a scene. Some of the greatest pieces of this kind are the "Battle of Constantine," of which the cartoons were drawn by Raphael, and which was executed by Giulio Romano; and the "Battle of the Standard," which Leonardo da Vinci was commissioned to paint for the Palace of the Signory in Florence. In this famous work he has represented in a marvelous manner the "bestial frenzy" of war. The cartoon for this painting was exhibited in Florence at the same time with one by Michael Angelo intended for a wall painting in the Palazzo Vecchio. Only the cartoon of the latter was finished. It represents a troop of soldiers surprised, and attacked while bathing. Among other battle pieces are: The "Battle of the Huns and Romans" by Kaulbach, a striking production; Lebrun's "Battles of Alexander," the "Battles of the Amazons," by Rubens; "Gettysburg" by Rothermel; and "Hooker's Battle Above the Clouds" by Walker.

**Battleship**, a warship of the heaviest class, designed for fighting in line of battle. The battleship is the fighting unit in a fleet engagement, designed to take the hardest blows and to overcome any ship that may oppose her. Her armor is the least vulnerable, her guns are the heaviest, and the qualities of the cruiser and armored cruiser are subordinated to secure this preponderance of protection and armament. The United States navy, Jan. 1, 1900, contained the following named battleships, all of which had rendered remarkable service in the war with Spain in 1898: "Iowa," "Indiana," "Massachusetts," "Oregon," and "Texas," the last being rated as second class, the others as first class. On the same date there were authorized or under construction, all first class, the "Kearsarge," "Kentucky," "Illinois," "Alabama," "Wisconsin," "Maine," "Missouri," "Ohio," "Georgia," "New Jersey," and "Pennsylvania." The new "Kearsarge," in June, 1900, was designated as the flag ship of the reorganized European Squadron, which was disintegrated at the beginning of the war with Spain. See DREADNAUGHTS.

**Battue**, a method of killing game by having persons beat a wood, copse, or other cover, to drive the animals (pheasants, hares, etc.) toward the spot where sportsmen are stationed.

**Batuecas, Las**, two valleys, inclosed by high mountains, in the Spanish province of



Salamanaca, so difficult of access as to have been unknown, so it is said, for several centuries. A convent of Carmelites was built there as early as 1599. These valleys are so situated that in the longest days the sun shines into them only four hours.

**Baucher, François**, a French hippologist, born in Versailles, in 1796; is best known because of his method of training saddle horses, and his book "Methode d'Equitation" (1842). He died in Paris, March 14, 1873.

**Baucis** (bâ'sis), an old and infirm woman of Phrygia, who, with her husband, lived in a small cottage, in a penurious manner. When Jupiter and Mercury traveled in disguise over Asia, they came to the cottage, and were so pleased with the hospitality they received, that Jupiter changed their dwelling into a magnificent temple, of which Baucis and her husband Philemon were made priests. After they had lived happily to an extreme old age, they died both at the same hour, according to their request to Jupiter, that one might not have the sorrow of following the other to the grave. Their bodies were changed into trees before the doors of the temple.

**Baudelaire, Charles** (böd-lär'), a French poet, born in Paris, April 21, 1821. In his youth he traveled to India, and is said to have likewise visited the Mauritius and Madagascar. On his return to Paris he became a notable figure in the second group of romantic poets who carried on the movement begun by the Romanticists of 1830.



CHARLES BAUDELAIRE.

His "Flowers of Evil," a volume of poems issued in 1857, was the subject of a prosecution on the score of immorality, and had to undergo expurgation. He afterward published "Artificial Paradises, Opium and Hash-

eesh," a work partly original, partly composed of selections, admirably translated, from the writings of Poe and De Quincey. His occasional essays, which were finally collected in a volume entitled "Romanesque Art," are remarkable for the finish of the style and the subtlety of the criticism. Apart from his verse, however, Baudelaire's finest work is contained in his

50 "Little Poems in Prose." All of these are exquisitely written, and in many of them the beauty of the thought is equal to the beauty of the language. Baudelaire died in Paris Aug. 31, 1867. He united a remarkably keen analytic faculty with a powerful, somber imagination. Brooding melancholy, curiously tinged with irony, inspires the solemn music and dreamlike imagery of his best verses. The writer whom, in many respects, he resembles most strongly is Edgar Allan Poe.

**Baudissin** (bou'dis-sën), **Wolf Heinrich, Count von**, a German littérateur, born in 1789; one of the chief contributors to the famous German translation of Shakespeare edited by Schlegel and Tieck, of which he rendered "Comedy of Errors;" "Love's Labor's Lost;" "All's Well that Ends Well;" "Taming of the Shrew;" "Much Ado About Nothing;" "Merry Wives of Windsor;" "Measure for Measure;" "Titus Andronicus;" "King Lear;" "Antony and Cleopatra;" "Troilus and Cressida;" "Othello;" and "Henry VIII." Under the title "Ben Jonson and His School" (1836), he published translations of old English dramas. He died in 1878.

**Baudry, Paul** (bō-drē), a French painter, born Nov. 7, 1828, at La Roche-sur-Yon; studied in Paris and Rome. Among his best known works are "Punishment of a Vestal Virgin" (1857), and the "Assassination of Marat" (1867). He was for 10 years employed in decorating the foyer of the Grand Opéra in Paris. Elected a member of the Académie des Beaux-Arts in 1870, he died Jan. 17, 1886.

**Bauer, Bruno** (bour), a German Biblical critic and scholar, born in Eisenberg, Sept. 9, 1809. His writings carry the new movement in rational theology very far, his "Critical Exposition of the Religion of the Old Testament" (1838), and "Critique of the Gospels" (1850) being extreme in their various expositions. He died in Rixdorf, April 13, 1882.

**Bauer, Caroline**, a German actress, born at Heidelberg in 1807, made her début in 1822, and had achieved a brilliant success, in comedy and tragedy alike, when in 1829 she married Prince Leopold, afterward King of the Belgians. Their morganatic union was as brief as it was unhappy; in 1831 she returned to the stage, which she quitted only in 1844, on her marriage to a Polish count. She died at Zürich, Oct. 18, 1878.

**Bauer, Louis A.**, an American mathematician, born in Cincinnati, O., Jan. 28, 1865; graduated at the University of Cincinnati in 1888; took a special course in the University of Berlin, 1892-1895; was Astronomical and Magnetic Computer for the United States Coast and Geodetic Survey, 1887-1892; Docent in Mathematical



Physics in the University of Chicago, 1895-1896; Instructor in Geophysics, 1896-1897; Chief of Division of Terrestrial Magnetism of Maryland Geological Survey since 1896; became Assistant Professor of Mathematics in the University of Cincinnati in 1897; Astronomer and Magnetician of the Western Boundary Survey of Maryland. He is an honorary member of the Sociedad Científica Antonio Alzate of Mexico, and a member of the Permanent Committee on Terrestrial Magnetism and Atmospheric Electricity of the International Meteorological Conference. He edits and publishes the "Terrestrial Magnetism."

**Bauer, Wilhelm**, a German inventor, born in Dillingen, in 1822. He served as an artilleryman during the Schleswig-Holstein War (1848), and, meanwhile, conceived the plan of a submarine vessel for coast defense. From 1851 to 1855 he vainly sought means from Austria, France, and England to complete his experiment. Russia finally adopted his scheme. He afterward made improvements in torpedoes and in submarine guns. He died in 1875.

**Bäuerle, Adolf** (boi'er-le), an Austrian dramatist and novelist, born in Vienna, April 9, 1786; cultivated with much success the field of popular comedy and local farce in Vienna, where, in 1804, he founded the "Vienna Theater-Gazette," until 1847 the most widely read paper in the Austrian monarchy, and now a valuable source for the history of the stage in Vienna. Of his numerous plays the following became known also outside of Austria: "Leopold's Day" (1814); "The Enchanted Prince" (1818); "The Counterfeit Prima Donna" (1818); "A Deuce of a Fellow" (1820); "The Friend in Need." Under the pseudonym OTTO HORN he wrote the novels "Therese Krones" (1855) and "Ferdinand Raimund" (1855), full of the personal element and local anecdote. He died in Basel, Sept. 20, 1859.

**Bauernfeld, Eduard von** (bou'ern-feld), an Austrian dramatist, born in Vienna, Jan. 13, 1802; studied law and entered the government service in 1826, but resigned, after the revolutionary events of 1848, to devote himself exclusively to his literary pursuits. A brilliant conversationalist, he soon became a universal favorite in Vienna society. Intimate from childhood with the genial painter, Moritz von Schwind, and the composer, Franz Schubert, he also kept up a lifelong intercourse with Grillparzer. Among his comedies, distinguished for their subtle dialogue and sprightly humor, particularly the descriptions of fashionable society have made his great reputation. The best known and most successful were "Reckless from Love" (1831); "Love's Protocol" (1831); "Confessions" (1834); "Domestic and Romantic" (1835); "Of Age" (1846);

"The Categorical Imperative" (1851); "From Society" (1866); "Modern Youth" (1868). He died in Vienna, Aug. 9, 1890.

**Bauhinia** (named by Blumier after John and Caspar Bauhin, the plants which have two-lobed leaves being deemed suitable for rendering honor to two brothers, instead of to one person simply), mountain ebony, a genus of plants belonging to the order *fabaceæ*, or *leguminosæ*, and the sub-order *cæsalpinicæ*. The species, which are mostly climbers, belonging to the East or West Indies, have beautiful flowers.

**Baum, Friedrich** (boum), a German military officer in the British service in the Revolutionary War. He arrived in Canada in 1776, and in Burgoyne's expedition acted as Lieutenant-Colonel of the Brunswick dragoons. He was sent out with 800 men and two pieces of artillery on a foraging expedition. Near Bennington, Vt., he was attacked by the New Hampshire militia under Stark, and utterly defeated. He himself was killed Aug. 16, 1777.

**Baumbach, Rudolf** (boum'bäch), a German poet, born at Kranichfeld, Saxe-Meiningen, Sept. 28, 1840. After studying natural science in Würzburg, Leipsic, Freiburg, and Heidelberg, he lived as a tutor in Austria, last at Trieste, where he devoted himself afterward exclusively to writing. In 1885 he returned to Meiningen. He has most successfully cultivated the poetical tale, based upon ancient popular legends. Epics: "Zlatorog," a Slovenic Alpine legend (1875, 37th ed., 1892); "Horand and Hilda" (1879); "Lady Fair" (1881); "The Godfather of Death" (1884); "Emperor Max and His Huntsmen" (1888). Lyrics: "Songs of a Traveling Journeyman" (1878); "Minstrel's Songs" (1882); "From the Highway" (1882); "Traveling Songs from the Alps" (1883); "Adventures and Pranks Imitated from Old Masters" (1883); "Jug and Inkstand" (1887); "Thuringian Songs" (1891). He is also an excellent prose writer, author of "False Gold" (1878), a historical romance of the 17th century; "Summer Legends" (1881); "Once upon a Time" (1889), etc.

**Baumgarten, Alexander Gottlieb**, a German philosopher of the school of Wolf, was born in Berlin, July 17, 1714; studied at Halle, and in 1740 became Professor of Philosophy at Frankfort-on-the-Oder, where he died May 26, 1762. He is the founder of æsthetics as a systematic science of the beautiful and an integral part of philosophy. In 1750-1758 he issued two volumes of his "Æsthetica," but his death hindered the completion of the work. His writings in other departments of philosophy are marked by clearness and precision. He carried the dogmatic, rationalistic system of Wolf to its utmost development; his "Metaphysica"



## Baumgarten-Crusius

(Halle, 1739; 7th ed., 1779) is one of the most useful books for the study of the Wolfian philosophy. He also wrote "Philosophia Generalis" (1770); "Ethica" (1740); "Jus Naturæ" (1765).

**Baumgarten-Crusius, Ludwig Friedrich Otto**, a German theologian, born in Merseburg, in 1788; studied theology in Leipsic, and became the University Preacher in 1810; appointed Professor of Theology at Jena, in 1817; and became widely known as a foremost champion of religious liberty. His publications include "Introduction to the Study of Dogmatics" (1820); "Manual of Christian Ethics" (1827); "Outlines of Biblical Theology" (1828); "Outlines of Protestant Dogmatics" (1830); "Text-book of the History of Doctrines" (1832); "Schleiermacher, His Method of Thought, and His Value" (1834); "Considerations on Certain Writings of Lamennais" (1834), etc. He died in Jena, May 31, 1843.

**Baur, Ferdinand Christian** (bour), a German theologian and Biblical critic, head of the so-called Tübingen School of Rationalist divines, born in Schneiden, June 21, 1792. While holding a professorship at a seminary in Blaubeuren, he published, in 1824, his "Symbolik und Mythologie." In 1826 he accepted a call to the chair of theology at Tübingen, and henceforward distinguished himself by his labors and learned productions in the field of Biblical criticism, and the history of doctrines. A disciple of Hegel, he applied the principles of his philosophy to the study of theology and the criticism of the earliest Christian literature, with results startling enough, and which are still the subjects of grave controversy. His principal works on the history of dogmas, are: "The Christian Gnosis," "The Christian Doctrine of the Atonement," and "The Christian Doctrine of the Trinity and Incarnation." Of his works of New Testament criticism the most important are "The Christ Party in the Corinthian Church," "The So-called Pastoral Letters of the Apostle Paul," "Paul, the Apostle of Jesus Christ," "Critical Researches Respecting the Canonical Gospels" (in which he especially attempts to disprove the historical character of the Fourth Gospel), and a work on "The Origin and Character of the Gospel of Mark." He died Dec. 2, 1860.

**Baur, Frederick Wilhelm von**, a Russian military engineer, born in Hanau, Germany, in 1735; early adopted a military life, and, in 1755, entered the British service. In 1757 he obtained the rank of general, and engineer-in-chief. Frederick II. of Prussia ennobled him. In 1769 he entered into the service of Catherine II., Empress of Russia, and was employed against the Turks. The Empress had a high notion of his talents, and employed him in making the aqueduct of Tsarskoe-Selo, for supplying

## Bautzen

Moscow with water, and in deepening the canal near St. Petersburg, at the end of which he constructed a large harbor, and other important undertakings. He died in St. Petersburg, in 1783. Baur had for his secretary the celebrated Kotzebue, who directed in his name the German theater at St. Petersburg.

**Bausset, Louis François, Cardinal** (bō-sā'), born in Pondicherry, India, Dec. 14, 1748. His father, who held an important position in the French Indies, sent young Bausset to France when he was but 12 years of age. He was educated by the Jesuits, and became Bishop of Alais in 1784. Having signed the protest of the French bishops against the civil constitution of the clergy, he emigrated in 1791, but in the following year he returned to France. He was soon arrested, and imprisoned in the old Convent of Port Royal, where he remained until after the fall of Robespierre. After the restoration of Louis XVIII., in 1815, he entered the Chamber of Peers; the following year he became a member of the French Academy; and, in 1817, he received the appointment of Cardinal. He wrote the "History of Fénelon" (1808-1809, 3 vols.), at the request of the Abbot Emery, who had in his possession the MSS. of the illustrious Archbishop of Cambray. The work had great success, and its author was awarded, in 1810, the second decennial prize of the Institute, for the best biography. His "History of Bossuet" (1814) was less favorably received. He died in Paris, June 21, 1824.

**Bautain** (bō-tan'), **Louis Eugene Marie**, a French philosopher, born in Paris, Feb. 17, 1796; educated at the Normal School; became Professor of Philosophy in Strasburg College in 1816; entered the Church, and became a priest in 1828; resigned his professorship in 1830; and later was suspended as a priest because of his work, "La Morale de l'Evangile comparee a la Morale des Philosophes;" but was reinstated in 1841. He was made Dean of the Faculty of Letters at Strasburg in 1838, and subsequently Director of the College of Juilly. At a still later period he was transferred to Paris, and made Vicar-General of the Metropolitan Diocese. He was also appointed a member of the theological faculty of Paris. His writings include "Philosophie-psychologie Experimentale" (1839); "Philosophie Morale" (1842); "Philosophie du Christianisme" (1835); "La Religion et la Liberte considerees dans leurs Rapports" (1848); "La Morale de l'Evangile comparee aux divers Systemes de Morale" (1855), etc. He died Oct. 18, 1867.

**Bautzen** (Wendish *Budissin*), an important manufacturing town in Saxony, situated on a rising ground overlooking the river Spree, 35 miles W. of Görlitz by rail. It is the chief town of an administrative dis-



trict of the same name, which had a population (1890) of 370,739, including 50,000 Wends, remnants of the old Slavic population of Eastern Germany. The chief buildings are a former cathedral (1497), and the Castle of Ortenburg, dating from 958, and a frequent residence of the Kings of Bohemia. The leading industries are manufactures of woollens, fustian, linen, hosiery, leather, and gunpowder. Pop. (1890). 21,516. Bautzen was first made a town under Otho I. It suffered greatly in the war with Hussites, and still more during the Thirty Years' War. Here Napoleon, after an obstinate resistance, won a barren victory over Russians and Prussians, May 20-21, 1813. Pop. (1905) 29,419.

**Bauxite**, a mineral occurring in round, concretionary disseminated grains; found extensively in France and other parts of Europe, and, in the United States, principally in Alabama and Georgia. The purest bauxite is called aluminum ore, because commercial aluminum is made from it. Beds of this mineral have been discovered in Alabama, Arkansas, and Georgia, and now that aluminum has been introduced rapidly into many of the economic arts, the mining of bauxite bids fair to become the basis for important industries in the Southern States. In Alabama the deposits known as the Cherokee and Calhoun, are near Jacksonville, and are hard on the outcrops, but after being cut into become soft and crumbly. White, gray, and red are the principal colors. An analysis of samples showed 54.68, 55.73, 61.05, 60.15, and 58.25 per cent. of alumina. In Arkansas the ore is found in Saline and Pulaski counties, and in the Little Rock region some veins are estimated to be 20 feet thick. The deposits are red, black, and cream colored, the first two predominating; the red showing 46.44 per cent. of alumina, the black 55.89. In Georgia, the counties of Floyd, Polk, and Bartow, which are adjacent to the Alabama deposits, have been shown by government surveys and Smithsonian Institute reports to be rich in the ore, and experts agree that these counties and Cherokee, Calhoun, and Cleburne counties in Alabama, are almost wholly underlaid with beds, practically inexhaustible. In 1908 the total production in the United States—Georgia, Alabama, and Arkansas—was 52,167 long tons, valued at the mines at \$263,968; and the consumption of aluminum in the same year amounted to 11,152,000 pounds, a decrease in a year of 6,059,000 pounds. The Pittsburg Reduction Company is the sole American producer.

**Bavaria** (German, Baiern; French, Bavière), a kingdom of Central Europe, in the S. of Germany, composed of two isolated portions of unequal size. The larger portion, comprising about seven-eighths of the monarchy, is included between lat. 47° 19'

and 50° 41' N., and lon. 8° 53' and 13° 50' E.; bounded E. by Bohemia and the archduchy of Austria, S. by Tyrol, Vorarlberg, and Lake Constance, W. by Würtemberg, Baden, the grand-duchy of Hesse, and the Prussian province of Hesse-Nassau, N. by the States of Ducal Saxony, the principalities of Reuss, and the kingdom of Saxony. The smaller portion, the Pfalz or Palatinate, lies W. from the main portion of the kingdom, and separated from it by Würtemberg, Baden, and the grand-duchy of Hesse. It is included between lat. 48° 57' and 49° 50' N.; and lon. 7° 6' and 8° 31' E.; and is bounded E. by the Rhine, which separates it from Baden, S. by the German territory of Alsace-Lorraine, W. by the Prussian Rhine provinces and a portion of Saxe-Coburg, and N. by the grand-duchy of Hesse. Bavaria is estimated to contain an area of 29,286 English square miles, and is divided into eight circles (*kreise*), which were formerly named after the rivers that watered them; but an edict of Nov. 29, 1837, gave the circles new names and new boundaries. The following table shows the names of the circles, with their area and population:

| CIRCLES (KREISE).  | Area,<br>sq. m. | Pop. 1905. |
|--|-----------------|------------|
| 1. Oberbaiern (Upper Bavaria) ..                             | 6,456           | 1,414,224  |
| 2. Niederbaiern (Lower Bavaria)                              | 4,152           | 707,367    |
| 3. Pfalz (Palatinate) .....                                  | 2,288           | 885,833    |
| 4. Oberpfalz (Upper Palatinate)<br>and Regensburg (Ratisbon) | 3,728           | 574,693    |
| 5. Oberfranken (Upper Franconia) .....                       | 2,702           | 637,700    |
| 6. Mittelfranken (Middle Franconia) .....                    | 2,925           | 868,846    |
| 7. Unterfranken (Lower Franconia) and Aschaffenburg.         | 3,243           | 682,532    |
| 8. Schwaben (Swabia) and Neuburg .....                       | 3,792           | 753,177    |
| Total .....  | 29,286          | 6,524,372  |

**Mountains.**—Bavaria is a hilly rather than a mountainous country. A large portion, more especially S. of the Danube, is a plateau country of considerable elevation, and indeed, the whole of the main portion of the kingdom may be described as an upland valley, averaging about 1,600 feet above the sea-level, intersected by numerous large streams and ridges of low hills. On all sides it is surrounded by hills of a greater or less altitude, either quite upon the frontier or only at small distances from it. The whole S. frontier is formed by a branch of the Noric Alps, offsets from which project far into the S. plateau of Bavaria. Besides numerous peaks which this range contains, varying from 4,000 to 8,000 feet high, the following may be named as being above the latter number: The Zugspitze, 10,394 feet high; the Watzmann, 9,470 feet; the Hoehvogel, 8,460 feet; the Madeler Gabel, 8,650 feet. Passing along the valley of the Inn and across the Danube, we come to the Bohemian frontier, formed by the Böhmerwald mountains running S. E. to N. W., and lowering down at the valley of the Eger.



## Bavaria

The highest peaks in this range are the Rachel, 5,102 feet, and the Arber, 5,185 feet. Crossing the Eger we meet with the Fichtelgebirge, presenting the Schneeberg, 3,750 feet high, and the Oehsenkopf, 3,633 feet. W. from this range, and along the frontier of the Saxon ducal territories and Hesse-Cassel, run hills of moderate elevation, under various names, Frankenwald, Rhöngebirge, etc., no peaks of which attain an elevation of more than 3,327 feet. The W. mountain boundary of the Bavarian valley is formed N. of the Main by the Spessartwald range, and in the kingdom of Würtemberg by the Alb or Alp. The only noteworthy interior ranges are, in the N. W., the Steigerwald; and in the N. E., running in a S. W. direction from the Fichtelgebirge, the Franconian Jura; a low limestone range, containing numerous remarkable stalactitic caves. The Pfalz or Palatinate is traversed by the N. extremity of the Vosges, the highest peak in this locality being the Königstuhl, 2,162 feet high.

*Lakes.*—The lakes of Bavaria are neither very numerous nor of very great extent, though many of them present exceedingly picturesque scenery. The larger are all situated on the upper part of the S. plateau; the smaller within the range of the Noric Alps. The most remarkable of the former are, Lake Ammer, about 10 miles long by  $2\frac{1}{2}$  broad, 1,736 feet above the sea; Lake Würm or Starnberg, about 12 miles long by 3 broad, 1,899 feet; and Lake Chiem, 9 miles long by 9 to 4 broad, 1,651 feet above the sea. Of the smaller, the more remarkable are Lake Tegner, about 3 miles long, 2,586 feet; Lake Walchen, 2,597; and various others upward of 2,000 feet above the sea-level. Most of the lakes are well supplied with fish.

*Rivers.*—Bavaria belongs wholly to the basins of the Danube and the Rhine, with exception of a very small portion in the N. E. corner, which through the Eger appertains to the basin of the Elbe. The river Danube intersects the main portion of the kingdom W. to E. nearly in the center, and before it enters the Austrian dominions at Passau, where it is still 925 feet above the sea, it receives on its right bank the rivers Iller, Lech, and Isar, which have their sources in the Noric Alps, besides numerous smaller streams; and on its left bank, the Wörnitz, Altmühl, Nab, and Regen, besides other lesser streams. The Main traverses nearly the whole of the N. part of this portion of the kingdom from the E. to W., and is navigable for steam-vessels from Bamberg to the Rhine. Its principal affluents are the Regnitz and the Saale. In the Palatinate there are no streams of any importance, the Rhine being merely a boundary river.

*Climate.*—If we except the valley of the Rhine, and the valley of the Main in lower Franconia, Bavaria, even including the Pa-

## Bavaria

latinate, in comparison with other German States, is a cold country. The average temperature of the year is about 47° F., the same as the E. coast of Scotland. Winter, 30°; spring, 47°; summer, 63°; and autumn, 47°.

*Soil, Vegetation, etc.*—Bavaria is one of the most favored countries in Germany, in respect of the fruitfulness of its soil, due no doubt in a considerable degree to the undulating nature of the country, to the numerous streams by which it is watered, and to being nearly wholly composed of Jura limestone. In the plains and valleys the soil is capable of producing all kinds of crops, but not till lately were the natural advantages of the country turned to good account. Ignorance and idleness opposed a barrier to improvement, which it took the utmost efforts of an enlightened government, aided by the general spread of education, to remove. At length a spirit of agricultural enterprise pervades the kingdom, improved methods of cultivation have been introduced, and large tracts of waste land have been reclaimed and brought under the plow. The principal crops are wheat, rye, barley, and oats; but in some districts rice, spelt, maize, and buckwheat are also raised. To these productions of the soil may be added potatoes (the cultivation of which is yearly increasing), tobacco, and fruit, of which large quantities are grown in the valleys of the Main and the Rhine. In the circles of Mittelfranken and Schwaben-Neuburg, the hop plant is cultivated to a considerable extent, the quantity varying from 30,000 to 40,000 hundred weight per annum; and the vine in the circles of Pfalz and Unterfranken. The latter produces the Franconian wines; the best wines of the former are produced near Deidesheim and Wachenheim. The celebrated Steinwein and Leistenwein are the produce of the S. slope of the Marienberg, near the town of Würzburg. The forests of Bavaria, composed chiefly of fir and pine trees, cover nearly a third of its entire surface, and yield a large revenue to the State; much timber being annually exported, together with potashes, tar, turpentine, and other products peculiar to these wooded regions. The principal mineral products are salt, coal, and iron. Some of the mining works belong to the State, and contribute something to the public revenue; but the minerals are not wrought to the extent they might be. Coal mining gives employment to between 4,500 and 5,000 hands. Black lead is found in several places, and pretty largely manufactured into pencils. Porcelain clay of the finest quality likewise abounds in some localities, the best being obtained in the districts of Wunsiedel in the Upper Main. Lithographic stones should also be mentioned. In the rearing of cattle and sheep the Bavarians are somewhat backward. Swine are reared in great



numbers in all parts of the country, and poultry and wild fowl are abundant. The wolves and bears, with which the forests of Bavaria were at one time infested, are nearly extinct.

*Manufactures.*—The manufactures of Bavaria are singly not very important, being mostly on a small scale, and conducted by individuals of limited capital. The principal articles manufactured are linens, woollens, cottons, silks, leather, paper, glass, earthen and iron and steel ware, jewelry, etc., but the supply of some of these articles is inadequate to the home consumption. Of leather, paper, glass, and ironware, rather large quantities are exported. The optical and mathematical instruments made at Munich are the best on the Continent, and are prized accordingly. But the most important branch of manufacture in Bavaria is the brewing of beer—the universal and favorite beverage of the country. There are upward of 5,000 brewing establishments in the kingdom, which have been calculated to supply on an average about 20 gallons a year to every individual of the population. The beer is neither so strong nor so sweet as Scotch ale; but is of more delicate flavor, and forms a pleasant and wholesome beverage. It is not only consumed in immense quantities in the country, but is sent to all parts of Germany, and even as far as America and India. Spirits are also largely distilled. A large portion of the industrial population maintain themselves by weaving linen, and by the manufacture of articles in wood (some of which are of beautiful workmanship), and by the felling and hewing of timber. Notwithstanding its favorable geographical position, and other natural advantages, the trade of Bavaria is comparatively limited. Among the exports are corn, timber, wine, cattle, leather, glass, hops, fruit, beer, iron and steel wares, machinery, fancy articles, colors, lucifer matches, stoneware, etc. Among the imports are coffee, cacao, tea, cotton, tobacco, drugs, copper, oil, spices, dyestuffs, silk and silk goods, lead, etc.

*Communications.*—From its position Bavaria enjoys a considerable portion of transit trade, much facilitated by the good roads that traverse the country in all directions. The means of communication are now very complete. The Danube, the Rhine, the Main, the Regnitz, etc., afford ample scope for inland navigation, besides the König Ludwig Canal, which connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing direct water communication through the Rhine between the German Ocean and the Black Sea. The railway system (now managed as a part of the imperial system of railways) has been carried out on an extensive scale. The lines are partly State

property, partly private. The number of miles in operation amounts (1899) to 4,062, about 3,000 of this total being State railways the remainder private railways. The amount of debt contracted for railways by Bavaria is £50,000,000, forming over four-fifths of the total debt of the country. The receipts from the railways are now generally sufficient to pay the interest and charges on account of this debt. The State also possesses two canals.

*Education and Art.*—The department of education is under the superintendence of the Superior Board of Education and Ecclesiastical Affairs. A complete system of inspection is established throughout the country; the reports of the inspectors including not only the number and proficiency of the scholars, but also the conduct of the teachers, the state of the buildings, and the nature and extent of the funds available. It is necessary in Bavaria, before admission can be obtained into any higher school, to have passed a satisfactory examination in the lower school. Not only must all candidates for offices under the State pass examinations, but examinations are held of apprentices in trade who wish to become masters, and even of officers in the army on promotion. There are over 8,000 schools in Bavaria, attended by more than 600,000 pupils. Attendance on school is compulsory up to 14 years of age. There are three universities in Bavaria—two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. The University of Munich is attended by about 3,500 students, and has about 170 professors and instructors; that of Würzburg has 80 professors and instructors, and about 1,350 students; and that of Erlangen 67 professors and instructors, and about 1,100 students. There are also several lycea, a number of gymnasia, numerous Latin, normal, and polytechnic schools, besides academies of arts and sciences, fine arts, horticulture, etc. The capital, Munich, contains a library of 800,000 volumes, including 25,000 MSS.; several scientific and literary institutions, academies, and national societies, and extensive collections of works of art.

Bavaria enjoys the honor of having originated a school of painting of a high order of merit, known as the Nuremberg school, founded about the middle of the 16th century by Albert Dürer, a native of that town, whose works are little, if at all, inferior to those of his great Italian contemporaries. Hans Holbein, who excelled Dürer in portrait, though far behind him in historical painting, is claimed by Bavaria, but neither the precise locality nor the date of his birth is known with certainty—Augsburg, Basel, and Grünstadt being severally named as the one, and the dates 1495 and 1498 as the other. To these celebrated



names have been added those of the eminent sculptors Kraft and Vischer, both also Bavarians; the former born about 1435 and the latter about the middle of the same century. The masterpiece of the latter distinguished artist is the bronze shrine of St. Sebaldus in Nuremberg, esteemed a marvel of art for beauty of design and delicacy of workmanship. The most celebrated of Kraft's works is the remarkable tabernacle in stone, affixed against one of the columns of the choir of the church of St. Lawrence, also in Nuremberg. The restoration of Bavarian preëminency in modern times, in connection with the fine arts, is, in a great measure, if not entirely, owing to Louis I., whose love of art and liberal patronage have rendered the capital one of the most celebrated seats of the fine arts in Europe.

*Religion.*—The religion of the State is Roman Catholicism, which embraces more than seven-tenths of the population (in 1895, 4,115,578). The remainder are principally Protestants (1,642,348) and Jews (53,750). The proportion between Catholics and Protestants has scarcely varied during the last three-quarters of a century. All citizens, whatever their creed, are equally admissible to the same public functions and employments, and possess the same civil and political rights. The articles of the concordat concluded with the Pope are subordinate in their application to the fundamental law of the State. By an ordinance of Louis I. females are prohibited from pronouncing any monastic vow until after having passed their 33d year. The dioceses of Bavaria comprise two archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstädt, Passau, Würzburg, and Spire. The salaries are paid by the government. In Bavaria marriage between individuals having no capital cannot take place without the consent of the principal persons appointed to superintend the poor institutions, who, if they grant such liberty where there are no means of supporting the children that may spring from such marriage, render themselves liable for their maintenance. The law is intended to prevent improvident marriages, for which it seems certainly better adapted than for the promotion of morality.

*People.*—In personal appearance the Bavarians are stout and vigorous, well adapted to bear the fatigues of war, and are in general considered as good soldiers. They are accused of being indolent, and somewhat addicted to drinking, but are brave, patriotic, and faithful to their word. Their manners and customs toward the close of the 18th century were described as very coarse, and they were said to be deeply imbued with superstitious bigotry; but, since the more general diffusion of knowledge a great change for the better has taken place. Many

of the peasantry wear long loose snuff-colored coats, lined or edged with pink, and studded in front with silver or white metal buttons, thrown open to display a smart waistcoat of various and brilliant colors; their hats are ornamented with artificial flowers. Many of the Bavarian females are handsome, lively, and graceful. They dress smartly, and display much taste in their attire. Some of them wear black silk handkerchiefs tied tightly round their heads, decorated with flowers or ribbons, some caps of silver or gold tissue, and all having their hair neatly braided. German is the language spoken, with local peculiarities; but they have never been conspicuous for the cultivation of their native tongue.

*Constitution.*—Bavaria was formerly a member of the Germanic Confederation, and now forms part of the German empire. The executive is in the hands of the king. The legislature consists of two chambers—one of senators, and one of deputies; the former composed of princes of the royal family, the great officers of the State, the two archbishops, the heads of certain noble families, a bishop named by the king, the president of the Protestant General Consistory, and any other members whom the king may create hereditary peers; the latter, of members chosen indirectly, one to every 31,500 persons of the total population. The qualifications are that the candidate shall have completed his 30th year, that he shall be a free and independent citizen, that he shall be a member of the Roman or the Reformed Church, and pay direct State taxes. The members are chosen every six years, unless the house is dissolved by the king, and are generally convened once a year, but are bound to assemble at least once every three years. Each of the eight circles or provinces has a provincial government, consisting of two boards, one for the management of the police, schools, etc., and the other for the management of financial affairs. The revenue for the financial year 1896–1897 was 345,356,505 marks or £17,267,825, and the public debt, including railway debt, etc., was 1,332,000,000 marks, or £66,600,000. The army is raised by conscription—every man being liable to serve from January 1 of the year in which he completes his 20th year—and it forms an independent part of the army of the German empire. In time of peace it is under the command of the King of Bavaria, but in time of war it is placed under that of the Emperor of Germany, as commander-in-chief of the whole German army. The period of service is three years in the active force, four in the reserve, and five in the landwehr; and no Bavarian can settle or marry, or accept of any definite appointment, till he has fulfilled his military liabilities. On a peace footing the Bavarian army consists in all of fully 63,000 men



and 2,600 officers; on a war footing, about twice this number.

*History.*—The Bavarians take their name from the Boii, a Celtic tribe who inhabited the districts which, when conquered by the Romans, became the Roman provinces of Vindelicia and Noricum. After the fall of the Western Empire this territory was overrun by various Germanic tribes, who formed themselves into a confederation, like that of the Franks and Marcomanni, and called themselves Boiarii. The confederacy of the Boiarii was made tributary first to the Ostrogoths, and then to the Franks. Finally the sovereignty over them was assumed by Charlemagne, and on the death of that monarch the Kings of the Franks and Germans governed it by their lieutenants, who bore the title of margrave, afterward converted into that of duke, and latterly (1623) into that of elector. In 1070 Bavaria passed into the possession of the family of the Guelphs, and in 1180 it was transferred by imperial grant to Otho, Count of Wittelsbach. On the extinction of the direct line of that family in 1777, the elector palatine, Charles Theodore, added the Palatinate and the duchies of Juliers and Berg to the Bavarian dominions. In 1799 the Duke Maximilian Joseph of Deux-Ponts came into possession of all the Bavarian territories. The peace of Lunéville (Feb. 9, 1801) essentially affected Bavaria. While it lost all its possessions on the left bank of the Rhine, and also the lands of the Palatinate on the right bank, it obtained, on the other hand, by an imperial edict, an indemnification, by which it gained, in addition to the amount lost, a surplus of 2,109 square miles, and 216,000 inhabitants.

In 1805 Bavaria was raised, by the treaty of Presburg, to the rank of a kingdom, with some further accessions of territory, all of which were confirmed by the treaties of 1814 and 1815, by which also a great part of the lands of the Palatinate was restored. In 1848 the conduct of the King of Bavaria, in maintaining an open *liaison* with Lola Montez, had thoroughly alienated the hearts of his subjects, and quickened that desire of political change which had previously existed. The people, early in March, 1848, demanded immediate convocation of the chambers, liberty of the press, public judicial trials; also that electoral reform should be granted, and that the army should take an oath to observe the constitution. The king having refused, tumults occurred, and King Louis announced his resignation of the scepter to his son, Maximilian II., under whom the reforms and modifications of the constitution were carried out. Maximilian died in 1864, and was succeeded by Louis II. In the war of 1866 Bavaria sided with Austria, in consequence of which it was obliged, by the treaty of August 22 in

the same year, to cede a small portion of its territory to Prussia, and to pay a war indemnity of 30,000,000 florins (£2,500,000). Soon after Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein under Prussian regulations. In the Franco-German War of 1870–1871 Bavaria took a prominent part, and since 1871 it has been one of the constituent States of the German empire, represented in the Bundesrath by 6; in the Reichstag by 48 members. In 1886 King Louis II. committed suicide from alienation of mind. His brother Otto succeeded, but he being also insane, his uncle Leopold became regent.

**Bax, Ernest Belfort**, an English socialist; born in Leamington, July 23, 1854; was educated in London and Germany; followed journalism in Germany, as foreign correspondent in 1880–1881; and returning to England, became one of the founders of the English socialist movement. In 1885 he aided in starting the Socialist League. He wrote a large number of works on socialistic and historical subjects.

**Baxter, Richard**, an English Nonconformist preacher and theological writer; born in Shropshire in 1615. He early entered the Church, and, taking sides with the Parliamentary party, became chaplain to one of the regiments of the Commonwealth, though not participating in actual combat, he witnessed most of the bloodshed of the Civil War. It was while so employed that he wrote his first book, the "Saint's Rest." The Restoration and the Act of Conformity drove Baxter into retirement, and shut him out of the pulpit, during which time, and till religious animosity had sufficiently abated to allow him to resume his clerical functions, he wrote his second book, "The Call."

But, either his Republican opinions were still offensively prominent, or his enemies took advantage of his public preaching to denounce him; for, after enduring much persecution, he, then 70 years old, was brought before Judge Jeffreys, who abused him in court, and fined him £500, with imprisonment till paid. Baxter was a prolific writer, a large portion of



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## Baxter

his works being polemical and now little read. His most popular books are the "Saint's Everlasting Rest," "Dying Thoughts," and "Call to the Unconverted." His theological views are set forth in the "Methodus Theologiæ," and "Catholic Theology;" and he has left an account of the principal passages of his life in the "Reliquiæ Baxterianæ." He died Dec. 8, 1691.

**Baxter, Sylvester**, an American journalist, born in Massachusetts, in 1850. Attached to the Boston "Herald," he was prominent in pushing the Metropolitan Park system and advocating a Greater Boston. He has written "The Cruise of a Land Yacht, a Boy's Book of Mexican Travel."

**Baxter, William**, an American clergyman and author, born at Leeds, England, in 1820. President of Arkansas College, Fayetteville; when it was burned in the Civil War, he removed to Cincinnati. He has written "The Loyal West in the Time of the Rebellion," and "Pea Ridge and Prairie Grove, or Scenes and Incidents of the War in Arkansas" (1864). His "War Lyrics," originally published in "Harper's Weekly," were very popular at the time of their publication.

**Bay**, an arm or inlet of the sea extending into the land, with a wider mouth proportionally than a gulf. Compare in this respect the Bay of Biscay with the Gulf of Venice.

In hydraulics: a pond-head raised to keep a store of water for driving a mill.

In architecture: a term used to signify the magnitude of a building. Thus, if a barn consists of a floor and two heads, where they lay corn, they call it a barn of two bays. These bays are from 14 to 20 feet long, and floors from 10 to 12 broad, and usually 20 feet long, which is the breadth of the barn.

**Bay**, a berry, and especially one from some species of the laurel; also the English name of the *laurus nobilis*. A fine tree, with deep green foliage and a profusion of dark purple or black berries. Both of these have a sweet, fragrant odor, and an aromatic, astringent taste. The leaves, the berries, and the oil made from the latter are narcotic and carminative. The leaves were anciently used to form wreaths or garlands with which to encircle the brows of victors. The bay is common in Spain, Italy, Greece, and the Levant. It is common in English gardens, the leaves being often used for flavoring certain dishes. There are several trees called by the same name. The red bay of our Southern States is *laurus carolinien-sis*. The white bay is *magnolia glauca*.

**Bayadere**, a name originally given by the Portuguese to the singing and dancing girls of Hindustan. They are of two kinds — those who are employed as priestesses in the

## Bayard

temples, and those who go about the country as itinerants. The former class celebrate with song and dance the festivals of the gods; the latter are employed by the grandees of India to amuse and cheer them at their banquets.

**Bayamo, or San Salvador**, a town in the interior of the E. part of the island of Cuba, situated in a fertile and healthy district on the northern slope of the Sierra Maestra. It is connected by a railway with Manzanilla.

**Bayard, or more properly Bayart, Pierre du Terrail, Chevalier de**, called the "knight without fear and without reproach"; born in 1476, in the castle of Bayard, near Grenoble, was one of the most spotless characters of the Middle Ages. He was simple and modest; a true friend and tender lover; pious, humane, and magnanimous. The family of Terrail, to which he belonged, was one of the most ancient in Dauphiné, and was celebrated for nobility and valor. Young Bayard, educated under the eyes of his uncle George du Terrail, Bishop of Grenoble, early imbibed those virtues which distinguished him later. At the age of 13 he was received among the pages of the Duke of Savoy, the ally of France. Charles VIII., who saw him at Lyons, struck with the dexterity with which the youth managed his horse, begged him of the duke, and committed him to the care of Paul of Luxemburg, Count de Ligny. The tournaments were his first field of glory.

At the age of 18 he accompanied Charles VIII. to Italy, and distinguished himself greatly in the battle at Verona, where he took a standard. At the beginning of the reign of Louis XII., in a battle near Milan, he pursued the foe with such eagerness that he entered the city with them, and was taken prisoner. Ludovico Sforza returned his arms and his horse, and dismissed him without ransom. In Apulia, Bayard defeated a Spanish corps, and making the leader, Alonzo de Sotomayor, prisoner, treated him generously. Sotomayor, however, broke his parole by flight, and calumniated Bayard, who, according to the custom of that time, challenged, and killed him. Afterward, he defended a bridge over the Garigliano singly, and saved the French army by checking the advance of the Spaniards. For this exploit he received as a coat of arms a porcupine, with the motto, "*Vires agminis unus habet.*" He distinguished himself equally against the Genoese and the Venetians. When Julius II. declared against France, Bayard assisted the Duke of Ferrara. He did not succeed in his plan of taking the Pope prisoner; but he refused with indignation an offer made to betray him. Being severely wounded at the assault of Brescia, he was taken into the house of a nobleman who had fled, leaving his wife and two daughters ex-



## Bayard

posed to the insolence of the soldiers. Bayard protected the family, refused the reward of 2,500 ducats, which they offered to him, and returned, as soon as he was cured, into the camp of Gaston de Foix, before Ravenna. In an engagement that followed shortly after he took two standards from the Spaniards, and pursued the fugitives. Gaston, the hope of France, perished through his neglect of the advice of Bayard. In the retreat from Pavia Bayard was again wounded. He was carried to Grenoble; his life was in danger. "I grieve not for death," he said, "but to die on my bed, like a woman."

In the war beyond the Pyrenees, he showed the same qualities that had distinguished him beyond the Alps. When Henry VIII. of England put to flight the French at Terouane, Bayard by his intrepidity and gallantry won the king's admiration and to a certain extent saved the honor of the French army.

When Francis I. ascended the throne, he sent Bayard into Dauphiné to open for his army a passage over the Alps and through Piedmont. Prosper Colonna lay in wait for him on his march, expecting to surprise him, but Bayard made him prisoner. This brilliant exploit was the prelude to the battle of Marignano, in which Bayard, at the side of the king, performed wonders of bravery, and decided the victory. After this glorious day Francis was knighted with the sword of Bayard. When Charles V. invaded Champagne with a large army, and threatened to penetrate into the heart of France, Bayard defended the weakly fortified town of Mézières against every assault, until the dissensions of the hostile leaders compelled them to retreat. Bayard was saluted in Paris as the savior of his country; the king bestowed on him the Order of St. Michael, and a company of 100 men, which he was to command in his own name—an honor which till then had only been conferred on princes of the blood. Soon afterward Genoa revolted from France; Bayard's presence reduced it to obedience. But after the surrender of Lodi fortune changed, and the French troops were expelled from their conquests. Bonnivet was obliged to retreat through the valley of Aosta; his rear was beaten, and himself severely wounded, when the safety of the army was committed to Bayard. It was necessary to pass the Sesia in the presence of a superior enemy, and Bayard, always the last in retreat, vigorously attacked the Spaniards, when a stone from a blunderbuss struck his right side, and shattered his backbone. The hero fell, exclaiming, "Jesus, my God, I am a dead man!" They hastened toward him. "Place me under yon tree," he said, "that I may see the enemy." For want of a crucifix he kissed the cross of his sword, con-

## Bayazid

fessed to his squire, consoled his servants and his friends, bade farewell to his king and his country, and died April 30, 1524, surrounded by friends and enemies, who all shed tears of admiration and grief. His body, which remained in the hands of his enemies, was embalmed by them, given to the French, and interred in a church of the Minorites, near Grenoble. His monument consists of a simple bust, with a Latin inscription.

**Bayard, Thomas Francis**, an American statesman and diplomatist, born in Wilmington, Del., Oct. 29, 1828. He came of a family which for four successive generations represented the State of Delaware in the United States Senate. The first of his ancestors to settle in that State was Peter, a son of Petrus Bayard, probably a collateral descendant of the celebrated Chevalier Bayard and Anne C. Stuyvesant, the latter a sister of Peter Stuyvesant, the last of the Dutch Governors of New Netherlands. Mr. Bayard's great-grandfather, Richard Bassett, was a member of the convention that framed the Constitution of the United States. Mr. Bayard was admitted to the bar in 1851 and practiced law until 1868, when he succeeded his father, James A. Bayard, in the United States Senate. In the Democratic National Convention of 1872 he received 15 votes for the presidential nomination, and in the convention of 1876, 31 votes, which he turned over to Samuel J. Tilden. In 1880 and again in 1884 his name was voted on in the National conventions of his party. In 1885 he was chosen by President Cleveland as Secretary of State, and on Cleveland's second election, in 1892, he was appointed United States Ambassador to the Court of St. James, being the first to bear that title. Mr. Bayard filled this office with high honor to himself and his country. During his official residence in London he was the recipient of marked attentions, and by his public utterances and his engaging personality promoted the best feeling in both social and government circles. He died in Dedham, Mass., Sept. 28, 1898.

**Bayazid**, or **Bayezed**, a town of Turkish Armenia, in the province of Erzerum; on one of the spurs of Ala Dagh, about 15 miles to the S. W. of the foot of Mt. Ararat. Prior to 1829 its population was upward of 15,000, and it had a brisk trade; but afterward the dread of Russian encroachments drove away most of its Armenian inhabitants, and the population is now but 5,000, mostly Kurds. Bayazid has repeatedly been the scene of conflict. Here the Russians defeated a Turkish army in 1854. In 1877 it was seized by the Russians, but was restored by the Berlin Congress of 1878.

**Bayazid.** See BAJAZET.



## Bay City

**Bay City**, city and county-seat of Bay co., Mich.; on the Saginaw river and several railroads; 13 miles N. of Saginaw. It is noted for its large steel ship-building plants and its extensive trade in lumber, coal, and manufactured products. The city is the farming, lumbering and mining trade and wholesale center for Northern Michigan; has 2 National banks, a number of imposing public buildings, including the United States Government Building, City Hall, Masonic Temple, and the First Presbyterian Church; an assessed property valuation exceeding \$10,000,000, and a total debt of about \$700,000. According to the census of 1890 there were 331 manufacturing establishments, employing \$9,654,415 capital and 4,696 persons; paying \$2,006,052 for wages and \$5,043,587 for materials; and having a combined output valued at \$9,069,342. Bay City and West Bay City long had many trade, manufacturing, and financial interests in common. They practically formed one city, and in 1905 they were consolidated. Pop. (1910) 45,166.

**Bayer, Johann**, a German constructor of charts of the stars, born in 1572, at Rhain, in Bavaria. His zeal for the Protestant Church was so conspicuous that he was commonly called *Os Protestantium* ("the Mouth of the Protestants"). His contributions to astronomy are contained in his "Uranometria" (1603), in which he gave 51 maps of the heavens, constructed from the observations of his predecessors, and followed by explanations in his "Explicatio" (1654). He died at Augsburg in 1625.

**Bayer, Karl Robert Emerich von.** See BYR, ROBERT.

**Bayern.** See BAVARIA.

**Bayeux** (bī-ě'), an ancient city of Normandy, in the French Department Calvados, on the Aure, 15 miles N. W. of Caen. Many of the houses are built of wood, and the streets have a forlorn and decayed appearance. The Gothic cathedral—the oldest it is said, in Normandy—was rebuilt after a fire by William the Conqueror, in 1077; but the present edifice dates mainly from 1106 to the 13th century. The W. front, with its two 12th century steeples, and the three sculptured porches, are notable features. Porcelain and lace are manufactured.

**Bayeux Tapestry**, a celebrated roll of linen cloth or canvas, 214 feet in length and 20 inches wide, containing, in 72 distinct compartments, a representation, in embroidery, of the events of the Norman invasion of England, from Harold's leave-taking of Edward the Confessor, on his departure for Normandy, to the battle of Hastings. It contains the figures of 623 men, 202 horses, 55 dogs, 505 animals of various kinds not hitherto enumerated, 37 buildings, 41 ships and boats, and 49 trees—in all 1,512 fig-

## Bayfield

ures. These are all executed by the needle, and are believed to have been the handiwork of Matilda, the queen of William the Conqueror, and by her presented to the Cathedral of Bayeux. Montfaucon caused re-



BAYEUX TAPESTRY — HAROLD ANCHORING ON THE COAST OF NORMANDY.

searches to be made that ended in the discovery of the tapestry in 1728; it narrowly escaped destruction during the frenzy of the first French Revolution, and Napoleon I. had it conveyed to Paris in 1803, where it was kept some time and exhibited. This piece



BAYEUX TAPESTRY — THE CROWN OFFERED TO HAROLD.

of tapestry is exceedingly valuable, both as a work of art of the period referred to, and as correctly representing the costume of the time. It has been engraved, and several works upon the subject have been published.

**Bayfield, Matthew Albert**, an English clergyman, born in Edgbaston, June 17, 1852; educated at the King Edward's School, in Birmingham, and at Clare College, Cambridge; was assistant master in the Blackheath School, in 1875-1879, and in Marlborough College in 1879-1881; headmaster's assistant in Malvern College, in 1881-1890; Headmaster of Christ College, Brecon, in 1890-1895, and Headmaster of Eastbourne College, in 1900. He was the editor of "Ion, Alcestis and Medea." His works



include "Septem contra Thebas" (with Dr. Verrall); "Iliad" (with Dr. Leaf); "Latin Prose for Lower Forms," etc.

**Bay Islands**, a small group in the Bay of Honduras, 150 miles S. E. of Balize. The cluster was proclaimed a British colony in 1852, but in 1859 they were ceded to the Republic of Honduras. The chief of the six islands are Roatan (30 by 9 miles; 900 feet high), and Guanaja, whence, in 1492, Columbus first sighted the mainland of America.

**Bay Lake**, a body of water in the northern part of Luzon, Philippine Islands. This lake is connected with Manila Bay by the Pasig river, and from its center rises a high volcanic island. Bay Lake is about 20 miles in extent from N. to S., and about 47 miles from E. to W. In 1899 it was made a naval headquarters for the gunboat fleet and small craft of the United States in Philippine waters.

**Bayle** (bāl), **Pierre**, a French critic and writer, the son of a Calvinist preacher, born at Carlat (Languedoc) in 1647; studied at Toulouse, and was employed for some time as a private tutor at Geneva and Rouen. He went to Paris in 1674, and soon after was appointed Professor of Philosophy at Sedan. Six years after he removed to Rotterdam, where he filled a similar chair.



PIERRE BAYLE.

The appearance of a comet, in 1680, which occasioned an almost universal alarm, induced him to publish, in 1682, his "Pensées Diverses sur la Comète," a work full of learning, in which he discussed various subjects of metaphysics, morals, theology, history and politics. It was followed by his "Critique Générale de l'Histoire du Calvinisme de Maimbourg." This work excited the jealousy of his colleague, the theologian Jurieu, and involved Bayle in many disputes. In 1684 he undertook a periodical work, "Nouvelles de la République des Lettres," containing notices of new books in theology, philosophy, history, and general literature. This publication, which lasted for three years, added much to his reputation as a philosophical critic. In 1693 Jurieu succeeded in inducing the magistrates of Rotterdam to remove Bayle from his office. He now devoted all his attention

to the composition of his "Dictionnaire Historique et Critique," which he first published in 1696, in two volumes folio. This work, much enlarged, has passed through many editions. It is a vast storehouse of facts, discussions and opinions, and though it was publicly censured by the Rotterdam consistory for its frequent impurities, its pervading scepticism, and tacit atheism, it long remained a favorite book both with literary men and with men of the world. The articles in his dictionary, in themselves, are generally of little value, and serve only as a pretext for the notes, in which the author displays, at the same time, his learning and the power of his logic. The best editions are that of 1740, in four volumes folio (Amsterdam and Leyden), and that in 16 volumes, published in 1820-1824, at Paris. He died in Rotterdam, in 1706.

**Baylen**, or **Bailen**, a town of Spain, Province of Jaen, at the foot of the Sierra Morena, 22 miles N. of Jaen. It commands the road leading from Castile into Andalusia, and derives its celebrity from the events which took place in its vicinity leading to the "Capitulation of Baylen," signed July 20, 1808, when General Dupont, and about 20,000 French troops under his command, surrendered to the Spaniards on condition of their being conveyed to France by the Spanish government; but the latter stipulation was not carried into effect. The incapacity of Dupont was mainly instrumental in bringing about this result, which inspired the Spaniards with confidence, and was always regarded by Napoleon as the principal source of the French disasters in the Peninsula.

**Bayley**, **James Roosevelt**, an American theologian, born in New York city, Aug 23, 1814; studied at Trinity College, Hartford, and became minister of the Protestant Episcopal Church; but, in 1842, was converted to the Roman Catholic faith; and, after studying at Paris and Rome, became a priest in 1844. He accepted the Chair of Belles-Lettres at St. John's College, Fordham, and was its Acting President in 1846. After serving as secretary to Archbishop Hughes, he was consecrated the first Bishop of Newark, N. J., in 1853. In 1872 he became Archbishop of Baltimore, Md. He was the founder of Seton Hall College and several other institutions. His "Pastorals for the People," and "History of the Catholic Church on the Island of New York," are his chief writings. He died in Newark, N. J., Oct. 3, 1877.

**Bayley**, **William Shirley**, an American geologist, born in Baltimore, Md., Nov. 10, 1861, graduated at Johns Hopkins, in 1883; since 1887 has been Assistant Geologist of the Lake Superior division of the United States Geological Survey, and since 1886 as-



## Bayliss

sociate editor of the "American Naturalist;" reviewer on "Neues Jahrbuch für Mineralogie," etc. (Berlin). He is the author (with Prof. C. R. Van Hise) of the "Report on the Geology of the Marquette Iron District of Michigan," and has been a frequent contributor to scientific journals.

**Bayliss, Sir Wyke**, an English artist; born in Madeley, Oct. 21, 1835; educated by his father and at the Royal Academy. He was president of the Royal Society of British Artists, 1888-1906. His paintings include "La Sainte Chapelle" (1865); "St. Mark's, Venice" (1880); "St. Peter's, Rome" (1888); "The Golden Duomo, Pisa" (1892), etc. He died April 5, 1906.

**Baylor University**, a Baptist educational institution at Waco, Tex. It was chartered in 1845, named in honor of R. E. B. Baylor (a judge of the district and supreme courts under the Republic, and a district judge of the State of Texas), and located at Independence. In 1866 a female department was chartered under a separate management, named Baylor Female College, and in 1886 located at Belton, Tex. Soon after the organization of the Baptist State Convention in 1848, Baylor University passed to its control. In 1886 Baylor University and Waco University (chartered in 1861, under the control of the Baptist General Association) were consolidated as Baylor University at Waco; the two governing bodies were consolidated as the Baptist General Convention of Texas. R. C. Burleson, president of Waco University, became president of Baylor. The school, though sectarian, is broad in its policy. In 1904 a medical department was founded and located at Dallas, and in 1905 the Baylor Theological Seminary was opened in connection with the university. The university has grounds and buildings valued at over \$656,000; scientific apparatus, about \$72,000; endowment, \$120,000; faculty, about 70; students, over 1,300; graduates, over 1,350.

**Bayly, Ada Ellen**, an English novelist, best known as EDNA LYALL, born at Brighton. She published "Won by Waiting" (1879); "Donovan" (1882); "We Two" (1884); "In the Golden Days" (1885); "Knight Errant" (1887); "Autobiography of a Slander" (1887); "Derrick Vaughan, Novelist" (1889); "A Hardy Norseman" (1889); "Doreen" (1894); "How the Children Raised the Wind" (1895); "Autobiography of a Truth" (1896); "Wayfaring Men" (1897); "Hope the Hermit" (1898); "In Spite of All" (1901), etc. Although her novels are romantic, their aim is to depict the development of character. She died Feb. 9, 1903.

**Bayly, Thomas Haynes**, an English song-writer and author; born in Bath, Oct. 13, 1797. After deserting successively both law and church, Bayly, during a short so-

## Bayonet

journal in Dublin, first discovered his powers as a ballad writer and achieved his earliest successes. In 1824 he settled in London, and his "I'd Be a Butterfly" was quickly followed by "The Soldier's Tear"; "We Met—'Twas in a Crowd"; "She Wore a Wreath of Roses"; "Oh, No, We Never Mention Her," and many others, familiar wherever the English language is spoken. Bayly also wrote a novel, "The Aylmers," several volumes of verse, some tales, and numerous dramatic pieces, the best of which was "Perfection," a clever little comedy, produced by Madame Vestris, and once very popular. He died April 22, 1839.

**Baynes, Thomas Spencer**, an English editor, born in Wellington, Somerset, in 1823. He studied under Sir William Hamilton at Edinburgh and acted as his class assistant from 1851 to 1855. From 1857 to 1863 he was resident in London, where he acted as examiner in logic and mental philosophy in the University of London, and as assistant editor on the "Daily News." In 1864 he was appointed to the chair of logic, rhetoric, and metaphysics in St. Andrews University, a post he held till his death. In 1873, when he became editor of the 9th edition of the "Encyclopædia Britannica," his wide acquaintance with men of letters and learning assisted him greatly in the selection of suitable contributors. He translated the "Port Royal Logic," and was a frequent contributor to the principal reviews and literary journals. He died in London in 1887.

**Bay of Islands**, a large, deep, and safe harbor on the N. E. coast of the North Island of New Zealand. On it is Kororarika, the first European settlement in New Zealand. Also a large bay formed by the Gulf of St. Lawrence, on the W. coast of Newfoundland.

**Bayonet**, a straight, sharp-pointed weapon, generally triangular, intended to be fixed upon the muzzle of a rifle or musket, which is thus transformed into a thrusting weapon. It was probably invented about 1640, in Bayonne (though this is doubtful), but was not universally introduced until after the pike was wholly laid aside, in the beginning of the 18th century. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted, as formerly, in the inside. A variety of the bayonet, called the sword bayonet, is now quite widely used in European armies, especially for the short rifles of the light infantry, the carbines of the artillery, etc. It is a compound of the sword and the bayonet, as its name indicates, having a sword-like blade with only one edge, and being capable of being fastened to the muzzle of the gun like the bayonet.



## Bayonne

**Bayonne**, a city in Hudson Co., N. J., on New York harbor, the Kill von Kull, and Newark bay, and the Central Railroad of New Jersey; 7 miles S. W. of New York city. The city is also on the grand Hudson County Boulevard and the Morris canal. It was formed by the union of a number of former villages (Pamrapo, Bayonne, Centerville and Bergen Point), and is principally engaged in coal shipping and the exporting and refining of petroleum, the works for the latter being connected by pipe lines with New York, Philadelphia, Baltimore, and other cities. Other industries are the manufacture of chemicals, ammonia and colors. The residential part of the city is very attractive, containing fine homes of New York business men, and having trolley connection with Jersey City, Newark, and the Oranges. The assessed property valuation exceeds \$13,000,000, and the total debt is less than \$2,000,000. Pop. (1900) 32,722; (1910) 55,545.

**Bayonne**, a strongly fortified seaport of France, in the Department of Basses-Pyrénées, capital of an *arrondissement*; at the confluence of the Neve with the Adour, and 58 miles W. N. W. of Pau. It is a first class fortress; the citadel, one of the finest works of Vauban, commands the town and harbor; and the fortifications have been still further augmented and strengthened. It is a well built town, with superb quays and promenades. A mint is established here. Chocolate, liqueurs, glass, sugar, etc., are manufactured. There are also extensive yards for the building of ships of war and merchant vessels. The hams of Bayonne have long enjoyed a high celebrity. The military weapon called the bayonet takes its name from this city, where it is said to have been first invented and brought into use during the siege of 1523. Though often besieged, Bayonne has never been taken; and hence its motto, "*Nunquam Polluta*." It was invested by the British Feb. 24, 1814, who sustained considerable loss from a *sortie* made by the garrison. Pop. (1901) 27,601.

**Bayonne Conference**, a conference held at Bayonne, in June, 1565, between Charles IX. of France, the queen mother, Catherine de Medicis, Elizabeth, Queen of Spain, and the Duke of Alva, envoy of Philip II., to arrange plans for the repression of the Huguenots. It is generally believed that the massacre of St. Bartholomew's Day was determined upon at this meeting.

**Bayonne, Treaty of**, a treaty of peace agreed to May 4, 1808, and signed on the next day, between Napoleon I. and Charles IV., King of Spain. The latter resigned his kingdom, and Napoleon I. engaged to maintain its integrity, and to preserve the Roman Catholic religion. His son, Ferdinand VII., confirmed the cession May 10.

## Bazaine

**Bayreuth**. See BAIREUTH.

**Bayrholder, Karl Theodore**, a German Hegelian philosopher, and radical politician, born in Marburg in 1812, was Professor of Philosophy there, taking the chair in 1845. In 1846 his radical views caused his expulsion. During the brief rule of liberalism in Hesse, he was chosen president of the Chamber; but, in 1853, he was forced to flee to the United States. Among other works he wrote "On Catholicism in Germany," "Idea and History of Philosophy," "Fundamental Problems of Metaphysics," etc. He died in Jordan, Wis., Feb. 3, 1888.

**Bay Rum**, an aromatic, spirituous liquid, used by hair dressers and perfumers, prepared in the West Indies by distilling rum in which bay leaves have been steeped. As imported it is almost colorless, and contains 86 per cent. of proof spirit. It is difficult to obtain genuine bay rum, except directly from the importer, more than one-half of that consumed in the United States being an artificial mixture of oil of bay, alcohol, and water.

**Bay Salt**, a general term for coarse grained salt, but properly applied to salt obtained by spontaneous or natural evaporation of sea water in large shallow tanks or bays.

**Bay Window**, a window projecting beyond the line of the front of a house, generally either in a semi-hexagon or semi-octagon. Strictly speaking, a bay-window rises from the ground or basement, while an oriel is supported on a corbel or brackets, and a bow window is always a segment of an arch; but in ordinary use these distinctions are seldom accurately observed, all three words being used as synonymous.

**Baza** (bä'tha), an old town of Spain, Andalusia, Province of Granada, formerly a large and flourishing city. In 1810 the French, under Marshal Soult, here defeated the Spaniards under Generals Blake and Freire.

**Bazaine, François Achille** (ba-zān), a French military officer, born in Versailles, Feb. 13, 1811. He served in Algeria, in Spain against the Carlists, in the Crimean War, and joined the Mexican expedition as general of division, in 1862, and, in 1864, was made a marshal of France. He commanded the 3d Army Corps in the Franco-Prussian War, when he capitulated at Metz, after a seven weeks' siege, with an army of 175,000 men. For this act he was tried by court-martial in 1871, found guilty of treason and condemned to death. This sentence was commuted to 20 years' seclusion in the Isle St. Marguerite, from which he escaped and retired to Spain. He died in Madrid, Sept. 23, 1888. His widow, who had clung faithfully to him in his adversity



## Bazán

and had plotted successfully for his escape, died in Mexico City, Jan. 8, 1900. She was a woman of aristocratic birth and much beauty.

**Bazán, Emilia Pardo** (bä-thän'), a Spanish novelist, born in Coruña, in 1852; published works on history and philosophy, and



EMILIA PARDO BAZÁN.

was the author of "Studies in Darwinism," "Saint Francis of Assisi," and many novels. These, translated into English, have become very popular, and include "A Christian Woman" (New York and London, 1891);

"Homesickness" (1891); "The Swan of Vilamorta" (1891), and "The Wedding Trip" (1891).

**Bazar**, an exchange; a market place: a place where goods are exposed to sale. Bazar is a term originally derived from the Arabic, and literally signifies the sale or exchange of goods. Among the Turks and Persians it is exclusively applied to a market place, whether open or covered, where goods are sold, and where merchants meet for the transaction of business. The bazar of Taurus (or Tabriz) in Persia, is the most extensive in the world, and that of Khan Khalil, at Cairo, which occupies the site of the tombs of the caliphs, contains some valuable records. It was built in 1292. The bazar at Ispahan is, perhaps, the most magnificent one in the East. Adrianople and Constantinople have each large bazars. The last mentioned was built in 1462. The name has of late years been adopted in many European and American cities, and is applied to places for the sale of fancy goods, etc.

**Bazard, Saint-Amand** (bä-zär'), a French Socialist, born in Paris in 1791. After the Restoration, he helped to found the revolutionary society of the "Amis de la Vérité," and in 1820 an association of French Carbonari. In 1825, Bazard, impressed with the necessity of a total reconstruction of society, attached himself to the school of Saint-Simon, and became one of the editors of a journal termed "Le Producteur." In 1828 he delivered at Paris a series of lectures, the substance of which was published in the "Exposition de la Doctrine de Saint-Simon" (2 vols., 1828-1830), of which the first part was by Bazard, the second being

## Bdellium

chiefly the composition of Enfantin. He and Enfantin became the acknowledged leaders of the school. After the July revolution (1830), a larger scope was afforded to the Saint-Simonians. The masses were attracted by the doctrine that all social institutions ought to have for their end the moral, intellectual, and physical amelioration of the poor. In a short time, Bazard and his friends had created a new society, living in the midst of the old, with peculiar laws, manners, and doctrines. But Bazard's connection with it was of short duration. He differed from Enfantin on the doctrine of the emancipation of women, and in 1831 seceded in disgust. His efforts to found a school of his own proved unsuccessful, and, during a heated discussion with his former friend, Enfantin, he was struck with apoplexy, from the effects of which he died, July 29, 1832.

**Bazigars**, a tribe of Indians dispersed throughout the whole of Hindustan, mostly in wandering tribes. They are divided into seven castes; their chief occupation is that of jugglers, acrobats, and tumblers, in which both males and females are equally skilful. They present many features analogous to the gypsies of Europe.

**Bazoche** (ba-zōsh'), or **Basoche** (a corruption of Basilica), a brotherhood formed by the clerks of the Parliament of Paris at the time it ceased to be the Grand Council of the French King. They had a king, chancellor, and other dignitaries; and certain privileges were granted them by Philip the Fair early in the 14th century, as also by subsequent monarchs. They had an annual festival, having as a principal feature dramatic performances in which satirical allusions were freely made to passing events. The representation of these farces or satires was frequently interdicted, but their development had a considerable effect on the dramatic literature of France.

**Baztau** (bas-tō'), or **Bastau**, a Pyrenean valley in the extreme N. of Spain; having a length of 9 miles, and an average breadth of 4 miles. It is inhabited by about 8,000 people, who form, under Spanish supervision, a sort of diminutive republic, at the head of which is the mayor of Elizondo. The citizens of this republic rank with the Spanish nobility and hold special privileges, which were granted them for former services to the Spanish crown.

**Bdellium**, in Scripture, is in Hebrew *bedholachh*, rendered in the Septuagint of Gen. ii: 12, anthrax (literally, burning coal) = \* \* \* the carbuncle, ruby, and garnet (Liddell and Scott), the red sapphire (Dana): while in Numb. xi: 7, it is translated *krystallos* = \* \* \* rock crystal. Some modern writers, following the Septuagint translation, make it a mineral, as are the gold and the onyx stone, with which



## Beach

it is associated in Gen. ii: 12. Others think that it was the gum described below; while the Rabbins, Bochart, and Gesenius consider that it was a pearl, or pearls.

In botany and commerce, Indian bdellium, or false myrrh, is a gum resin produced by *balsamodendron roxburghii*, or *amyris bdellium*. It appears in light colored pellicles in the bark of the tree, which peel off from time to time; they diffuse for some distance around a fragrance of a delightful kind, but not equal to that of myrrh. It was formerly used in plasters.

The bdellium of the Persian Gulf is a gum resin derived from *balsamodendron mukul*.

African bdellium is the name of two gum resins; the one from *balsamodendron africanum*, which grows in Abyssinia and Western Africa; the other from a composite plant, *ceradia furcata*.

Sicilian bdellium is a gum resin, produced by a species of carrot, *daucus hispanicus* (De Candolle), *D. gummiifer* (Lamarek), or by *D. gingidium* (Linnaeus.).

**Beach, Alfred Ely**, an American publisher and inventor, born in Springfield, Mass., in 1826; son of Moses Yale Beach, editor of the old New York "Sun." In 1846 he established the "Scientific American," in connection with Orson D. Munn. For nearly 50 years he was editor of this paper and director of its patent business. In 1852 he perfected a typewriting machine, for which the American Institute awarded him a gold medal. Later he invented a system of carrying letters from street lamp posts to the central office by means of underground pneumatic tubes. In 1867 he exhibited a working model of a section of a pneumatic elevated railway at the American Institute. He also invented a hydraulic shield, by the use of which a tunnel could be excavated without interfering with surface traffic. He died in New York city, Jan. 1, 1896.

**Beach, Amy Marcy**, an American composer, born in Henniker, N. H., Sept. 5, 1867; studied music from childhood, and made her first appearance in public as a pianist at the Boston Music Hall, when 16 years old. She has composed a mass, a symphony, cantatas, anthems, songs, and compositions for various musical instruments and full orchestras.

**Beaches, Raised**, a term applied to those long, terraced, level pieces of land, consisting of sand and gravel, and containing marine shells, now, it may be, a considerable distance above and away from the sea, but bearing sufficient evidences of having been at one time sea beaches. In Scotland, such a terrace has been traced extensively along the coasts at about 25 feet above the present sea level.

**Beachy Head**, a promontory in the S. of England, on the coast of Sussex, rising

## Beaconsfield

575 feet above sea level, with a revolving light, visible in clear weather from a distance of 28 miles. A naval battle took place here, June 30, 1690, in which a French fleet under Tourville defeated an English and Dutch combined fleet under Lord Torrington.

**Beaconsfield, Benjamin Disraeli, Earl of**, an English statesman and author; born in London, England, Dec. 21, 1804; the eldest son of Isaac D'Israeli, the well-known author of the "Curiosities of Literature"; his mother also being of Jewish race. Little is known of his early education, though it is certain he never attended a public school or a university. In 1817 he was baptized into the Church of England. While yet a boy he was apprenticed to a firm of attorneys, but he did not long remain in this uncongenial occupation. His father's position gained him an easy entrance into society, and before he was 20 he was a frequenter of such salons as those of Lady Blessington. In 1826 he published "Vivian Grey," his first novel, which was very popular, and displays remarkable cleverness and knowledge of the world. He now traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterward reproduced in his books. In 1831 another novel, "The Young Duke," came from his pen. It was followed at short intervals by "Contarini Fleming," "Alroy," "Henrietta Temple," "Venetia," "The Revolutionary Epic" (a poem), etc.

His father having acquired a residence near High Wycombe in Buckinghamshire, he attempted to get elected to Parliament from this borough in 1832. He came forward as a Radical or "people's" candidate as against the Whigs, and he was supported by the Tories, but was defeated. On this occasion he was recommended to the constituency by Hume and O'Connell. At the general election after the passing of the Reform Bill he again unsuccessfully contested High Wycombe, and the like ill fortune attended him on another attempt in 1835, as also at Taunton the same year. On the latter occasion he appeared in the character of a decided Tory, and his change of political opinions naturally occasioned a good deal of comment. To this period belongs the noted passage of arms between him and O'Connell, which was signalized by a strength of language happily rare between public men in these days. At last, however, he gained an entrance to the House of Commons, being elected for Maidstone in 1837. His first speech in the house was treated with ridicule; he had to stop abruptly and sit down; but he finished with the prophetic declaration that the time would come when they would hear him. In 1839 he married the widow of his colleague in the representation of Maidstone, a lady 15 years older than himself. At the general



## Beaconsfield

election of 1841 he was sent to Parliament by Shrewsbury. He had now gained some reputation in Parliament, and he was for some years an enthusiastic supporter of Sir Robert Peel.

About this time he became a leader of what was known as the "Young England" party, the most prominent characteristic of which was a sort of sentimental advocacy of feudalism. This spirit showed itself in his two novels of "Coningsby, or The New Generation," and "Sybil, or The New Nation," published respectively in 1844 and 1845. For some years previous to the downfall of Sir Robert Peel in 1846 he was most persistent and bitter in his hostility to this statesman, whom he had so recently supported, being the advocate of protection against the free-trade policy of Sir Robert. His clever speeches of this period greatly increased his reputation, and by 1847 he was recognized as one of the leaders of the Tory party. Having acquired the manor of Hughenden in Buckinghamshire, he was in the above year elected for this county, and he retained his seat till raised to the peerage nearly 30 years later. In 1847 was published his novel of "Tancred, or the New Crusade," a somewhat extravagant production containing enigmatic allusions to the great "Asian mystery."

His first appointment to office was in 1852, when he became chancellor of the exchequer under Lord Derby. The following year, however, the ministry was defeated, and Mr. Disraeli again became leader of a Conservative opposition. He remained out of office till 1858, when he again became chancellor of the exchequer with Lord Derby as his chief. As on the former occasion his tenure of office was but short, a reform bill which he had introduced causing the defeat of the government and their resignation after an appeal to the country. During the next six years, while the Palmerston government was in office, Mr. Disraeli led the opposition in the lower house with conspicuous ability and courage. He spoke vigorously against the Reform Bill brought forward in 1866 by the Russell-Gladstone ministry; but when, soon after, he came into power along with his chief Lord Derby, the demand for reform was so urgent that he had to bring in a reform bill himself. Accordingly in August, 1867, a measure by which the parliamentary representation was reformed became law, being piloted through Parliament by Mr. Disraeli with remarkable tact and dexterity. In February, 1868, he reached the summit of his ambition, becoming premier on the resignation of Lord Derby, but being in a minority after the general election he had to give up office the following December. In 1874 he again became prime minister with a strong Conservative majority, and he remained in power for six years. This period was

## Beagle Island

marked by his elevation to the peerage in 1876 as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern question and the conclusion of the treaty of Berlin in 1878, when he visited the German capital.

In the spring of 1880 Parliament was rather suddenly dissolved, and the new Parliament showing an overwhelming Liberal majority, he resigned office, though he still retained the leadership of his party. Not long after this, the publication of a novel called "Endymion" (his last, "Lothair," had been published 10 years before) showed that his intellect was still vigorous. His physical powers, however, were now giving way, and he died April 19, 1881, after an illness of some weeks' duration. His wife had died in 1872 after having been created Viscountess Beaconsfield. Among others of his writings besides those already mentioned are: "A Vindication of the English Constitution" (1834), "Alarcos, a Tragedy" (1839), and "Lord George Bentinck, a Political Biography" (1852). Lord Beaconsfield was one of the most remarkable men of the 19th century; endowed with great intellectual power, he had astonishing tenacity of purpose, and showed remarkable tact and ability in managing men. As a parliamentary speaker and debater he had few rivals, and in wit, sarcasm, epigram, and other rhetorical devices he was a master. His novels are open to criticism on many grounds. Their popularity has been largely owing to their author having so frequently introduced real persons into them under a more or less penetrable disguise, and presented them in a more or less favorable light.

**Bead Snake**, a beautiful little snake (*Elaps fulvius*), variegated with yellow, carmine, and jet black. It belongs to the family *Elapidae*, of the colubrine sub-order of snakes. Though venomous, it rarely uses its fangs. It is about two feet long.

**Beagle**, a small hunting dog, a sub-variety of *canis gallicus venatorius* = the hunting hound. It was formerly much used for hunting hares, which it pursued slowly, but surely to their fate. There are several sub-varieties: (1) the Southern, smaller and shorter, but at the same time thicker than the deep-mouthed hound; (2) the Northern, or cat beagle, smaller and finer in form, and a more untiring runner; (3) a cross between these two; and (4) a dwarf variety used for hunting rabbits or young hares. Queen Elizabeth had little "singing beagles" so small that they could be placed in a man's glove. Hamilton Smith thinks the beagle the same with the brachet of the Middle Ages, and the agasseus of Oppian.

**Beagle Island**, an island discovered by Admiral Fitzroy, during a voyage in the



"Beagle," to survey Patagonia, in 1828-1834. The channel of the same name is on the S. side of the Island of Tierra del Fuego.

**Beal, George Lafayette**, an American military officer, born in Norway, Me., May 21, 1825. When the Civil War broke out, he was captain of the Norway Light Infantry, and with this company was mustered into the 1st Maine Regiment for the three months' campaign. At the end of this service, he was commissioned Colonel of the 19th Maine Infantry, which took part in the battles of Cedar Mountain and Antietam and covered the retreat of General Banks from Winchester to Williamsport, Va. He was mustered out with his regiment in May, 1863; volunteered again; was made Colonel of the 29th Maine, and promoted to Brigadier-General of Volunteers, Nov. 30, 1864, for his services in the Red River campaign. On Jan. 15, 1866, he was mustered out of service with the brevet of Major-General of Volunteers. In 1880-1885 he was adjutant-general of Maine, and in 1888-1894, State treasurer. He died in Norway, Me., Dec. 11, 1896.

**Beal, William James**, an American botanist, born in Adrian, Mich., March 11, 1833; graduated at the University of Michigan, in 1859; taught in various institutions from 1859 till 1870; since 1870 has been Professor of Botany in the Michigan Agricultural College. He is a Fellow of the American Society for the Advancement of Science, and was President of the Natural History section of this society in 1883; first President of the Association of Botanists of the United States Experimental Stations in 1888, etc. His works include "Grasses of North America" (2 vols.); "The New Botany," "Plant Dispersal," etc.

**Beale, Dorothea**, an English teacher, born in London, in 1831; became Mathematical Tutor in Queen's College in 1850, and later, Latin Tutor in the school; head teacher in the Clergy School, in Casterton, in 1857; and Principal of Cheltenham Ladies' College, in 1858. Her publications include "Text-Book of English and General History;" "Chronological Maps;" "Report on Girls' Education Commission of 1864"; "Work and Play in Girls' Schools." In 1880 she became editor of the "Ladies' College Magazine."

**Beale, Edward Fitzgerald**, an American diplomatist, born in Washington, D. C., Feb. 4, 1822; graduated at the United States Naval Academy in 1842, and at the beginning of the Mexican War was assigned to duty in California, under Commodore Stockton. After the war, he resigned his naval commission and was appointed Superintendent of Indian Affairs for California and New Mexico. He was commissioned a Brigadier-General in the army by President

Pierce. He served in the Union army in the Civil War, and at its close engaged in stock raising in Los Angeles, Cal., till 1876, when President Grant appointed him United States Minister to Austria. He died in Washington, D. C., April 22, 1893.

**Beale, Lionel Smith**, an English physiologist and microscopist, born in London, Feb. 5, 1828; was educated at King's College, London, where he was subsequently made Professor of the Principles and Practice of Medicine. In 1859 he became a Fellow of the Royal College of Physicians. He has contributed to the "Lancet," "Microscopical Journal," and other periodicals, and is author of "How to Work with a Microscope" (1858); "Life Theories and Their Influence upon Religious Thought" (1871); "Our Morality and the Moral Question" (1887); "On Slight Ailments," "Vitality: an Appeal, an Apology, and a Challenge," "Replies to Objections and a Further Appeal," etc. He is a member of the Royal Medical and Chirurgical, the Microscopical, and other English and foreign societies.

**Beall, John Young**, a Confederate guerilla, born in Virginia, Jan. 1, 1835; was appointed an acting master in the Confederate naval service in 1863. On Sept. 19, 1864, he and a number of followers were shipped on the Lake Erie steamer "Philo Parsons" as passengers, and at a given signal, took possession of the vessel, making prisoners of the crew. They also scuttled another boat, the "Island Queen," and tried to wreck a railroad train near Buffalo, N. Y. In spite of a proclamation of Jefferson Davis assuming the responsibility of this expedition, Beall was hanged on Governor's Island, New York, Feb. 24, 1865, on the ground that, if acting under orders, he should have shown some badge of authority.

**Beam**, a long, straight and strong piece of wood, iron, or steel, especially when holding an important place in some structure, and serving for support or consolidation; often equivalent to girder. In a balance it is the part from the ends of which the scales are suspended. In a loom it is a cylindrical piece of wood on which weavers wind the warp before weaving; also, the cylinder on which the cloth is rolled as it is woven. In a ship, one of the strong transverse pieces stretching across from one side to the other to support the decks and retain the sides at their proper distance; hence, a ship is said to be on her beam ends when lying over on her side.

**Beaming**, the art of winding the web on the weaver's beam in a manner suitable for weaving, with regard to firmness and evenness. It is to some extent a special employment, followed by workmen trained as beamers.

**Beam Tree**, a species of wild Service, so called probably from the beam-like aspects



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of its corymbiferous flowers. Its full name is the white beam-tree. It is *pyrus aria*. It has downy leaves and red fruit, larger than that of its near ally, *P. aucuparia*, the mountain ash, or rowan tree. The wood is extremely hard.

**Bean**, a well known cultivated plant, *vicia faba*, of Linnæus, now called *faba vulgaris*. It belongs to the order *leguminosæ*. The stem is quadrangular and hollow; the leaves are alternate; they are pinnate, with two to four leaflets. The flowers, which are fragrant, are papilionaceous, white, with violet colored veins and blotches, looking almost black. The seeds are partly kidney-shaped. The native country of *faba vulgaris* is believed to be the regions near the Caspian Sea, the Levant, and Egypt. The word bean occurs twice in Scripture (in II Sam. xvii: 28, and Ez. iv: 9).

Pythagoras and his followers did not eat it, and the flamen Dialis, or priest of Jupiter at Rome, was forbidden to touch it. *Faba vulgaris* may be primarily divided into the garden bean and the field bean. Of the former, there are numerous sub-varieties. The earliest is the mazagan, which is small seeded; while the largest is the windsor. The field bean runs into two leading sub-varieties, a larger and a smaller one; the latter is called ticks. The horse bean is the variety *equina*.

The word is also applied to any leguminous plant resembling a bean, though not of the genuine genus *faba*. Such, for example, as the Florida bean, which is the seed, not the fruit, of a West Indian plant. These seeds are washed up on the Florida shore, and are sometimes used as food, and sometimes they are polished and used as ornaments. The navy bean is the common white bean, used largely as an article of diet by sailors. The pea bean is a small white bean used commonly as food. The tonquin bean is the fragrant seed of a leguminous tree.

In commerce, the word is applied to the seeds of certain plants belonging to the natural order *leguminosæ*. The common field bean is the seed of the *faba vulgaris*, the broad, or windsor bean, being a cultivated variety of the same plant. The French, or haricot bean, is the seed of *phaseolus multiflorus*, and the scarlet runner (which is closely akin to the former), is *phaseolus vulgaris*.

Scarlet runners and French beans are used in the pod, in the green state, and eaten as a vegetable. Bean meal, which is more easily digested than whole beans, contains twice as much nitrogenous matter as wheat flour, and is more nutritious. It is sometimes used to adulterate flour and bread, but this can be readily detected by the microscope. The cells of the bean are larger, and the cell walls much thicker, than those of the wheat. The starch granules are also

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different, being oval or kidney-shaped, and having an irregular, deep cleft down the center. Roasted beans are sometimes used to adulterate coffee.

**Bean, Nehemiah S.**, an American inventor, born in Gilmanton, N. H., in 1818; learned the machinist's trade. In the winter of 1857-1858 he built his first steam fire engine, which he named the "Lawrence," and sold it to the city of Boston. In 1859 he took the management of the Amoskeag Locomotive Works in Manchester, where he had been employed in 1847-1850. During 1859 he built the "Amoskeag Steam Fire Engine, No. 1," the first of a class of engines which now is used everywhere. He died in Manchester, N. H., July 20, 1896.

**Bean, Tarleton Hoffman**, an American ichthyologist, born in Bainbridge, Pa., Oct. 8, 1846; graduated at Columbian University in Washington, 1876. He was editor of the "Proceedings and Bulletins" of the United States National Museum, Washington, 1878-1886, and of the "Report and Bulletin of the United States Fish Commission," Washington, 1889-1892; was Assistant in charge of the Division of Fish Culture in the United States Fish Commission, 1892-1895, and Curator of the Department of Fishes in the United States National Museum, 1880-1895. In 1893 he represented the United States Fish Commission at the World's Columbian Exposition, in 1895 at the Atlanta Exposition, in 1900 at Paris, and in 1902-1905 at St. Louis; in 1895-1898 was Director of the New York (city) Aquarium; and in 1906 became New York State Fish Culturist. His works include "The Fishes of Pennsylvania," "The Salmon and Salmon Fisheries," "Oceanic Ichthyology" (with George Brown Goode), "The Fishes of Bermuda," etc.

**Bear**, the English name of the various species of plantigrade mammals belonging to the *ursus* and some neighboring genera. The term plantigrade, applied to the bears, intimates that they walk on the soles of their feet; not, like the digitigrade animals, on their toes. Though having six incisor teeth in each jaw, like the rest of the carnivora, yet the tubercular crowns of the molar teeth show that their food is partly vegetable. They grub up roots, and, when they can obtain it, greedily devour honey. They hibernate in winter. The best known species is *ursus arctos*, the brown bear, the one sometimes seen dancing to the amusement of children in the streets. They are wild in this country, on the continent of Europe, and in Asia. Other species are the Syrian bear (*ursus syriacus*, which is the bear of Scripture); the American black bear (*ursus americanus*); the grizzly bear of the same continent (*ursus ferox*); and the Polar bear (*ursus* or *thalassarctos maritimus*), and others.



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The earliest representative of the *ursida*, or bear family, known at present, does not belong to the typical genus *ursus*. It is called *amphicyon*, and is of Miocene age. Of the true bears belonging to the *ursus* genus none have as yet been found earlier than the Pliocene. The best known Pliocene species is *ursus arvernensis*.

Of Post-pliocene bears, one, *ursus priscus*, seems the same as *ursus ferox* (the grizzly bear). Several bears, *ursus spelæus*, *arctos*, and others, have been found in caves in England and elsewhere. Of these, *ursus spelæus*, from the Greek *spelaios* = a grotto, cave, cavern, or pit, is the one called especially the cave bear. It is a giant species, occurring in the later rather than the earlier Post-pliocene beds.

In Stock Exchange parlance, a bear is one who contracts to sell on a specified day certain stock not belonging to him, at the market price then prevailing, on receiving imaginary payment for them at the rate which obtains when the promise was made. It now becomes his interest that the stock on which he has speculated should fall in price; and he is tempted to effect this end by circulating adverse rumors regarding it; while the purchaser, called a "bull," sees it to his advantage to make the stock rise. The origin of the term is uncertain. Dr. Warton derives it from the proverbial expression of selling the skin before the bear is caught, but he does not assign any explanation to the contrary term bull; others point out that the action of the former is like that of a bear pulling down something with his paws, while that of the latter is suggestive of a bull tossing a person up with his horns.

In astronomy, the word is applied to one or other of two constellations, Ursa Major and Ursa Minor, called respectively the Great Bear and the Little Bear. When the word Bear stands alone, it signifies Ursa Major.

**Bear, or Bere**, a species of barley (*hordeum hexastichum*), having six rows in the ear, cultivated in Scotland and the N. of England.

**Bear Berry**, the English name of the *aretostaphylos*, a genus of plants belonging to the order *ericaceæ* (heathworts). It includes the two species, *aretostaphylos uva ursi* and *A. alpina*. They are sometimes ranked under the genus *arbutus*. The flowers are rose colored, the berry of the *uva ursi* is red, while that of the other is black. They afford food for moor fowl. The former is used in nephritic and calculous cases, and sometimes even in pulmonary diseases; it, moreover, dyes an ash color, and can be used in tanning leather. It is found on the Continent, especially in Alpine regions, while its chosen habitat in the British Isles is in the Scottish Highlands.

## Beard

**Beard**, the hair that grows on the chin, lips, and adjacent parts of the face of men, and sometimes, though rarely, of women. Its growth is the distinctive sign of manhood. Generally speaking, the growth of the beard was cultivated among the nations of the East, although it must be observed that most of the Egyptian figures in the ancient paintings are without beards. Among the Greeks, and especially among the Greek philosophers, this ornament was held in high estimation. Athenæus tells us that the Greeks wore the beard until the time of Alexander the Great, who ordered his Macedonian soldiery to shave it off, lest the growth of it might give a ready handle to their enemies in battle. Socrates and Plato were honored with the distinction of "bearded master" by their pupils; and the origin of the proverb, *ek pogon oi sophoi* (wise men from their beards), arose from this class of wise men among the Greeks indulging always in this ornament. The Romans wore the beard until the 5th century A. U. C., when Publius Ticius Mena brought over a colony of barbers from Sicily to exercise their profession on the Roman chins. It was customary, on the assumption of the *toga virilis* among the Roman youth, to consecrate the first fruits of their beards to some deity. The Lombards (or long-beards), the early French, the ancient Britons, and the Anglo-Saxons, after they conquered Britain, all nourished the growth of their beards with peculiar care. The English clergy, by and by, probably in imitation of those of Western Europe, began to shave the beard, and until the time of William the Norman, the whole of whose army shaved the beard, there prevailed a bearded class and a shaven class, in short, a laity and a clergy, in England. The higher classes indulged in the moustache, or the entire beard, from the reign of Edward III. down to the 17th century. The beard then gradually declined, and the Court of Charles I. was the last in which even a small one was cherished. After the restoration of Charles II., moustaches or lip-whiskers continued, but the rest of the face was shaved; and in a short time the process of shaving the entire face became universal. The beard went out of fashion in France in the reign of Louis XIII., and in Spain when Philip V. ascended the throne. At the present time, the Jews, and the Arabs, constant to their ancient customs, continue to let the entire beard grow, when mourning, for a period of 30 days. "By the beard of Aaron," or "By the beard of the Prophet," is looked on as the most solemn oath of a Jew or Mohammedan. Among almost all civilized nations, the tendency is to let the beard grow, though in a way suggested by the taste of the individual.

**Beard, Daniel Carter**, an American artist and author, born in Cincinnati, O.,



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June 21, 1850; first engaged in civil engineering and surveying; went to New York in 1878 and studied art, and has since become widely known as a book and magazine illustrator. He founded and became teacher of the Department of Animal Drawing in the Woman's School of Applied Design, believed to be the first class of this character in the world. Besides his illustrative work he has published "Moonlight," "Six Feet of Romance," "American Boys' Handy Book," "American Boys' Book of Sport," etc.

**Beard, George Miller**, an American physician and hygienic writer, born at Montville, Conn., May 8, 1839; made a specialty of the study of stimulants and narcotics, hypnotism, spiritualism, etc. Among his works were "Our Home Physician" (1869); "Eating and Drinking" (1871); "Stimulants and Narcotics" (1871); "American Nervousness" (1881); "Sea-Sickness" (1882); etc. He died in New York, Jan. 23, 1883.

**Beard, Henry**, an American painter, born in Ohio, in 1841; son of James Henry Beard, and nephew of William Holbrook Beard; served in the Union army during the Civil War; at its close applied himself to painting, particularly animal life; and, after his removal to New York city, in 1877, was chiefly engaged in illustrating books and periodicals. He died in New York, Nov. 19, 1889.

**Beard, James Henry**, an American painter, born in Buffalo, N. Y., in 1814. In his childhood his parents removed to Ohio. He became a portrait painter in Cincinnati, and painted the portraits of Henry Clay and other distinguished men. In 1846 he exhibited his "Carolina Emigrants" at the National Academy in New York, of which he was elected an honorary member in 1848. In 1870 he removed to New York, and, in 1872, was elected a full member of the National Academy. Subsequently he devoted himself to animal painting. Among his better known works are "Mutual Friend" (1875); "Consultation" (1877); "Blood Will Tell" (1877); "Don Quixote and Sancho Panza" (1878); "Heirs at Law" (1880); "Which Has Pre-emption?" (1881); "Detected Poacher" (1884); "Don't You Come Here" and "The Mississippi Flood" (1885); "A Barnyard" and "'Ll Yer Gimme Some? Say!" (1886). He died in Flushing, N. Y., April 4, 1893.

**Beard, William Holbrook**, an American painter, born in Painesville, O., April 13, 1825; brother of James H. Beard; was a traveling portrait painter from 1846 till 1851, when he settled in Buffalo, N. Y. In 1856 he went abroad; studied at Düsseldorf, Germany, and in Italy, Switzerland, and France. He returned to Buffalo, but, in 1860, removed to New York. In 1862 he was elected a member of the National Acad-

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emy. His works include genre and allegorical pictures, but he was most popular in painting animals, especially bears, whose actions he humanized in a satirical and pleasing manner. He made many studies of decorative architecture. Among his most popular works are "Power of Death" (1859); "Bears on a Bender" (1862); "Bear Dance" (1865); "March of Silenus" (1866); "Flaw in the Title" (1867); "Darwin Expounding His Theories" and "Runaway Match" (1876); "Divorce Court" (1877); "Bulls and Bears in Wall Street" (1879); "Voices of the Night" (1880); "Spreading the Alarm" (1881); "In the Glen" (1882); "Cattle Upon a Thousand Hills" (1883); "Who's Afraid?" (1884); "His Majesty Receives" and "Office Seekers" (1886), etc. He published "Humor in Animals," a collection of his sketches (1885). He died in New York city, Feb. 20, 1900.

**Beard Grass**, a name given to two well known British grasses of the genus *polypogon* from the bearded appearance of the panicles.

**Beard Moss** (*usnea barbata*), a lichen of gray color, forming a shaggy coat on many forest trees.

**Beardsley, Aubrey**, an English author and illustrator, born in Brighton, in 1874; received a grammar school education; began working for London periodicals and publishers in 1892; and soon became widely known by his striking designs for posters and book covers. In 1894 he became art editor of "The Yellow Book," and while supplying it with illustrations, contributed drawings also to the "Savoy" and "Le Courrier Française." He illustrated "Bons Mots" (1892); Malory's "La Morte d'Arthur" (1893); Oscar Wilde's "Salome" (1894); "The Rape of the Lock" and "An Album of Fifty Drawings" (1896); and wrote and illustrated "The Story of Venus and Tannhauser" (1895); and a novel, "Under the Hill" (1896). He died in Mentone, France, March 16, 1898.

**Beardsley, Eben Edwards**, an American Episcopal clergyman and writer, born in Stepney, Conn., 1808; became pastor in New Haven in 1848. He wrote "History of the Episcopal Church in Connecticut" (4th ed., 1883), and lives of "Samuel Johnson, First President of King's College, New York" (1874); "William Samuel Johnson, President of Columbia College" (1876); and "Samuel Seabury, First Bishop of Connecticut" (1881). He died in New Haven, Dec. 22, 1891.

**Beardsley, Samuel**, an American jurist, born in Hoosic, N. Y., Feb. 9, 1790. On leaving the common school he took up the study of medicine, but abandoned it for law. In 1813 he was a member of the militia that



## Bearer Company

defended Sackett's Harbor. Two years later he was admitted to the bar, and became Judge-Advocate of the Militia. In 1823 he was State Senator from the Fifth District of New York. He was appointed attorney for the Northern District of New York by President Jackson, and was a member of Congress in 1831-1836 and 1843-1845. From 1836 to 1838 he was Attorney-General of the State of New York. He became Associate Judge of the Supreme Court of New York in 1844, and three years later succeeded Judge Bronson as Chief Justice. On his retirement he devoted himself to the practice of his profession. He died in Utica, N. Y., May 6, 1860.

**Bearer Company**, a British organization for removing wounded soldiers from the field of battle to the dressing station or temporary hospital, which is part of the equipment of the bearer company, and where first aid can be given to them. The bearer company, first introduced into the British army in 1873, comprises the medical and other officers for discipline and supply duties, over 30 non-commissioned officers and men, trained as sick bearers of the medical staff corps, about 100 attendant untrained bearers from the Militia Reserve, six "bâtmén" and drivers of the Army Service Corps. Tents for the personnel and for the dressing stations are carried, and a bearer company also has ambulances, surgery wagons, equipment, supply, and water carts, requiring over 100 horses. A modified organization for mountain warfare comprises muleteers, mules, and a special kind of caçolets or litters. Half a bearer company is attached to each army corps on active service, forming the link between the battalion stretcher bearers and the field hospitals.

**Bearing**, in architecture, the space between the two fixed extremities of a piece of timber, or between one of the extremities and a post or wall placed so as to diminish the unsupported length. Also and commonly used for the distance or length which the ends of a piece of timber lie upon or are inserted into the walls or piers.

In mechanics, (a) The portion of an axle or shaft in contact with the collar or boxing. (b) The portion of the support on which a gudgeon rests and revolves. (c) One of the pieces resting on the axle and supporting the framework of a carriage. (d) One of the chairs supporting the framework of a railway carriage or truck.

In ship carpentry (plural): the widest part of a vessel below the plank-shear.

In heraldry: a charge; anything included within the escutcheon. (Generally in the plural, as armorial bearings.)

In nautical parlance: observation as to the direction by the compass in which an object lies from the vessel, or the direction thus ascertained. (Sometimes in the plural.)

## Beast Fables

**Bear Lake, Great**, an extensive sheet of fresh water in the Northwest Territory of Canada, between about 65° and 67° 32' N. lat.; and under the 120th degree of W. long.; of irregular shape; area about 14,000 square miles. The water is very clear, and the lake abounds in fish. Bear Lake river, the outlet at the S. W. extremity of Great Bear Lake, runs S. W. for 70 miles and joins the Mackenzie river.

**Bearn** (byärñ), formerly one of the 32 provinces into which France was divided, and now forming the greatest portion of the Department of Basses-Pyrénées. The inhabitants are chiefly Gascons, with a strong infusion of Basque blood, and they speak the purest Gaseon dialect. Bearn was a portion of Aquitania under the Romans, and, after the downfall of that Empire, under its ruling dukes, it was a country of considerable importance. From the intermarriage of the ruling family, the counts of Foix, with that of Navarre, sprang the French monarch, Henry IV., who, because he was born and brought up in Bearn, was derisively called Le Bearnois. When he ascended the throne of France, Bearn, of course, virtually became part of that country; but was only formally incorporated with it in 1620, by Louis XIII.

**Bear River**, a river of the United States, 400 miles long; rises in the N. of Utah, and flows N. into Idaho; turns abruptly S., re-enters Utah, and empties into Great Salt Lake.

**Bear's Grease**, the fat of bears, esteemed as of great efficacy in nourishing and promoting the growth of hair. The unguents sold under this name, however, are in a great measure made of hog's lard or veal fat, or a mixture of both, scented and slightly colored.

**Beast Fables**, stories in which animals play human parts, a widely spread primitive form of literature, often surviving in more or less developed forms in the more advanced civilizations. No better example of its simplest form could be found than those stories of the negroes within the Southern States of America, which, through Harris' "Uncle Remus," are now so well known to the reading public. The primitive natives of many parts of Africa still tell stories similar to these, and, indeed, they have acquired no very exalted notions of the inherent superiority of the human race, and admit without difficulty that the wisdom of the lower animals may be equal to their own.

We find the "Lion and the Mouse" in a papyrus dating from 1200-1166 B. C.—the days of Rameses III. (Rhampsinitus) or Hak On—not as a rude and early attempt, but in a finished form postulating a much more ancient origin. Sir Richard Burton points out that from Kemi, the Black-land, it was but a step to Phœnicia, Judæa, Phry-



gia, and Asia Minor, whence a ferry led over to Greece. Here the apologue found its popularizer in Aisōpos, whose name, involved in myth, possibly connects with Aithiops. The fabulist's era may be taken as contemporary with Solon (570 B. C.), about a century after Psammetichus (Psamethik I.) threw Egypt open to the restless Greek. From Africa, too, the fable would spread eastward, and find a new home in the second great focus of civilization in the Tigris-Euphrates valley; while in later days the conquests of Alexander and his successors Hellenized the Eastern world, and carried with their victorious arms every form of literature that had been fostered by the Western peoples. To us the allegory in such fictions seems fundamental, but it was not so to the primitive mind. To the savage the beast fable is not nonsense, for he ascribes to the lower animals the power of speech and a nature resembling his own, and believes readily in transmigration and metamorphosis. Savage mythology is full of metamorphoses, and these happen still as contemporary events in Samoa and Sarawak.

The belief in the affinity between man and animals in which primitive man has so nearly anticipated the would-be conclusions of certain advanced evolutionists belongs even now to half mankind, and most students of comparative religion maintain that in the other half the worship of animals represented an earlier stage in the religious evolution. The Australians, Kamchadales, Polynesians, North American Indians, Basques, and Transylvanian gipsies at the present day tell beast fables into which as yet no moral lesson has entered. Among the Zulus and Hottentots we find the same stories, infused with the true Æsopic humor. In the Bushmen's beast fables, the hare, as among the American negroes the rabbit, plays much the same clever part as the fox in the European examples, and "fables that illustrate the superior cunning of the hare can be traced," says Sayce, "from the Bari of Central Africa through Malagasy, Swahili, Kafir, and Hottentot, back to the Bushmen, where he is associated with what Dr. Bleek calls 'a most unpronounceable click,' not otherwise found in the language." But, indeed, we find the beast-fable in all parts of the world. Thus, in Gill's "Myths and Songs from the South Pacific," a stork speaks and acts like a man, and Mr. Ridley tells us the Australians ascribe human speech and action to the pelican and the musk duck.

The question need not now be raised whether these fables are really an indigenous native literature — it is sufficiently striking and significant to find here stories almost identical with those found among widely different people in widely distant regions. In our civilized world the animal story lingered long after the moral

beast fable had become predominant. The crows of Æsop had croaked their wisdom through the medium of Babrius and Phædrus for 1,000 years before the genuine beast epic reached its highest development in "Reynard the Fox," belonging to the 12th century, but containing materials of a far earlier date. It is not a didactic poem, nor essentially even a satirical poem. Its charm lies in the admirable manner in which the characters of the various animals are sustained. Its influence in the Middle Ages may be partly understood from the fact that our common names, reynard, bruin and chanticleer, were originally the names of the characters in the great beast fable. Beast fables, resembling more particularly the African, have been found in the cuneiform inscriptions of Babylonia. Stories of the name nature are equally common farther E. in Asia.

Perhaps no book has been more widely popular than the fables of Pilpay, translated first into Pehlevi or ancient Persian from an old Indian original, in part represented now by the Panchatantra. The Indian fables differ from the Æsopic in this: In the former, animals act as men in form of animals; in the latter, animals are allowed to act as animals. Benfey ascribes this peculiarity of Indian conception to the belief in metempsychosis, and the exclusively didactic nature of Indian tales. All tales, therefore, in which animals play the part of human beings, are Indian. As to the ultimate origin of beast fables, Benfey's conclusion is that most fables about animals are Western or Æsopic; that, on the contrary, the tales are Indian. In all our folk tales the relations between the heroes and animals are usually kind or helpful. Nothing is more common than for the hero to do some kindness to a suffering animal, who afterward shows his gratitude by some signal service to his benefactor at the moment of his own perplexity. Beasts and birds often carry grave secrets to favored individuals, and so save them from unhappiness and danger. If this feeling for animals is not of Buddhist origin, it is at least, as Cosquin points out, a prevailing Indian idea, and is certainly derived from the belief in metempsychosis, which effaces the distinction between man and the animal, and which, in every living thing, sees a brother. Benfey throws out the hint that metempsychosis may have come from Egypt. It does not occur in any of the Indo-European races save the Indians themselves, and undoubtedly intimate relations once existed between the Indus and the Nile. The Phœnicians were active intermediaries of commerce, and just as it is very probable they carried writing to India, they may have carried and re-carried many other elements of civilization.

There are many apologues in the "Arabian Nights," but these are much longer and more



involved in circumstance than the straightforward fables of Æsop, with their single event and simple moral. But these, despite their monumental antiquity, Burton regards as the offspring of a comparatively civilized age, when a jealous despotism or a powerful oligarchy threw difficulties and dangers in the way of speaking plain truths. The danger of attempting openly to administer plain reproof to absolute Asiatic potentates may well have led to the invention of fables in which the lessons intended to be imparted were veiled under ingenious fictions of animals. Mr. Clouston quotes the following story from an Oriental historian of a tyrannical monarch having been reclaimed by such means. "A wise and prudent vazir once related the following fable to his royal master: There was an owl in El-Basra and an owl in El-Mosul. And the owl of El-Basra said to the other one day: 'Give me thy daughter in marriage to my son.' Quoth the owl of El-Mosul, 'I consent, on condition that thou give me as her dowry 100 ruined villages.' 'That,' replied the owl of El-Basra, 'I cannot do at present; but if Allah spare the Sultan another year, I will do what thou requirest.' The Sultan, deeply impressed by this simple fable, at once caused all the ruined towns and villages to be rebuilt, and henceforward studied to promote the well being of his subjects, and to render his rule easy and acceptable to them."

**Beat**, in music, the beating or pulsation resulting from the joint vibrations of two sounds of the same strength, and all but in unison. Also a short shake or transient grace-note struck immediately before the note it is intended to ornament.

**Beatification**, in general, the act of rendering supremely blessed, also the state of being rendered supremely blessed. In a special sense an act by which the Pope declares, on evidence which he considers himself to possess, that a certain deceased person is in the enjoyment of supreme felicity in Heaven. It is the first step toward canonization, but it is not canonization itself.

Crabb thus distinguishes between beatification and canonization: "In the act of beatification the Pope pronounces only as a private person, and uses his own authority only in granting to certain persons, or to a religious order, the privilege of paying a particular worship to a beatified object. In the act of canonization, the Pope speaks as a judge after a judicial examination on the state, and decides the sort of worship which ought to be paid by the whole Church.

**Beaton, David**, Cardinal Archbishop of St. Andrew's, Scotland, born in 1494. He became Abbot of Arbroath in 1525, Lord Privy Seal three years later, was sent on several missions to France, received a cardi-

nal's hat in 1538, and in the following year became Primate. On the death of James V., he, by craft and determination, secured to himself the chief power in Church and State, being named Lord High Chancellor of Scotland, and Papal Legate. He opposed an alliance with England, and especially distinguished himself as a persecutor of the Reformers. The trial and burning of George Wishart for heresy took place under his direction, and, a short time afterward Beaton was assassinated at St. Andrew's, in May, 1546. With his death, church tyranny came to an end in Scotland.

**Beatrice**, city and county-seat of Gage co., Neb.; on the Big Blue river, and several railroads; 40 miles S. of Lincoln, the State capital. It is the seat of the State Institution for Feeble Minded Youth; and has an attractive courthouse, United States Government Building, Holly system of water works, electric light and street railway plants, public library, 3 National banks, excellent water power, flour and planing mills, tile and barbed wire works, creamery, iron foundry, and manufactories of gasoline engines, wind mills, and farming implements. The assessed property valuation exceeds \$1,000,000, and the total debt is less than \$500,000. Pop. (1910) 9,356.

**Beatrice Portinari** (bā-a-trē'chā por-tō-nā'rē), the poetical idol of Dante; born about 1266, died 1290; the daughter of a wealthy citizen of Florence, and wife of Simone de Bardi. She was but eight years of age, and Dante nine, when he met her first at the house of her father. He altogether saw her only once or twice, and she probably knew little of him. The story of his love is recounted in the "Vita Nuova," which was mostly written after her death.

**Beattie, Francis Robert**, a Canadian-American educator, born near Guelph, Ontario, in 1848; was educated at Toronto University, and studied theology at Knox College, Toronto, and at the Presbyterian College in Montreal. He was pastor at Baltimore and Cold Springs, Ontario, in 1878-1882, and at Brantford in 1882-1888. In 1888 he became Professor of Apologetics in the Presbyterian Theological Seminary in Columbia, S. C., where he remained till 1893 and then accepted the Chair of Systematic Theology and Apologetics in the Presbyterian Theological Seminary, Louisville, Ky. His writings include "An Examination of Utilitarianism" (1884); "Methods of Theism" (1887); "The Higher Criticism; or, Modern Critical Theories" (1888); "Radical Criticism, an Exposition and Examination of the Radical Critical Theory of the Old Testament Scripture" (1895), etc. He died Sept. 4, 1906.

**Beattie, James**, a Scottish poet and miscellaneous writer, born at Laureneekirk, Kincardineshire, Oct. 25, 1735; studied at



## Beatty

Marischal College, Aberdeen, for four years, and received the M. A. degree. In 1753 he was appointed schoolmaster at Fordoun, a few miles from his native place; from whence he obtained a mastership in the Grammar School of Aberdeen, and ultimately was installed Professor of Moral Philosophy and Logic in Marischal College.



JAMES BEATTIE.

In 1760 he published a volume of poems, which he subsequently endeavored to buy up, considering them unworthy of him. In 1765 he published a poem, the "Judgment of Paris," and in 1770 his celebrated "Essay on Truth," for which the University of Oxford conferred on him the degree of LL. D.; and George III. honored him, when on a visit to London, with a private conference and a pension. He next published in 1771 the first book of his poem, the "Minstrel," and in 1774 the second; this is the only work by which he is now remembered. In 1776 he published dissertations on "Poetry and Music," "Laughter and Ludicrous Composition;" in 1783 "Dissertations, Moral and Critical;" in 1786 "Evidences of the Christian Religion," and in 1790-1793 "Elements of Moral Science." He died in Aberdeen, Aug. 18, 1803.

**Beatty, John**, an American legislator, born in Bucks county, Pa., Dec. 19, 1749; was educated at Princeton, and took up the study of medicine with Dr. Rush of Philadelphia. He fought with distinction through the Revolutionary War, reaching the rank of Colonel; was Delegate to the Continental Congress in 1783-1785; Speaker of the House; served in the convention which adopted the Federal Constitution; was a member of Congress in 1793-1795; and Secretary of State of New Jersey in 1795-1805. He died in Trenton, N. J., April 30, 1826.

**Beatty, John**, an American military officer, born near Sandusky, O., Sept. 16, 1828. He fought on the Union side in the Civil War, rising from private to Brigadier-General, and showing intrepid courage at Stone River, 1862-1863. He was a member of Congress in 1868-1874, and Republican Presidential Elector-at-Large in 1884. He wrote "The Citizen Soldier; or, Memoirs of a Volunteer" (1876); "The Belle o' Becket's Lane" (1882), etc.

## Beaufort

**Beaucaire** (bō-kār'), a town of France, in the Department of Gard, on the right bank of the Rhone, opposite Tarascon, with which it is connected by a suspension bridge, 14 miles S. S. W. of Avignon. Vessels enter its harbor by a canal communicating with the Mediterranean. A great fair, established in the 13th century, is held from the 15th till the 20th of July. It was once one of the principal occasions of trade between France, Italy, and the East, and was attended by 300,000 foreigners. The fair is still the scene of a brisk trade in silks, wines, oil, southern fruits, and leather.

**Beauchamp, Alphonse de** (bō-shän'), French historian and publicist, born at Monaco in 1767. Under the Directory he had the surveillance of the press, a position which supplied him with materials for his "History of La Vendée." He contributed to the "Moniteur" and the "Gazette de France." Among his chief works are the "History of the Conquest of Peru," the "History of Brazil," and the "Life of Louis XVIII." The "Memoirs of Fouché" is also with good reason ascribed to him. He died in Paris, June 1, 1832.

**Beaufort**, town, port of entry, and county-seat of Beaufort co., S. C.; on the Port Royal river, and the Charleston and Western Carolina railroad; 15 miles from the Atlantic Ocean and 80 miles S. W. of Charleston. It is midway between Charleston and Savannah; has an excellent harbor, and is the center of the phosphate trade of the State. The city is nearly 200 years old, and for many years prior to the Civil War was a noted health and pleasure resort, especially for the cotton planters interested in the plantations on the adjoining Sea Islands. It is still a popular summer and winter resort, principally engaged in phosphate mining, and with large exports of cotton, yellow pine and cypress lumber, rice, and sweet potatoes. In the fiscal year ending June 30, 1900, the imports of merchandise here aggregated in value \$81,042, and the exports, \$181,908. Pop. (1890) 3,587; (1900) 4,110.

**Beaufort, Henry, Cardinal**, natural son of John of Gaunt and half brother of Henry IV., King of England, born 1377; was made Bishop of Lincoln, whence he was translated to Winchester. He repeatedly filled the office of Lord Chancellor, and took part in all the most important political movements of his times. He died April 11, 1447.

**Beaufort, Margaret**, an English countess, born in 1441; daughter of John, first Duke of Somerset, and mother of Henry VII., King of England. She was three times married, viz.: to Edward Tudor, Earl of Richmond, in 1455; Henry Stafford, son of the Duke of Buckingham, and to Lord Stanley, a minister of Edward IV. In the Wars of the Roses, she and her son, Henry, be-



came more or less dangerous to the Yorkists and were for a long time in retirement or exile. Henry was attainted by a Parliament under Richard III., and Margaret's estates forfeited. After the accession of her son as Henry VII. she took no part in public affairs. Her life forms one of the romantic episodes of English history. She was devoutly religious, and founded several religious institutions.

**Beaugrand, Honoré** (bō-grän'), a Canadian journalist, born in Lanoraie, P. Q., March 24, 1849; educated in Joliette College. In 1865 he joined the French army in Mexico under Marshal Bazaine, and, after the failure to establish Maximilian as Emperor, accompanied the army to France. In 1867 he went to New Orleans, where he engaged in newspaper work. He served subsequently as a journalist in Boston and St. Louis, and, returning to Canada, founded "La Patrie" in Montreal in 1879, as an organ of the French Liberal Party. He sold this paper in 1897. In 1887 he established a paper in the English language, the "Montreal Daily News." He was mayor of Montreal in 1885-1887, and a delegate from Montreal to the Congress of the World's Chambers of Commerce in London in 1896. His publications include "Melanges; Trois Conférences" (1888); "Lettres de Voyage" (1889), and a novel, "Jeanne la Fileuse." He was decorated with the Cross of the Legion of Honor in 1885, and became commander of that order in 1889. He is also an officer of the Academy of France; a commander of the Order of Nicham Iftikar of Tunis, etc.

**Beauharnais** (bō-här-nā'), the name of a noble French family, of which the following are historical personages:

**BEAUHARNAIS, ALEXANDRE, VICOMTE DE**, born at Martinique, 1760. He served under Rochambeau in the War of American Independence. On his afterward taking up his residence in France, he was elected a Deputy to the States-General, where he espoused the Democratic or Liberal party, became President of the National Assembly, and played a conspicuous part in the Revolution. Beauharnais served with distinction in the French army, but became ultimately a victim to the Revolutionary Tribunal just previous to the fall of Robespierre, in 1794. His widow, Josephine Tascher de la Pagerie, became the first wife of Napoleon I.

**BEAUHARNAIS, FRANÇOIS, MARQUIS DE**, elder brother of the preceding, born in 1756. He was a Major-General in the French army, protested against revolutionary excesses in a letter to the President of the National Assembly, and, on Bonaparte becoming First Consul, recommended him to restore the scepter to the House of Bourbon. He was afterward Ambassador to Spain, but fell into disgrace with Napoleon, and was

banished. He returned to Paris after the Restoration, and died in 1823.

**BEAUHARNAIS, EUGENE DE**, Viceroy of Italy, and a Prince of the French Empire, son of Alexandre de Beauharnais and Josephine, born in Paris in 1781. After his mother's marriage to Napoleon, he, in 1796, became aide-de-camp to the latter, and served with distinction in the campaigns of Italy and Egypt. Beauharnais was wounded at Acre, contributed to the victory of Marengo, was created Prince of the Empire in 1805, and Viceroy of Italy. In 1806, he married the Princess Amalie Augusta, of Bavaria, and in the same year was adopted by the Emperor as his son, and appointed governor of Lombardy and Venice. He served in the campaign of 1809, defeated the Austrians at Raab, and distinguished himself at Wagram. His military talents were particularly evinced in the retreat from Moscow, and in the following campaigns of 1813-1814. To Beauharnais may be mainly ascribed the victory of Lützen. After the fall of Napoleon, he retired to Munich, was allowed, by the Treaty of Fontainebleau and the Congress of Vienna, to retain his extensive possessions in Italy, and took his place as Duke of Leuchtenberg among the Bavarian nobles. His children subsequently ranked as members of the imperial family of Russia. He died Feb. 21, 1824.

**Beaulieu, Jean Pierre** (bōl-yé'), an Austrian military officer, born in Namur, Oct. 26, 1725; served in the Seven Years' War; was promoted a Major-General for his successful operations against the Belgian insurgents in 1789; commanded at Jemappes in 1792; was defeated by Napoleon, in 1796, while commander-in-chief of the forces in Italy, in the battles of Montenotte, Millesimo, Montesano, Mondovi, and Lodi. He died near Linz, Dec. 22, 1819.

**Beaumarchais** (bō-mär-shā'), **Pierre Augustin, Baron de**, born in Paris, Jan. 24, 1732. He was a man of singular versatility of talent, being by turns politician, artist, dramatist, and merchant. His father was a watchmaker, and brought up his son to the same profession, in which young Beaumarchais showed considerable skill. He was also remarkably fond of music, and attained great proficiency in playing on the harp and the guitar. But his fame rests on his plays, and chiefly on the two, "Le Barbier de Seville" (1775), and "Le Mariage de Figaro" (1784), which are too well known, both as plays and as operas, to require further notice here. The character of "Figaro" was a happy invention, and the other principal characters, in both plays, are drawn with great skill. The "Mariage de Figaro" alone produced to Beaumarchais 80,000 francs. He wrote a third play, "Le Mère Coupable," which may be considered as a sequel to the other two, but is inferior to them in many



respects, and objectionable in a moral point of view. He also wrote "Eugenie," and "Les Deux Amis." The subject of the first is taken from an adventure which occurred to his own sister, and which he relates in his memoirs. Goethe has treated the same subject in his drama of "Clavigo." At the beginning of the American War of Independence (1777), Beaumarchais entered into a speculation for supplying the colonies with arms, ammunition, etc.; he lost several ves-



BEAUMARCHAIS.

sels, three of which were taken in one day by the English cruisers in coming out of the river of Bordeaux, but the greater number arrived in America, and inspired the colonists with renewed hope. Among other speculations he engaged to supply Paris with water and with fire engines. When the French Revolution broke out, Beaumarchais showed himself favorable to the popular cause, and entered into speculations to supply corn, muskets, etc. But his activity in that critical period exposed him to suspicion; he was accused and acquitted, then accused again, and, being obliged to run away, he escaped to England and afterward to Germany. He returned to France after the fall of Robespierre, and then entered into a new speculation in salt, by which he lost a large sum. He died in Paris, May 18, 1799.

**Beaumont, Francis, and Fletcher, John**, two eminent English dramatic writers, contemporaries of Shakespeare, and the most famous of literary partners. The former, son of a Common Pleas judge, was born at Grace-Dieu, in Leicestershire, in 1584. At the age of 16 he published a translation, in verse, of Ovid's fable of "Salmacis and Hermaphroditus," and later he became the friend of Ben Jonson. With Fletcher also he was early on terms of friendship. He married Ursula, daughter of Henry Isley, of Sundridge, in Kent, by whom he left two daughters. He died March 6, 1616, and was buried in Westminster Abbey. **JOHN FLETCHER** was born at Rye, Sussex, in December, 1579. His father was successively Dean of Peterborough, Bishop of Bristol, Worcester, and London. The "Woman Hater," produced in 1606-1607, is the earliest work known to exist in which he had a hand. It does not appear that he was ever married. He died in London in

August, 1625, and was buried at St. Saviour's, Southwark. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names consist of over 50 plays, a masque, and some minor poems. It is believed that all the minor poems except one were written by Beaumont. After the death of Beaumont Fletcher continued to write plays alone or with other dramatists. It is now difficult, if not indeed impossible, to determine with certainty the respective shares of the two poets in the plays passing under their names. According to the testimony of some of their contemporaries Beaumont possessed the deeper and more thoughtful genius, Fletcher the gayer and more idyllic. "Four Plays in One," "Wit at Several Weapons," "Thierry and Theodoret," "Maid's Tragedy," "Philaster,"

"King and No King," "Knight of the Burning Pestle," "Cupid's Revenge," "Little French Lawyer," "Scornful Lady," "Coxcomb," and "Laws of Candy" have been assigned to Beaumont and Fletcher conjointly. To Beaumont alone



FRANCIS BEAUMONT.

"The Masque of the Inner Temple and Gray's Inn." To Fletcher alone "The Faithful Shepherdess," "Woman Hater," "Loyal Subject," "Mad Lover," "Valentinian," "Double Marriage," "Humorous Lieutenant," "Island Princess," "Pilgrims," "Wild Goose Chase," "Spanish Curate," "Beggar's Bush," "Rule a Wife and Have a Wife," "Fair Maid of the Inn." To Fletcher and Rowley "Queen of Corinth," "Maid of the Mill," and "Bloody Brother." To Fletcher and Massinger "False One," and "Very Woman." To Fletcher and Shirley "Noble Gentleman," "Night Walker," and "Love's Pilgrimage." To Fletcher and Shakespeare "Two Noble Kinsmen."

**Beaumont, Gustav Auguste de la Bonniere de** (bō-môn'), a French publicist and general author, and member of the Institute, born Feb. 16, 1802. He early entered upon the legal profession, and, in 1831, was sent with De Tocqueville to study the penitentiary system of the United States. He was elected Deputy in 1839, and, in 1848, Vice-



President of the Constituent Assembly. He was subsequently Ambassador to London and Vienna. Beaumont first became known as a writer by his publishing, in conjunction with M. de Tocqueville, "*Traité du Système Pénitentiaire aux Etats-Unis et de son application à la France*" (1832). Among his other works may be named, "*Marie, ou l'Esclavage aux Etats-Unis*" (1835) — a work somewhat similar to "*Uncle Tom's Cabin*," and "*L'Irlande sociale, politique, et religieuse*" (1839). He died in Tours, Feb. 6, 1866.

**Beaumont, Jean Baptiste Elie de**, a French geologist, born in Canon, in 1798; taught geology in the Ecole des Mines and Collège de France, was elected to the Academy in 1835, and became, in 1853, its perpetual secretary. He died Sept. 22, 1874. His theory regarding the elevation of mountain systems has as yet found little acceptance outside France. With Dufrénoy he prepared a great geological map of France (1840). Another work is his "*Notice sur les Systèmes des Montagnes*" (1852).

**Beaumont, Sir John**, an English poet, born in 1583, brother of Francis Beaumont, the dramatist; published "*Bosworth Field*," an historical poem. He also wrote a poem in eight books, never printed, called "*The Crown of Thorns*." He died April 19, 1627.

**Beaumont, Joseph**, an English educator, born in 1615, descended from an old Leicestershire family. In 1663 he became Master of Peterhouse College, Cambridge. Wrote "*Psyche, or Love's Mystery*," a poem once very popular, and an attack on Henry More's "*Mystery of Godliness*," for which he received the thanks of the university. He died in 1699.

**Beaumont, William**, an American surgeon, born in Lebanon, Conn., in 1785. His experiments on digestion with the Canadian St. Martin, who lived for years after receiving a gunshot wound in the stomach which left an aperture of about two inches in diameter, were of great importance to physiological science. He died in St. Louis, Mo., April 25, 1853.

**Beaumont**, city and county-seat of Jefferson co., Tex.; on the Neches river and several railroads; 80 miles N. E. of Houston. It is an important shipping point; is at the head of tidewater navigation; and has a variety of important manufactures. In 1901 it was the center of the large and newly discovered petroleum fields of Texas. Fuel-oil wells were discovered of such capacity as made the Beaumont oil field one of the largest in the world. Pop. (1900) 9,427; (1910) 20,640.

**Beaune, Florimond de**, a French mathematician, born in 1601 at Blois, served as a soldier, and died at his native place in 1652.

His labors and discoveries contributed greatly to the improvement of the modern analytical geometry first introduced by Descartes. He is well known through "*Beaune's Problem*," solved with the help of the integral calculus by Jean Bernouilli in 1693, which turns on the determination of the nature of a curved line from a property of its tangent.

**Beaunoir, Alexandre Louis Bertrand** (bôn-wär'), [true name ROBINOIR], a French dramatist, born in 1746. His more than 200 comedies were very popular. Among the best of them are "*Love Goes A-Begging*," "*Jennie, or The Losers Don't Pay*." He died in 1823.

**Beauregard, Pierre Gustave Toutant**, (bō-re-gär'), an American military officer, born in St. Martin's parish, La., May 28, 1818; was graduated at the United States Military Academy and appointed a brevet Second Lieutenant of Artillery in 1838; was promoted First Lieutenant and transferred to the Corps of Engineers in 1839; distinguished himself in the Mexican War, where he won the brevet of Captain for gallantry at Contreras and Churubusco, and of Major for Chapultepec, where he was twice wounded; was engaged in constructing fortifications on the Gulf of Mexico after the war, and for five days in January, 1861, was Superintendent of the Military Academy. He resigned his commission after the secession of



PIERRE G. T. BEAUREGARD.

Louisiana in February following; was appointed commander of the Confederate forces at Charleston, S. C., and there opened the hostilities of the Civil War by bombarding Fort Sumter, on April 11. After the evacuation of the fort by Major Anderson, General Beauregard was transferred to Virginia, where he commanded the Confederate forces in the battle of Bull Run, on July 21. In March, 1862, he was ordered to the Army of the Mississippi, under Gen. Albert S. Johnston, and in April following fought the battle of Shiloh, gaining a victory over the National forces the first day, but being defeated by General Grant on the second day. Failing health kept him from active duty till June, 1863, when he took charge of the



## Beauregard

defense of Charleston against the combined land and naval forces. He remained in command there till April, 1864, when he was ordered to Richmond to strengthen its defenses. On May 16, he attacked General Butler in front of Drury's Bluff, and forced him back to his intrenchments between the James and the Appomattox rivers. In anticipation of General Sherman's successful march through the Carolinas, he ordered General Hardee to evacuate Charleston, which was done, Feb. 17, 1865. He attempted to aid Gen. Joseph E. Johnston in opposing General Sherman, but in April surrendered with the former to the latter. After the war he became president of the New Orleans, Jackson and Mississippi Railroad Company, Adjutant-General of the State, and a manager of the Louisiana State Lottery. In 1866 the chief command of the Rumanian army was tendered him, and in 1869 that of the army of the Khedive of Egypt, both of which he declined. He published "The Principles and Maxims of the Art of War" (Charleston, 1863), and "Report of the Defense of Charleston" (Richmond, 1864), and was the last survivor of the full generals of the Confederacy. He died in New Orleans, Feb. 20, 1893.

**Beausoleil, Joseph Maxime** (bō-sōl-āl'), a Canadian physician, born in St. Felix de Valois, P. Q., April 6, 1854; educated in Joliette College and at the School of Medicine and Surgery, Montreal. He lectured on histology in the Medical School in 1884-1888, and then became Professor of Materia Medica and Therapeutics there. In 1889 he was elected Governor of the Provincial College of Physicians and Surgeons. In 1900 he was Vice-President for Quebec of the Canada Medical Association. He was one of the editors of "The Journal of Popular Hygiene," and was subsequently for several years editor of the "Medical Gazette" of Montreal. Many of his papers have appeared in pamphlet form.

**Beauvais** (bō-vā) (ancient Bellovacum), a town of France, capital of the department of Oise, at the confluence of the Avelon with the Thérain, 43 miles N. of Paris. It has some fine edifices, the choir of the uncompleted cathedral being one of the finest specimens of Gothic architecture in France. In 1443 the English besieged Beauvais without success and in 1472 the city resisted an army of 80,000 Burgundians under Charles the Bold. On this occasion the women particularly distinguished themselves, and one of them, Jeanne Lainé, called La Hachette, seeing a soldier planting a standard on the wall, seized it and hurled him to the ground. The banner is preserved in the town hall, and an annual procession of young girls commemorates the deed. Pop. (1901) 20,300.

## Beaver

**Beaver** (*Castor fiber*), a quadruped of the order *Rodentia*, or gnawers, the only species of its genus. It is very widely distributed, being found in the N. parts of Europe, Asia, and America, nowadays most abundantly in the N. and thinly peopled parts of North America, dwelling in communities on the banks of rivers and lakes. It is only in a state of nature that the beaver displays any of those singular modes of acting which have so long rendered the species celebrated. These may be summed up in a statement of the manner in which they secure a depth of water that cannot be frozen to the bottom, and their mode of constructing the huts in which they pass the winter. They are not particular as to the site which they select for the establishment of their dwellings, but if it is in a lake or pond, where a dam is not required, they are careful to build where the water is sufficiently deep. In standing waters, however, they have not the advantage afforded by a current for the transportation of their supplies of wood, which, when they build on a running stream, is always cut higher up than the place of their residence, and floated down. The materials used for the construction of their dams are the trunks and branches of small birch, mulberry, willow, and poplar trees, etc. They begin to cut down their timber for building early in the summer, but their edifices are not commenced till about the middle or latter part of August, and are not completed till the beginning of the cold season. The strength of their teeth, and their perseverance in this work, may be fairly estimated by the fact that they commonly cut down trees of the diameter of six, seven, or eight inches, and in some cases a good deal more. The trees are cut in such a way as to fall into the water, and then floated toward the site of the dam or dwellings. Small shrubs, etc., cut at a distance, they drag with their teeth to the stream, and then launch and tow them to the place of deposit. At a short distance above a beaver dam the number of trees which have been cut down appears truly surprising, and the regularity of the stumps might lead persons unacquainted with the habits of the animals to believe that the clearing was the result of human industry.

The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swift, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees they intermingle mud and stones, to give greater strength; and when dams have been long undisturbed and frequently repaired they acquire great solidity, and their power of resisting the pressure of water, ice, etc., is

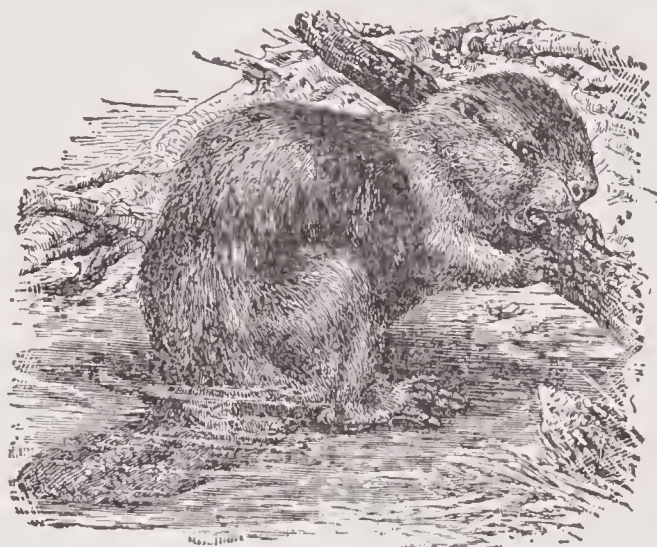


greatly increased by the willow and birch occasionally taking root, and eventually growing up into something like a regular hedge. The materials used in constructing the dams are secured solely by the resting of the branches, etc., against the bottom, and the subsequent accumulation of mud and stones by the force of the stream or by the industry of the beavers.

The dwellings of the beavers are formed of the same materials as their dams, are very rude, and adapted in size to the number of their inhabitants, seldom more than four old, or six or eight young ones, are found in one of the lodges, though double that number have been sometimes seen. In building their houses they place most of the wood crosswise, and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches projecting inward are cut off with their teeth, and thrown among the rest. The houses are not of sticks, and then plastered, but of all the materials used in the dams—sticks, mud, and stones, if the latter can be procured. This composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond near the door of the hut. The beaver always carries mud or stones by holding them between his fore paws and throat. Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used in building, it is an accident owing to the nature of the spot whence the mud is obtained. As soon as any portion of the materials is placed, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them on the surface of the water when they are in the act of diving. The outside of the hut is covered or plastered with mud late in the autumn, and after frost has begun to appear. By freezing it soon becomes almost as hard as stone, effectually excluding their great enemy the wolverene during the winter. Their habit of walking over the work frequently has led to the absurd idea of their using the tail as a trowel. The houses are generally from 4 to 6 feet thick at the apex of the cone; some have been found as much as 8 feet thick at top. The door or entrance is always on the side farthest from land, and is near the foundation or a considerable depth under water; this is the only opening into the hut. The large houses are sometimes found to have projections of the main building thrown out, for the better support of the roof, and this circumstance has led to all the stories of the different apartments in beaver huts. These larger edifices, so far from having several apartments, are double or treble houses, the parts having no communication except by water. It is a fact that the muskrat is sometimes found to have taken lodgings in

the huts of the beaver. The otter also occasionally intrudes; he, however, is a dangerous guest, for, should provisions grow scarce, it is not uncommon for him to devour his host. All the beavers of a community do not coöperate in fabricating houses for the common use of the whole. The only affair in which they have a joint interest, and upon which they labor in concert, is the dam. Beavers also make excavations in the adjacent banks, at regular distances from each other, which have been called "washes." These are so enlarged within that the beaver can raise his head above water to breathe without being seen, and when disturbed at their huts they immediately swim under water to these washes for greater security, where they are easily taken by the hunters.

The food of the beaver consists chiefly of the bark of the aspen, willow, birch, poplar, and occasionally alder; to the pine it rarely resorts, unless from severe necessity. They provide a stock of wood from the trees first mentioned during summer, and place it in



BEAVER.

the water opposite the entrance into their houses.

At one time immense numbers of these animals were killed for their fur, which was largely used in making hats, but in more recent times they have suffered less persecution on this account, their fur now not being held in the same estimation.

The beaver is about two feet in length; its body thick and heavy; the head compressed, and somewhat arched at the front, the upper part rather narrow; the snout much so. The eyes are placed rather high on the head, and the pupils are rounded; the ears are short, elliptical, and almost concealed by the fur. The skin is covered by two sorts of hair, of which one is long, rather stiff, elastic, and of a gray color for two-thirds of its length next the base, and terminated by shining, reddish-brown points; the other is short, thick, tufted, and soft, being of different shades of silver-gray or light lead color. The hair is shortest on the head and feet. The hind



## Beaver

legs are longer than the fore, and are completely webbed. The tail is 10 or 11 inches long, and, except the part nearest the body, is covered with hexagonal scales.

**Beaver**, a city in Beaver Co., Ut.; on the Beaver river; 32 miles from Milford, the nearest point on the Oregon Short Line railroad, and 50 miles S. by W. of Fillmore. The city and precinct of the same name contain copper and lead, but the chief productions are the various cereals and wool. Pop. (1900) 1,701.

**Beaver**, a borough and county-seat of Beaver Co., Pa.; on the Ohio river and the Pennsylvania Co.'s and the Pittsburgh and Lake Erie railroads; 28 miles N. W. of Pittsburgh. It has natural gas, abundant water power, large coal and oil shipping interests, a public park, National bank, and daily and weekly newspapers, and is the seat of Beaver College (M. E.). Pop. (1900) 2,348.

**Beaver, James Addams**, an American military officer and statesman, born in Millerstown, Pa., Oct. 21, 1837; was graduated at Jefferson College, Canonsburg, Pa., in 1856; and studied law with H. N. McAllister, Bellefonte, Pa., whose partner he afterward became. On the outbreak of the Civil War he was made Lieutenant-Colonel of the 45th Pennsylvania Volunteers. Later, he was Colonel of the 14th Pennsylvania Volunteers. He was wounded in the battle of Chancellorsville, and was not able to return to his command till the battle of Gettysburg. He was in active service till, at the battle of Ream's Station, he was again severely wounded and lost a leg; and was retired with the rank of Brigadier-General of Volunteers (Dec. 22, 1864). He then resumed the practice of law; became Major-General of the Pennsylvania State Militia; was defeated as Republican candidate for Governor in 1882; elected in 1887: President of the Board of Trustees of the Pennsylvania State College; Vice-Moderator of the Presbyterian General Assembly in 1888 and 1895; and member of the President's Commission on Investigation of the War Department in 1898.

**Beaver, Philip**, an English naval officer; born in Lewknor, Oxfordshire, England, Feb. 28, 1766. He served during the American Revolutionary War in the royal navy. After the war he undertook to establish an agricultural colony on Bulama island, on the W. coast of Africa, and on April 13, 1792, left England with three ships and 275 white colonists, expecting that the latter would not only cultivate the soil but would do much toward civilizing the negroes. The enterprise proved a failure and he returned to England in 1794. Subsequently he distinguished himself in the naval service. He died in Table Bay, South Africa, April 5, 1813.

## Bebeerine

**Beaver Falls**, a borough in Beaver county, Pa., on the Beaver river, near its junction with the Ohio, and on several railroads; 7 miles N. of Beaver, the county-seat. It has natural gas; good water power for manufacturing; produces steel, iron, wire, glass ware, pottery, shovels, etc., and has 2 National banks, and a property valuation of about \$5,000,000. It is the seat of Geneva College (Reformed Presbyterian). Pop. (1900) 10,054; (1910) 12,191.

**Beaver Islands**, a group of islands situated in the N. part of Lake Michigan and interesting as the scene of a short-lived Mormon colony. The largest town, St. James, on Big Beaver Island, was settled in 1847 by James J. Strang, a Mormon elder who had been driven away from the parent Mormon community because his claims conflicted with those of Brigham Young. In the little colony which he called St. James, after himself, Strang exercised the authority of king and high priest, his laws being implicitly obeyed. In 1849 he introduced polygamy, which did not spread rapidly and led to withdrawals and troubles with the "gentiles." Strang was assassinated in 1856 and the colony dispersed.

**Beaver Rat**, a name sometimes given to a small species of beaver, *castor zibethicus* (Linnæus), one of the animals called muskrat. It is only the size of a rabbit, and inhabits Canada.

**Beaverteen**, a cotton twilled cloth in which the warp is drawn up into loops, forming a pile, thus distinguishing the fabric from velvet, in which the pile is cut; a kind of fustian made of coarse twilled cotton, shorn after it has been dyed. If shorn before being dyed it is called moleskin.

**Bebber, Wilhelm Jakob van**, a Prussian meteorologist and writer, born in Grietham-Niederrhein, July 10, 1841; was educated at Bonn University, and for several years was a teacher. He became rector of the High School at Weissenburg-am-Sand in 1875. Since 1879 he has been chief of the weather telegraphing department of the German Seewarte at Hamburg. Among his works are a "Handbook of Practical Meteorology" (1885-1886), and a "Manual of Meteorology" (1890).

**Bebeerine**, in chemistry, an uncrystallizable basic substance,  $C_{19}H_{21}NO_3$ , extracted from the bark of the greenheart tree of Guiana (*nectandra rodiaei*). In pharmacy, the sulphate of bebeerine is a very valuable medicine, being used like quinine as a tonic and febrifuge. It can be given with advantage to patients who are unable to take sulphate of quinine. Unfortunately, owing to the supplies of the bark being very uncertain, this drug is at times scarce and difficult to obtain.



**Bebeeru**, a tree, the *nectandra rodici* or *N. leucantha*, variety *rodici*, a species belonging to the *lauraceæ* (laurels). It is called also the greenheart tree. It grows to about 70 feet high, and has strong, durable timber, much prized for shipbuilding. The bark is a tonic and febrifuge.

**Bebek**, a beautiful bay on the European side of the Bosphorus, with a palace of the Sultan, known as the Humayunabad, and built in 1725. Here also are the establishments for baking biscuits for the fleet, an American school, and a college of the French Order of Lazarists.

**Bebel, Ferdinand August** (bā'bel), a German Socialist, born in Cologne in 1840. In his youth he was an apprentice, and, while learning and practicing the turner's trade, he acquired a practical knowledge of the difficulties and disabilities of the workingmen. He settled in Leipzig in 1860, joined various labor organizations, and became one of the editors of the "Volkstaat" and of the better known "Vorwärts." Membership in the North German Reichstag was followed by his election to the German Reichstag, of which he was a member from 1871 to 1881, and which he entered again in 1883. He is the leader of his party in the Reichstag. Bebel's earnestness, large sympathy, and wide range of knowledge impress his hearers, although his appearance and manner in the Reichstag did not at first win them. These qualities are also characteristic of his numerous published books, among which are "Our Aims" (1874); "The German Peasant War" (1876); "The Life and Theories of Charles Fourier" (1888); "Women in Socialism, the Christian Point of View in the Woman Question" (1893).

**Bebel, Heinrich**, a notable German humanist (1472-1518). He was an alumnus of Cracow and Basel Universities, and from 1497 Professor of Poetry and Rhetoric at Tübingen. His fame rests principally on his "Facetiæ" (1506), a curious collection of bits of homely and rather coarse grained humor and anecdote, directed mainly against the clergy; and on his "Triumph of Venus," a keen satire on the depravity of his time.

**Bec**, a celebrated abbey of France, in Normandy, near Brionne, now represented only by some ruins. Lanfranc and Anselm were both connected with this abbey.

**Becafico** (bek-a-fē'kō), the fig eater, *sylvia hortensis*, a small bird of the warbler family. It is an inhabitant of the southern part of Europe, and principally of the Island of Cyprus. It is highly prized by gourmands for the delicacy of its flavor.

**Beccafumi, Domenico** (bek-a-fō'mē), an Italian painter, born near Sienna in the latter half of the 15th century; enriched the churches of Sienna with many noble frescoes and other paintings. He drew and colored

well, and possessed strong inventive powers. He died at Sienna in 1551, and was buried in its cathedral.

**Beccamoschino** (bek-a-mos-kē'nō), a little bird of the family of warblers, found in Italy. It is remarkable for its nest, which resembles that of the tailor birds, and is usually placed in a bush with long leaves, which are neatly sewed together with some kind of vegetable fibre, so as to form roof and floor.

**Beccaria, Cesare Bonesana** (bek-a-rē'a), **Marquis de**, an Italian political philosopher, born at Milan, March 15, 1738. He is chiefly known as author of the celebrated "Treatise on Crimes and Punishments," which first appeared in 1764, and advocated great reforms in criminal legislation. It passed through six editions in the first two years, and was soon read all over Europe. It brought, however, a storm of persecution on the author, who was protected by the Austrian governor of Milan, and made Professor of Political Philosophy. He died in Milan, Nov. 28, 1794.



MARQUIS DE BECCARIA.

**Beccaria, Giovanni Battista**, an Italian natural philosopher, born in Piedmont, Oct. 3, 1716; was appointed Professor of Experimental Physics at Turin, in 1748; author of a treatise on "Natural and Artificial Electricity," "Letters on Electricity," etc. He contributed several articles to the "Transactions" of the Royal Society of London, and was commissioned in 1759 to measure an arc of the meridian in the neighborhood of Turin. He died in Turin, May 27, 1781.

**Becerra, Gaspar** (be-thār'a), a Spanish painter and sculptor, born in 1520. He studied under Michael Angelo at Rome, and is credited with the chief share in the establishment of the fine arts in Spain. He died in 1570.

**Beche, Sir Henry de la** (bāsh), an English geologist, born in 1796. He founded the Geological Survey of Great Britain, which was soon undertaken by the Government, De la Beche being appointed director general. He also founded the Jermyn Street Museum of Economic or Practical Geology, and the School of Mines. His principal works are "Geology of Jamaica,"



## Becher

"Classification of European Rocks," "Geological Manual," "Researches in Theoretical Geology," "Geology of Cornwall, Devon, and West Somerset," etc. He died in 1855.

**Becher, Johann Joachim** (bech'er), a German chemist, born in 1635. He became a professor at Mainz; was elected a member of the Imperial Council at Vienna, in 1660, but fell into disgrace and subsequently resided in various parts of Germany, Holland, Italy, Sweden, and Great Britain. His chief work, "Physica Subterranea," containing many of the fanciful theories of the alchemists, was published in 1669, and enlarged in 1681. He died in London, October, 1682.

**Bechstein, Johann Matthaus** (bech'stīn), a German naturalist, born in Gotha, July 11, 1757; wrote a popular natural history of Germany, and various works on forestry, in which subject his labors were highly valuable. In Great Britain he is best known by a treatise on cage birds. He died Feb. 23, 1822.

**Bechstein, Ludwig**, a German poet and novelist (1801-1860), chiefly remembered for "The Legend Treasure and the Legendary Cycles of Thuringia" (1835-1838); "German Fairy-Tale Book" (1845, 41st ed., 1893); and others. Among his epical poems are "The Children of Haymon" (1830); "The Dance of Death" (1831); "New Natural History of Pet Birds" (1846), a humorous didactic poem; and "Thuringia's Royal House" (1865). Of his numerous novels, chiefly historical, the best known is "Journeys of a Musician" (1836-1837).

**Bechuanaland**, an extensive tract in South Africa, inhabited by the Bechuanas, extending from 28° S. lat. to the Zambesi, and from 20° E. long. to the Transvaal border. Until 1895 Bechuanaland included the Crown Colony of British Bechuanaland and the Bechuanaland Protectorate. In that year the Crown Colony was annexed to Cape Colony, and the Protectorate placed under the administration of the British South Africa Company. The Protectorate, in 1900, had an area of about 213,000 square miles, and extended from the Molopo river in the S. to the Zambesi, in the N., and was bounded on the E. by the former South African Republic and Matabeleland, and on the W. by German Southwest Africa.

Bechuanaland is a portion of an elevated plateau 4,000 to 5,000 feet above the level of the sea, and though so near the tropics, is suitable for the British race. In winter there are sharp frosts, and snow falls in some years. The rains fall in summer, and then only the rivers are full. It is an excellent country for cattle; sheep thrive in some parts, and there are extensive tracts available for corn lands; but it is not a wheat country on account of the summer rains.

## Bechuanaland

Though apparently subject to droughts, it is not more so than the Cape Colony, and the greater portion will be available for farming operations when the necessary dams have been constructed. It can be reached from Cape Town, Port Elizabeth, Durban, Delagoa Bay, and the Zambesi, the railway from the former being extended to Kimberley, Vryburg, Mafeking, Palachwe, Tati, and Buluwayo. There are extensive forests to the N. E., and to the W. the Kalahari Desert, which only requires wells dug to make it inhabitable.

The enormous quantities of buck which roam over the land attest the productiveness of the soil. Gold has been found near Sitlagoli, and there are indications of gold-bearing quartz reefs in many directions. Diamondiferous soil is also said to exist in several localities; indeed, diamonds were discovered at Vryburg in the autumn of 1887.

The Province of Stellaland is principally inhabited by Boers, and the remainder of the country by Bechuanas. The Bechuanas are a black race, possessing a language in common with the Bantu races of South Africa, extending as far N. as the equator. Their ancestors are said to have come from the N., and, progressing S. W., met the Hottentots from the Cape of Good Hope journeying N. The Bechuanas have divided up within the last 150 years, and comprise the Bahurutse, Bamangwato, Bakwena, Bangwaketse, Barolongs, Batlapins, and Batlaros. Each tribe has an animal as an emblem, or heraldic sign, which it is said they hold in esteem. They have since 1832 been at enmity with the Matabele, and in later years the Transvaal Boers have on one pretext or another endeavored to occupy their country. During the native risings in 1878, the Bechuanas invaded Griqualand West, and were in turn subdued by British volunteers as far as the Molopo. When the British Government withdrew from Bechuanaland in 1880, the natives, being helpless, were left to the mercy of the Boers of the Transvaal, whose harsh treatment in 1882 and 1883 led to the Bechuanaland expedition in 1884. At the beginning of the 19th century, the Bechuanas were further in advance in civilization than other nations of South Africa, and they are still ahead in this respect. The system of government among the Bechuanas would be termed in Europe, local government. All important matters are decided in the public assembly of the freemen of the town, but matters are previously arranged between the chief and headmen. During the British-Boer War of 1899-1900, Mafeking was the scene of one of the most determined and successful defenses in history, for an epitome of which, see BADEN-POWELL, ROBERT STEVENSON SMYTH.



**Beck, James Burnie**, an American lawyer, born in Dumfriesshire, Scotland, Feb. 13, 1822; came to the United States when a youth, and settled in Kentucky; and was graduated at the Law School of Transylvania University in 1846. He practiced law in Lexington, Ky., for 20 years. He was elected a Democratic Representative to Congress in 1866, 1868, 1870, and 1872; and United States Senator in 1876, 1882, and 1888. He died in Washington, D. C., May 3, 1890.

**Beck, Karl**, an Austrian poet, born at Baja, Hungary, May 1, 1817. His poems reflect the passionate temperament of his Hungarian countrymen in sonorous verses of consummate finish. Among his works are "Nights" (1838); "The Poet Errant" (1838); "Jankó" (1842), a romance in verse; "Songs of the Poor Man" (1847); "Jadwiga" (1863), a tale in verse; "Mater Dolorosa" (1854), a novel. He died in Vienna, April 10, 1879.

**Becke, Louis**, an Australian author, born in Port Macquarrie, Australia, about 1850. He went to sea at the age of 14, and has spent his life trading in the South Pacific. His publications are "By Reef and Palm" (1895); "South Sea Stories" (1896); "The Ebbing of the Tide" (1896); and with W. Jeffrey, "A First-Fleet Family" (1896).

**Becker, August**, a German poet and novelist (1828-1891); author of "Young Friedel, the Minstrel" (1854), a lyrical epic, and the novels "The Rabbi's Bequest" (1866); "Proscribed" (1868); "The Caruncle" (1870); "My Sister" (1876), descriptive of the doings of Lola Montez and the events of 1848 in Bavaria; "Painter Fairbeard" (1878); "The Sexton of Horst" (1889).

**Becker, Christiane Luise Amalie Neumann**, a German actress, born in Krossen, Dec. 15, 1778; was the daughter of Johann Christian Neumann, the actor. She performed in both tragedy and comedy, and was a friend of Goethe, who, after her death, made her the theme of his elegy, "Euphrosine." She died in Weimar, Sept. 27, 1797.

**Becker, George Ferdinand**, an American geologist, born in New York, Jan. 5, 1847; graduated at Harvard University in 1868; was Instructor of Mining and Metallurgy in the University of California in 1875-1879; attached to the United States Geological Survey since 1879, and Special Agent of the 10th Census, 1879-1883. He was appointed a special agent to examine into the mineral resources of the Philippine Islands in 1898. His publications include "Geology of the Comstock Lode," "Statistics and Technology of the Precious Metals" (with S. F. Emmons); "Geology of the Quicksilver Deposits of the Pacific Slope," etc.

**Becker, Karl Ferdinand**, a German musician, born in Leipsic, July 17, 1804. He wrote "Systematisch-chronologische Darstellung der Musikalischen Literatur" (1836-1839); "Die Hausmusik in Deutschland" (1840), etc. He died in Leipsic, Oct. 26, 1877.

**Becker, Karl Ferdinand**, a German philologist, born in Liser, April 14, 1775. He was the author of "Ausführliche deutsche Grammatik," "Handbuch der deutschen Sprache," etc. He died in Offenbach, Sept. 5, 1849.

**Becker, Karl Friedrich**, a German historical writer, born in Berlin, 1777; wrote various popular works on historical topics, the best known being "The World's History for Children and their Teachers" (1801-1805), a truly successful undertaking. He died in Berlin, March 15, 1806.

**Becker, Nikolaus**, a German poet (1800-1845), known as the author of the Rhine song, "They Never Shall Obtain It, the Free, the German Rhine," which became immensely popular throughout Germany, and provoked Alfred de Musset's "We Have Had it, Your German Rhine," and Lamartine's more conciliatory "Peace-Marseillaise" (1841).

**Becket, Thomas**, the most celebrated Roman Catholic prelate in the English annals; born in London in 1117 or 1118. He was the son of Gilbert, a London merchant. His mother is said to have been a Saracen lady, to whose father Gilbert was prisoner in Jerusalem, having become a captive during the Crusades. The lady is said to have fallen in love with the prisoner, to have assisted him in obtaining his liberty, and afterwards to have followed him to London, where she found him by repeating the only two European words she knew, "London" and "Gilbert." So runs the legend. After studying at Oxford and Paris, Becket was sent, by the favor of Theobald, Archbishop of Canterbury, to study civil law at Bologna in Italy, and on his return was made Archdeacon of Canterbury and Provost of Beverley. His claim to the good opinion of Theobald was founded on his skill in negotiation shown in a matter of the highest importance to England—the soliciting from the Pope of the prohibitory letters against the crowning of Eustace, the son of Stephen, by which that design was defeated. This service not only raised Becket in the esteem of the archbishop, but in that of King Henry II., and was the foundation of his high fortune.

In 1158 he was appointed high-chancellor and preceptor to Prince Henry, and at this time was a complete courtier, conforming in every respect to the humor of the king. He was, in fact, his prime companion, had the



same hours of eating and going to bed, held splendid levees, and courted popular applause. In 1159 he made a campaign with the king in Toulouse, having in his own pay 700 knights and 1,200 horsemen; and it is said he advised Henry to seize the person of Louis, King of France, shut up in Toulouse without an army. This counsel, however, so indicative of the future martyr, being too bold for the lay counsellors of one of the boldest monarchs of the age, was declined. In the next year he visited Paris to treat of an alliance between the eldest daughter of the King of France and Prince Henry, and returned with the young princess to England. He had not enjoyed the chancellorship more than four years when his patron Theobald died, and King Henry was so far mistaken as to raise his favorite to the primacy, on the presumption that he would aid him in those political views, in respect to Church power, which all the sovereigns of the Norman line embraced, and which, in fact, caused a continual struggle till its termination by Henry VIII. It has been asserted that Becket told the king what he was to expect from him; but there is evidence to prove his eagerness to obtain the dignity, and the disgust entertained by Henry, at the first symptoms of the real temper of the man whom he had been so anxious to promote, is against this statement.

Becket was consecrated archbishop in 1162, and immediately affected an austerity of character which formed a very natural prelude to the part which he meant to play. Pope Alexander III. held a general council at Tours in 1163, at which Becket attended and made a formal complaint of the infringements by the laity on the rights and immunities of the Church. On his return to England he began to act in the spirit of this representation, and to prosecute several of the nobility and others holding Church possessions, whom he also proceeded to excommunicate. Henry, an able and politic monarch, was anxious to recall certain privileges of the clergy, which withdrew them from the jurisdiction of the civil courts; and it was not without a violent struggle, and the mediation of the Pope, that Becket finally acquiesced. The king soon after summoned a convocation or parliament at Clarendon, to the celebrated "constitution" of which, although the archbishop swore that he would never assent, he at length subscribed, and alleging something like force for his excuse, by way of penance suspended himself from his archiepiscopal functions till the Pope's absolution could arrive. Finding himself the object of the king's displeasure, he soon after attempted to escape to France; but being intercepted, Henry, in a Parliament at Northampton, charged him with a violation of his allegiance, and all his goods were confiscated.

A suit was also commenced against him for money lent him during his chancellorship, and for the proceeds of the benefices which he had held vacant while in that capacity. In this desperate situation he with great difficulty and danger made his escape to Flanders, and, proceeding to the Pope at Sens, humbly resigned his archbishopric, which was, however, restored. He then took up his abode at the Abbey of Pontigny, in Normandy, whence he issued expostulatory letters to the king and bishops of England, in which he excommunicated all violators of the prerogatives of the Church, and included in the censure the principal officers of the crown. Henry was so exasperated that he banished all his relations, and obliged the Cistercians to send him away from the Abbey of Pontigny; from which he removed, on the recommendation of the King of France, to the Abbey of Columbe, and spent four years there in exile.

After much negotiation a sort of reconciliation took place in 1170, on the whole to the advantage of Becket, who, being restored to his see, with all its former privileges, behaved on the occasion with excessive haughtiness. After a triumphant entry into Canterbury the young Prince Henry, crowned during the lifetime of his father, transmitted him an order to restore the suspended and excommunicated prelates, which he refused to do, on the pretence that the Pope alone could grant the favor, though the latter had lodged the instruments of censure in his hands. The prelates immediately appealed to Henry in Normandy, who in a state of extreme exasperation exclaimed, "What an unhappy prince am I, who have not about me one man of spirit enough to rid me of a single insolent prelate, the perpetual trouble of my life!" These rash and too significant words induced four of the attendant barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to resolve to wipe out the king's reproach. Having laid their plans, they forthwith proceeded to Canterbury, and having formally required the archbishop to restore the suspended prelates, they returned in the evening of the same day (Dec. 29, 1170), and placing soldiers in the courtyard, rushed with their swords drawn into the cathedral, where the archbishop was at vespers, and advancing toward him threatened him with death if he still disobeyed the orders of Henry. Becket, without the least token of fear, replied that he was ready to die for the rights of the Church; and magnanimously added, "I charge you in the name of the Almighty, not to hurt any other person here, for none of them have been concerned in the late transactions." The confederates then strove to drag him out of the church; but not being able to do so, on account of his resolute deportment, they killed him on the



## Beckford

spot with repeated wounds, all which he endured without a groan.

The conduct of Henry, and the consequences of this assassination, form a part of English history wherein the discerning student will perceive the policy of the court of Rome, which eagerly availed itself of this opportunity to advance its general object, with a due regard to the power of Henry and his strength of character. The perpetrators of the deed, on taking a voyage to Rome, were admitted to penance, and allowed to expiate their enormity in the Holy Land.

Thus perished Thomas Becket in his 52d year, a martyr to the cause which he espoused, and a man of unquestionable vigor of intellect. He was canonized two years after his death, and miracles abounded at his tomb. In the reign of Henry III. his body was taken up and placed in a magnificent shrine erected by Archbishop Stephen Langton; and of the popularity of the pilgrimages to his tomb the "Canterbury Tales" of Chaucer will prove an enduring testimony.

**Beckford, William**, a noted English man of letters; born in Fonthill, Wiltshire, Sept. 29, 1759. Heir to a large fortune, he traveled extensively. While in France he became acquainted with Voltaire. Although a hard student and seclusive in life, he had luxurious and esthetic tastes and loved to surround himself with an Oriental atmosphere. His residence while in Portugal was regarded as a sort of fairy palace, and on his return to England he built a costly home at Fonthill, where he amassed many treasures of art and literature. The unique character of this dwelling and its rare collections, together with the eccentric manner of life of its owner appealed to the imagination of the public and excited much interest and curiosity. He is famous as the author of "Vathek," an Oriental romance of great power and luxurious imagination, written originally in French (1781 or 1782), and translated into English by himself, although another translation (by Henley) had been published anonymously and surreptitiously in 1784 (?). Among Beckford's other writings are



WILLIAM BECKFORD.

“Biographical Memoirs of Extraordinary Painters” (1780), a satirical burlesque; “Dreams, Waking Thoughts, and Incidents” (1783), a series of letters from various parts of Europe; “Italy, with Sketches of Spain and Portugal” (1834). He died at Bath, May 2, 1844.

**Beckwith, Sir George**, an English military officer, born in 1753. His scene of action was largely in America—in the United States, and the West Indies. He fought with the English in the American Revolution in 1776–1782, and was intrusted with important diplomatic commissions in 1782–1791, as there was then no British Minister to the United States. In 1804, he was made governor of St. Vincent, and four years later governor of Barbadoes. As England was then at war with France, he organized an expedition and conquered Martinique, for which he obtained the thanks of the House of Commons. Later (1810) he conquered Guadeloupe, the last possession of the French in that part of the world. When he returned to England, after nine years' service in the West Indies, a set of silver plate was given to him by the legislature of the Barbadoes, and the King conferred upon him armorial distinction. He died in London, March 20, 1823.

**Beckwith, James Carroll**, an American genre painter, born in Hannibal, Mo., Sept. 23, 1852; was a pupil of Carolus Duran, and became a member of the National Academy in 1894. Among his paintings are “Under the Lilacs” and “The Falconer.”

**Beckwith, John Watrus**, an American Episcopal bishop, born in Raleigh, N. C., Feb. 9, 1831; was graduated at Trinity College, Hartford, in 1852; ordained priest in 1855; labored in Mississippi and Alabama till after the close of the Civil War; was then called to the rectorship of Trinity Church, in New Orleans; and while there was elected Bishop of Georgia, being consecrated in Savannah, April 2, 1868. He was an eloquent and powerful preacher, and published several sermons and addresses. He died in Atlanta, Ga., Nov. 24, 1890.

**Beckx, Pierre Jean** (beks), a general of the Order of Jesuits, born near Lonvain, Belgium, Feb. 8, 1795. The success of the Jesuits, especially in non-Catholic countries, was greatly due to his tact and energy. He died in Rome, March 4, 1887.

**Becque, Henri François** (bek'), a French dramatist, born in Paris, April 9, 1837, the pioneer of realism on the Parisian stage, where he produced “The Prodigal Son” (1868): “The Abduction” (1871): “The Ravens” (1882), etc. He died in 1899.

**Becquer, Gustavo Adolfo** (bek'er), a Spanish poet and novelist, born in Seville, Feb. 17, 1836. His lyrics, chiefly elegiac, show much feeling, and his tales and legends are among the best creations of modern Spanish prose. He died in Madrid, Dec. 22, 1870.



**Becquerel, Antoine Cesar** (bek-er-el'), a French physician, and member of the Institute, born in Chatillon-sur-Loing, March 7, 1788. In early life he served in the French army in Spain as an officer of engineers. In 1815, he resigned his commission as chef de bataillon of the engineers, and devoted himself to scientific pursuits. In 1829, Becquerel became Professor of Physics in the Museum of Natural History. He was a voluminous writer on chemistry and electricity, and his industry in the collecting of facts was remarkable. His principal works are "Traité de l'Electricité et du Magnétisme" (Paris, 1834-1840); "Traité d'Electro-Chimie," "Traité de Physique Appliquée à la Chimie et aux Sciences Naturelles," "Eléments de Physique terrestre et de Météorologie" (1847), and "Traité de l'Electricité et du Magnétisme" (1855). He invented a new psychrometer in 1866. He died in Paris, Jan. 18, 1878. His son, ALEXANDRE EDMOND, also an eminent physicist, was born in Paris, March 24, 1820; was decorated with the cross of the Legion of Honor in 1851; and was appointed Professor of Physics in the Conservatoire des Arts et Métiers, in 1853. Besides his conjoint labors with his father, he made important researches on the nature of light and its chemical effects, on phosphorescence, on the conductivity and magnetic properties of many substances. He wrote "La Lumière, ses Causes et ses Effets" (1868). He died in Paris, May 13, 1891.

**Bed**, in ordinary language, an article of domestic furniture to sleep upon. Originally, a bed was the skin of a beast stretched upon the floor; then rushes, heath, and after a time straw were substituted. A modern bed consists of a large mattress stuffed with feathers, hair, or other materials, with bolster, pillow, sheets, blankets, etc., the whole raised from the ground on a bedstead. The term bed sometimes excludes and sometimes includes the bedstead. In India, and other Eastern countries, the bed of a native, at least on his travels, is simply a mat, a rug, or a bit of old carpet; his bed clothes are his scarf or plaid. Bed and bed clothes he has no difficulty in carrying with him as he goes.

In law, a divorce from bed and board, is the divorce of a husband and wife, to the extent of separating them for a time, the wife receiving support, under the name of alimony, during the severance.

In French history, the bed of justice was the throne on which, before the Revolution of 1789, the King used to sit when he went to Parliament to look after the affairs of State, the officers of Parliament attending him in scarlet robes. As this interference of the King with the Parliament was not compatible with free government, sitting on the bed of justice came to signify the exertion of arbitrary power,

In mechanics, a bed is the foundation piece or portion of anything on which the body of it rests, as the bed piece of a steam engine; the lower stone of a grinding mill; or the box, body, or receptacle of a vehicle.

**Beddoes, Thomas**, an English physician and author; born April 13, 1760, in Shifnal, Shropshire; was educated by his grandfather. He made great progress at school in classical studies, and distinguished himself at Oxford by his knowledge of ancient and modern languages and literature. He continued his studies with success in London and Edinburgh. In his 26th year he took his doctor's degree, afterward visited Paris, and formed an acquaintance with Lavoisier. On his return he was appointed Professor of Chemistry at Oxford. There he published some excellent chemical treatises, and "Observations on the Calculus," "Sea-scurvy," "Consumption," "Catarrh," and "Fever." But, dazzled by the splendid promises of the French Revolution, he offended some of his former admirers, and excited such a clamor against him by the publication of his political opinions, that he determined to resign his professorship, and retired to the house of his friend Mr. Reynolds, in Shropshire. There he composed his "Observations on the Nature of Demonstrative Evidence," in which he endeavors to prove that mathematical reasoning proceeds on the evidence of the senses, and that geometry is founded on experiment. He also published the "History of Isaac Jenkins," which was intended to impress useful moral lessons on the laboring classes in an attractive manner. After he had married, in 1794, he formed the plan of a pneumatic institution, for curing diseases, particularly consumption, by means of factitious airs or gases. He succeeded, with the assistance of the celebrated Wedgewood, in opening this institution in 1798. He engaged as superintendent of the whole, young Humphry Davy, the foundation of whose future fame was laid here. The chief purpose of the institution, however, was never realized, and Beddoes' zeal gradually relaxed, so that he relinquished it a year before his death. In the last years of his life he acquired the reputation of the best medical writer in Great Britain, particularly by his "Hygeia," in three volumes, a popular work which contains passages of extraordinary eloquence. His political pamphlets from 1795 to 1797 are forgotten. He died Dec. 24, 1808. His wife was a sister of Maria Edgeworth.

**Bede**, or **Bæda**, generally known as the Venerable Bede, the greatest figure in ancient English literature, was born near Monkwearmouth, Durham, about 673. Left an orphan at the age of six, he was educated in the Benedictine Abbey at Monkwearmouth, entering the monastery of Jar-



row, where he was ordained priest in his 30th year. His industry was enormous. "First," says Green, "among English scholars, first among English theologians, first among English historians, it is in the monk of Jarrow that English literature strikes its roots. In the 600 scholars who gathered around him for instruction, he is the father of our national education." Bede wrote homilies, lives of saints, hymns, epigrams, works on grammar and chronology, and the great "Ecclesiastical History of England," in five books, gleaned from native chronicles and oral tradition. This was translated from Latin into Anglo-Saxon by King Alfred. The first editions were issued from Strasburg in the 15th century. He died in the monastery of Jarrow, May 26, 735.

**Bede, Cuthbert**, pseudonym of EDWARD BRADLEY, an English author, born in Kidderminster in 1827; graduated at Durham University, and was rector of Denton, Stretton, and finally Lenton from 1883 until his death. He contributed to "Punch" and other London periodicals, and published the "Adventures of Mr. Verdant Green, an Oxford Freshman" (London, 1855), a humorous picture of college life. His other works include "Mr. Verdant Green Married and Done For" (1856); "The White Wife," a collection of Scottish legends (1864); "Little Mr. Bouncer and His Friend, Verdant Green" (1873-1874); and many books of travels. He died in Lenton, Dec. 12, 1889.

**Bedeguar**, the gall of the rose, found especially on the stem of the Eglantine. It is as large as an apple, and is covered with long reddish and pinnated filaments. It is produced by a puncture of a small hymenopterous insect, the *cynips rosæ*. It has been employed in cases of diarrhœa, dysentery, scurvy, stone, and worms.

**Bedell, Gregory Thurston**, an American clergyman, born in Hudson, N. Y., Aug. 27, 1817; in early life was rector of the Protestant Episcopal Church of the Ascension, New York city. In 1859 he was consecrated Assistant Bishop of Ohio, and in 1873 Bishop of that State. He wrote "The Divinity of Christ," "The Profit of Godliness," "The Age of Indifference," "Episcopacy—Fact and Law," "A Canterbury Pilgrimage," "A Votive Pillar," "Memorial of Bishop McIlvaine," and "Pastoral Theology." He died in New York city, March 11, 1892.

**Bedford**, a parliamentary and municipal borough of England, the county town of Bedfordshire, on the Ouse. The chief buildings are the law courts, a range of public schools, a large infirmary, County Jail, etc., and the churches. The town is rich in charities and educational institutions, the most prominent being the Bedford Charity, embracing grammar and other schools, and richly endowed. There is an extensive manufactory of agri-

cultural implements; lace is also made, and there is a good trade. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned.

**Bedford, Gunning**, an American patriot, born in Philadelphia, Pa., about 1730; was a lieutenant in the French War; entered the Revolutionary army with the rank of Major; was wounded at White Plains; became Muster-Master-General in 1776; was a delegate to the Continental Congress; and was elected Governor of Delaware in 1796. He died in Newcastle, Del., Sept. 30, 1797.

**Bedford, Gunning**, an American lawyer, born in Philadelphia, Pa., in 1747; was graduated at Princeton in 1771; became a lawyer; acted for a time as aide-de-camp to General Washington; represented Delaware in the Continental Congress in 1783-1786; and became Attorney-General of the State, and United States Judge for the District of Delaware. He died in Wilmington, Del., March 30, 1812.

**Bedford, Gunning S.**, an American physician, born in Baltimore, Md., in 1806; was graduated at Mount St. Mary's, Emmettsburg, Md., in 1825; took his medical degree in Rutgers Medical College in 1829; and spent some years in special study in Europe. In 1833 he was appointed Professor in the Medical College at Charleston, S. C.; subsequently was called to the Medical College in Albany, N. Y.; and, in 1836, settled in New York city. He made a specialty of obstetrics; was one of the projectors of the University Medical College; and introduced into the United States obstetrical clinics for the gratuitous treatment of poor women. His principal publications, "Diseases of Women and Children" and "Principles and Practice of Obstetrics," have had a large circulation in the United States and Europe. He died in New York city, Sept. 5, 1870.

**Bedford, John Plantagenet, Duke of**, Regent of France, third son of Henry IV. of England, was born June 20, 1389. He was created Constable of England in 1403; and sent to succor Harfleur in 1416. In 1422, Charles VI. of France died, and long years of war followed between the rival claimants for the crown, Charles VII. and Henry VI. Bedford secured the alliance of the Dukes of Burgundy and Brittany, and obtained a long series of military successes. The tide turned at the siege of Orleans, which was raised by Joan of Arc. The Duke of Brittany had previously abandoned the English cause; the Duke of Burgundy did the same in 1435; and Bedford died at Rouen, Sept. 19, 1435.

**Bedford, John Russell, Duke of**, distinguished for his princely patronage of letters, the fine arts, and every branch of social industry, was born in 1766. He was



versed in literature, fond of science, and a passionate lover of agriculture; to the improvement of which he devoted years of his life, and the expenditure of vast sums of money. Bedford was the father of the celebrated statesman, John Russell. He died in 1839.

**Bedford Level**, an eastern district of England, comprising about 450,000 acres of what is called the "Fen" country, in the counties of Cambridge (including the whole of the Isle of Ely), Suffolk, Norfolk, Huntingdon, Northampton and Lincoln. It was a mere waste of fen and marsh, until the time of Charles I., when, in 1634, a charter was granted to Francis, Earl of Bedford, who undertook to drain the level, on condition of being allowed 95,000 acres of the reclaimed land. He accomplished the undertaking at an enormous expense, and it now forms one of the most fertile and grain-productive districts in the kingdom.

**Bedivere**, Sir, in Arthurian legend, one of King Arthur's most trusted knights.

**Bedlam**, a contraction from Bethlehem, the English hospital for lunatics described below. It again is from Bethlehem, the little town, 6 miles S. of Jerusalem, everywhere and forever celebrated as the birth-place of David and of Jesus Christ. In the Hebrew, *Beth Lecchhem* means a house of bread. The Hospital of St. Mary Bethlehem was first a priory, founded in 1247, by an ex-sheriff, Simon Fitz Mary. Its original site was in Bishopsgate. The Priory of St. Mary Bethlehem, like the other English monastic establishments, was dissolved at the Reformation, Henry VIII., in 1547, granting its revenues to the mayor, the commonalty, and the citizens of London. They made it a hospital for lunatics. In 1676 the original buildings were superseded by those of the New Hospital of Bethlehem, erected near London Wall, the original one being thenceforward known as "Old Bethlehem." Finally, in 1815, the hospital was transferred to Lambeth.

**Bedloe's Island**, an island in New York harbor; ceded to the United States Government, in 1800; the site of Fort Wood, erected in 1841 and mounted with 77 guns; now the location of Bartholdi's colossal statue of "Liberty Enlightening the World."

**Bedmar**, Alfonso de la Cueva, Marquis de, Cardinal Bishop of Oviedo, a Spanish diplomatist, born in 1572. He was sent Ambassador to the republic of Venice by Philip III., in 1607, and, in 1618, he took part with Don Pedro, of Toledo, governor of Milan, and the Duke d'Ossuna, then Viceroy of Naples, in a conspiracy to overthrow the republic of Venice, by firing the arsenal, pillaging the mint and the treasury of St. Mark, and massacring the Doge and senators. The plot failed, and many Frenchmen and Spaniards were arrested and executed. Bedmar

was allowed to retire. He was created Cardinal in 1622, was afterward Spanish governor of the Netherlands, made himself detested by the Flemings, and retired to Rome, where he died in 1655.

**Bednor, Bednur, or Nagar**, a decayed city, now a village, of Mysore, India; in the midst of a basin in a rugged tableland of the Western Ghats, at an elevation of more than 4,000 feet above the sea, 150 miles N. W. of Seringapatam. It was at one time the seat of government of a rajah, and its population exceeded 100,000. In 1763, it was taken by Hyder Ali, who pillaged it of property to the estimated value of £12,000,000, and subsequently established an arsenal here.

**Bedouins** (bed-ö-enz'), a Mohammedan people of Arab race, inhabiting chiefly the deserts of Arabia, Syria, Egypt and North Africa. They lead a nomadic existence in tents, huts, caverns and ruins, associating in families under sheiks or in tribes under emirs. In respect of occupation they are only shepherds, herdsmen, and horse breeders, varying the monotony of pastoral life by raiding on each other and plundering unprotected travelers whom they consider trespassers. They are ignorant of writing and books, their knowledge being purely traditional and mainly genealogical. They are lax in morals, and unreliable even in respect to the code of honor attributed to them in poetry and fiction. In stature they are undersized, and, though active, they are not strong. The ordinary dress of the men is a long shirt girt at the loins, a black or red and yellow handkerchief for the head, and sandals; of the women, loose drawers, a long shirt, and a large dark-blue shawl covering the head and figure. The lance is the favorite weapon.

**Bedstraw**, the popular name of the different species of *galium*, a genus of plants, order *rubiacæ*. Of the species found in Britain one of the best known is the yellow bedstraw or cheese-rennet (*G. verum*), a common wayside plant, the flowers and roots of which afford yellow and red dyes. Goose-grass (*G. aparine*) is another well known member of the genus.

**Bee**, the common name given to a large family of hymenopterous or membranous-winged insects, of which the most important is the commonhive or honey bee (*apis mellifica*). It belongs to the warmer parts of the Eastern Hemisphere, but is now naturalized in the Western. A hive commonly consists of one mother or queen,



A QUEEN BEE.



from 600 to 800 males or drones, and from 15,000 to 20,000 working bees, formerly termed neuters, but now known to be imperfectly developed females. The last mentioned, the smallest, have twelve joints to their antennæ, and six abdominal rings, and



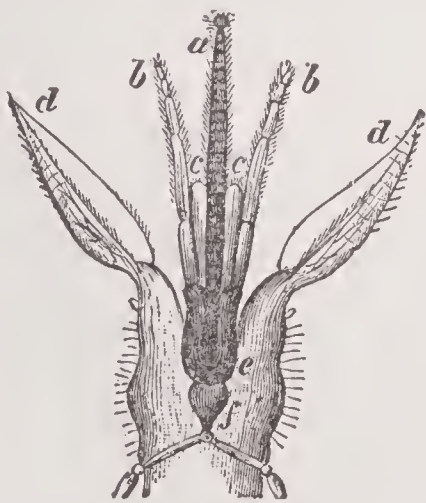
A DRONE BEE.

are provided with a sting; there is, on the outside of the hind legs, a smooth hollow, edged with hairs, called the basket, in which the kneaded pollen or beebread, the food of the larvæ, is stored for transit. The queen has the same characteristics, but is of larger size, especially in the abdomen; she has also a sting. The males, or drones, differ from both the preceding by having 13



A WORKER BEE.

joints to the antennæ; a rounded head with larger eyes, elongated and united at the summit; and no stings. According to Huber the working bees are themselves divisible into two classes; one, the *cirières*, devoted to the collection of provisions, etc., the other, smaller and more delicate, employed exclusively within the hive in rearing the young. The mouth of the bee is adapted for both masticatory and suctorial purposes, the

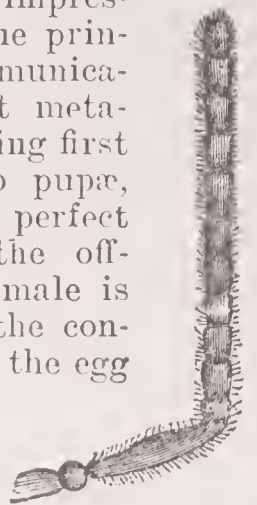


A WORKER'S MOUTH.

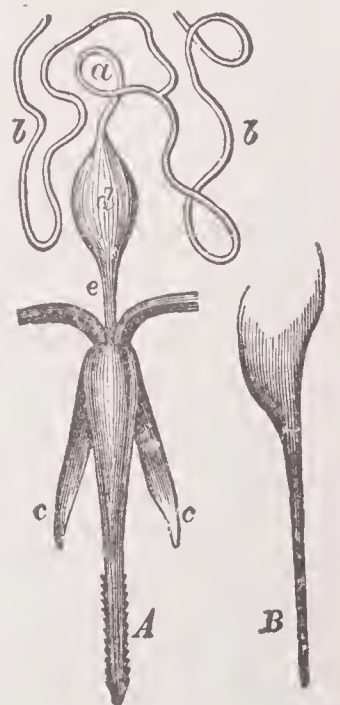
a, e, f, tongue and ducts; b, b labial palps; c, c, paraglossæ; d, d, first maxillæ.

honey being conveyed thence to the anterior stomach or crop, communicating with a second stomach in which alone a digestive process can be traced. The queen, whose sole office is to propagate the species, has two large ovaries, consisting of a great number of small cavities, each containing 16 or 17 eggs. The inferior half-circles, except the first and last, on the abdomen of working bees, have each on their inner surface two cavities, where the wax secreted by the bee from its saccharine food, is formed in layers, and comes out from between the abdominal rings. Respiration takes place by means of air tubes which branch out to all

parts of the body, the bee being exceedingly sensitive to an impure atmosphere. Of the organs of sense the most important are the antennæ, deprivation of these resulting in a species of derangement. The majority of entomologists regard their function as in the first place auditory, but they are exceedingly sensitive to tactual impressions, and are apparently the principal means of mutual communication. Bees undergo perfect metamorphosis, the young appearing first as larvæ, then changing to pupæ, from which the imagos or perfect insects spring. Whether the offspring are to be female or male is said to be dependent upon the contact or absence of contact of the egg with the impregnating fluid received from the male and stored in a special sac communicating with the oviduct, unfertilized eggs producing males. The further question whether the offsprings shall be queens or workers is resolved by the influence of environment upon function. The enlargement of a cell to the size of a royal chamber and the nourishment of its inmate with a special kind of food appears to be sufficient to transform an ordinary working bee larva into a fully developed female or queen bee. The season of fecundation occurs about the beginning of summer, and the laying begins immediately afterward, and continues until autumn; in the spring as many as 12,000 eggs may be laid in 24 days. Those laid at the commencement of fine weather all belong to the working sort, and hatch at the end of four days. The larvæ acquire their perfect state in about 12 days, and the cells are then immediately fitted up for the reception of new eggs. The eggs for producing males are laid two months later, and those for the females immediately afterward. This succession of generations forms so many distinct communities, which, when increased beyond a certain degree, leave the parent hive to found a new colony elsewhere. Thus three or four swarms sometimes leave a hive in a season. A good swarm is said to weigh at least six or eight



A FEELER.



STINGERS.

a, poison gland; b, b, glands; c, c, outer supports; d, poison bag; e, poison duct. A, sheath in which sting works; B, sting proper.



pounds. Besides the common bee (*A. mellifica*) there are the *A. fasciata*, domesticated in Egypt, the *A. ligustica*, or Ligurian bee of Italy and Greece, introduced into England, etc.

The humble-bees, or bumble-bees, of which about forty species are found in Great Britain and over sixty in North America, belong to the genus *Bombus*, which is almost world wide in its distribution. Of these species, solitary females which have survived the winter commence constructing small nests when the weather begins to be warm enough; some of them going deep into the earth in dry banks, others preferring heaps of stone or gravel, and others choosing always some bed of dry moss. In the nest the bee collects a mass of pollen and in this lays some eggs. The cells in these nests are not the work of the old bee, but are formed by the young insects similarly to the cocoons of silkworms; and when the perfect insect is released from them by the old bee, which gnaws off their tops, they are employed as honey-cups. The humble-bees, however, do not store honey for the winter, those which survive till the cold weather leaving the nest and penetrating the earth, or taking up some other sheltered position, and remaining there till the spring. The first brood consists of workers, and successive broods are produced during the summer. The experiment of domesticating different kinds of wild bees has been tried with no satisfactory results. Some bees, from their manner of nesting, are known as "mason bees," "carpenter bees," and "upholsterer bees." Some of these bees (genus *Osmia*) cement particles of sand or gravel together with a viscid substance in forming their nests; others make burrows in wood. The leafcutter or upholsterer bee (genus *Megachile*) lines its burrow with bits of leaf cut out in regular shapes.

According to the census of 1900, there are over 300,000 persons engaged in the culture of bees in the United States. The annual value of apiarian products exceeds \$20,000,000. There are 110 American apiarian societies, and eight journals are published in the interest of their work. It is estimated that the United States could, without difficulty, increase its annual bee products to \$200,000,000. The demand for American honey is increasing, England being the chief buyer. The finest honey for export is gathered from hives where white clover and basswood are accessible, although golden rod and buckwheat blossoms afford an excellent yield. New York, Pennsylvania, and Vermont furnish the greatest quantity of comb honey, while Arizona and California supply most of the extracted or liquid honey.

**Bee-Bird.** See KINGBIRD.

**Beech**, a tree, the *Fagus sylvatica*, or the genus *Fagus* to which it belongs. It is ranked under the order *Corylaceæ* (mastworts). The nuts are triquetrous, and are placed in pairs within the enlarged prickly involucre. They are called mast, and are devoured in autumn by swine and deer. The wood is brittle and not very lasting, yet it is used by turners, joiners, and millwrights. The fine thin bark is employed for making baskets and band-boxes. The country people in some parts of France put the elastic leaves under mattresses instead of straw.

**Beecher, Catherine Esther**, an American author and educator, daughter of Lyman, and sister of Henry Ward Beecher, born in Easthampton, L. I., Sept. 6, 1800. From 1822 to 1832 she conducted a school in Hartford, Conn.; and afterward taught for two years in Cincinnati, Ohio. The remainder of her life was devoted to training teachers and supplying them to needy fields, especially in the Western and Southern States. She wrote numerous works on education and on the woman question, urging the higher education, but opposing woman suffrage. She died in Elmira, N. Y., May 12, 1878.

**Beecher, Charles**, an American clergyman and author, brother of Henry Ward Beecher, born in Litchfield, Conn., Oct. 7, 1815. He graduated from Bowdoin College in 1834, and had charge of Congregational and Presbyterian churches, especially in Fort Wayne, Ind., Newark, N. J., and Georgetown, Mass. Among his published works are "David and His Throne" (1855); "Spiritual Manifestations" (1879); and "The Autobiography and Correspondence of Lyman Beecher" (1863). He died in Haverhill, Mass., April 21, 1900.

**Beecher, Edward**, an American clergyman and author, brother of Henry Ward Beecher, born in Easthampton, N. Y., Aug. 27, 1803. He graduated at Yale, studied theology at Andover and New Haven; was pastor of various Congregational churches, especially at Park street, Boston (1826-1830), and Salem street, Boston (1844-1855). He was president of Illinois College, Jacksonville (1830-1844), and for some years professor of exegesis in the Chicago Theological Seminary. He wrote many religious books, including "The Conflict of Ages" (1853) and "The Concord of Ages" (1860); in which he explained the existence of sin and misery in the world as the results of a pre-existent state, to be harmonized at last in an eternal concord of good. He died in Brooklyn, N. Y., July 28, 1895.

**Beecher, Henry Ward**, an American clergyman, editor, lecturer, orator and writer; of wide personal influence in the



## Beecher

public affairs of his generation. Third son of Lyman Beecher and Roxana Foote, he was born in Litchfield, Conn., June 24, 1813; graduated from Amherst in 1834; studied theology in Lane Seminary, near Cincinnati, Ohio (his father being president); spent ten years in Indiana as a Presbyterian pastor, two in Lawrenceburg and eight in Indianapolis; and in 1847 accepted the call of the newly organized Plymouth Church in Brooklyn, N. Y., where he remained in active pastorate until his death. Under his stirring eloquence Plymouth Church became famous for its great congregation, its liberal giving, and its advanced stand for reforms, especially as to intemperance, slavery and political corruption, while he became the favorite mouthpiece of the public on most important occasions. He joined freely in the politics of the anti-slavery, Civil War, and reconstruction periods, and championed the poor, the weak and the oppressed. Firmly believing in the divinity of Christ, he was yet more liberal in theology than most of his clerical colleagues, and is now recognized as a large factor in the theological changes during and since his day. His powers of spiritual guidance and helpfulness were extraordinary. His most noted oratorical feat was during a visit to England in 1863, when he subdued vast hostile audiences and effected a marked change in British opinion as to our Civil War.

Beecher was always interested in farming and floriculture. When in Cincinnati he worked on an agricultural journal, and his contributions both to that and to later periodicals treated often of such matters. In New York he was one of the founders of "The Independent" and among its most powerful writers before and during the Civil War. In 1870 he started "The Christian Union" (now "The Outlook"), and its circulation reached 136,000. In 1869 was begun a weekly pamphlet edition of his sermons, and as "Plymouth Pulpit" it issued nineteen volumes of his discourses (afterward published in book-form). A two-volume selection of his sermons had been put forth in 1868, edited by Lyman Abbott, and from 1857 to the time of his death there was some form of periodical printing of his pulpit utterances. The best-known of his published works are: "Lectures to Young Men" (1844); "Star Papers" (two series, 1855-58); "Life Thoughts" (ed. by Edna Dean Proctor, 1859); "Fruits, Flowers and Farming" (1864); "Eyes and Ears" (1864); "Freedom and War" (1865); "The Plymouth Collection of Hymns and Tunes" (the pioneer book for congregational singing); "Norwood, or Village Life in New England" (1867); "Prayers from Plymouth Pulpit" (1867); "Lecture Room Talks" (1870);

## Beechey

"Yale Lectures on Preaching" (three series, 1872-73-74); "The Life of Jesus, the Christ" (vol. i., 1871; vol. ii., issued after his death, 1888); "Morning and Evening Devotional Exercises" (ed. by Lyman Abbott, 1870); "Comforting Thoughts" (ed. by Irene H. Ovington, 1884); "Evolution and Religion" (1885); "Bible Studies" (ed. by John R. Howard, 1886); and, since his death, "Patriotic Addresses in England and America" (ed. by J. R. Howard, 1887), and "A Treasury of Illustration" (ed. by J. R. Howard and Truman J. Ellinwood, 1905). He died in Brooklyn, N. Y., March 8, 1887.

**Beecher, Lyman**, an American clergyman, born in New Haven, Conn., Oct. 2, 1775. His ancestors were Puritans. He graduated from Yale in 1796, and became pastor of the Presbyterian Church in Easthampton, L. I.; then of a Congregational church in Litchfield, Conn., in 1810; and then of the Hanover street Congregational Church in Boston, Mass. In 1832 he became president of Lane Theological Seminary, near Cincinnati, Ohio. His influence throughout the country was very great, especially on the questions of temperance and of slavery. His "Six Sermons on Intemperance" had a great effect, and have been frequently republished and translated into many languages. His sermon on the death of Alexander Hamilton, in 1804, with his "Remedy for Dueling" (1809), did much toward breaking up the practice in the United States. His collected "Sermons and Addresses" were published in 1852. He died in Brooklyn, N. Y., June 10, 1863.

**Beecher, Thomas Kennicutt**, an American clergyman, son of Lyman, born in Litchfield, Conn., Feb. 10, 1824. He became pastor in Brooklyn in 1852, and in Elmira, N. Y., in 1854, where he was very influential, being several times elected mayor while still pastor. He was a very successful lecturer and an effective writer on current topics. He published in book form "Our Seven Churches" (1870). He died in Elmira, N. Y., March 14, 1900.

**Beechey, Frederick William**, an English naval officer, born in London, Feb. 17, 1796. He entered the navy early in life, and, in 1818-19, took part in the great Arctic expeditions under Sir John Franklin and Sir Edward Parry. In 1821 he surveyed the N. coast of Africa. In 1825 he commanded in another polar expedition, and the results of this voyage, which lasted three years, were published under the title of "Narrative of a Voyage to the Pacific and Bering Straits, to Coöperate with the Polar Expedition in 1825-28"; and largely contributed to the progress of geographical enterprise and physical science. He became a rear-admiral of the blue in 1854, and in 1856 was elected president of



## Bee Eater

the Royal Geographical Society. He died in London, Nov. 29, 1856. Beechey Island in the Arctic Archipelago was named after him.

**Bee Eater**, in the singular the English name of a genus of birds, *merops*, and especially of the *M. apiaster*, more fully called the yellow throated bee eater of Africa. It has two long tail feathers projecting behind the rest. Its general color above is brownish red; the forehead is pale blue; a black band crosses the throat, meeting a streak of the same color along the side of the head, the space thus inclosed being yellow; the lower parts, wings, and tail are green.

In the plural, the English name of the family of *meropidæ*, of which the genus *merops* is the type. Residents in India have at times the opportunity of seeing a beautiful green species, *M. indicus*, darting out from among trees, and returning again, much as the fly-catchers do.

**Beef**, the flesh of the ox or the cow, used either fresh or salted. It is the most nutritious of all kinds of meat, and is well adapted to the most delicate constitutions. It should be well cooked, as it has been proved that underdone beef frequently produce tapeworm. Good beef is known by its having a clear, uniform fat, a firm texture, a fine open grain, and a rich reddish color. Meat which feels damp and clammy should be avoided, as it is generally unwholesome. Fresh beef loses in boiling 30 per cent. of its weight; in roasting it loses about 20 per cent. The amount of nitrogenous matter found to be present in one pound of good beef is about four ounces. In the raw state it contains 50 per cent of water.

**Beef Eater**, the *buphagineæ*, a sub-family of African birds, called also ox-peckers. They belong to the family of *sturnidæ* (starlings). *B. africana*, the species called by way of pre-eminence the beef-eater, perches on the back of cattle, picking from tumors on their hide the larvæ of bot-flies (*æstridæ*), on which it feeds.

**Beef Eater**, a name popularly given in England to the Yeomen of the Guard, attached to the court of the English sovereigns. Differences of opinion exist as to the origin of this term; but it is generally believed to be derived from the French *buffetier*, from their waiting at the royal table on great occasions. They were first constituted by Henry VII., in 1485, and have continued as a royal institution, and with nearly the same costume, to the present day.

**Beef Tea**, a nourishing beverage for invalids, which may be prepared from lean beef by chopping it small, putting it with some cold water into a saucepan and letting it simmer for two or three hours (or more), also skimming off the fat. Beef-tea is also easily and now most commonly

## Beerbohm-Tree

prepared from the extract of beef, which is extensively manufactured by the large packing houses of the United States.

**Beef Wood**, the timber of some species of Australian trees belonging to the genus *casuarina*, of a reddish color, hard, and close-grained, with dark and whitish streaks, chiefly used in fine ornamental work.

**Bee Hawk**, a name given to the honey buzzard (*pernis apivorus*), which preys on hymenopterous insects.

**Bee Hawk Moth**, the name of two British species of moths (*maeroglossa bombyli-formis* and *M. fuciformis*) having translucent wings and hairy bodies.

**Beehive Houses**, the archæological name of primitive dwellings of unknown antiquity found in Scotland and Ireland. They are conical in shape, with a hole at the apex. Some of them are ascribed to the Stone Age by Lubbock and others, but they are more generally assigned to the period from the 7th to the 12th century.

**Beelzebub**. (1) The fly-god, a god worshipped in the Philistine town of Ekron. (II Kings i: 3.) (2) An evil spirit. (3) Any person of fiendish cruelty, who is so nicknamed by his adversaries, or, in contempt of moral sentiment, appropriates the appellation to himself and cherishes it as if it were an honorable title.

**Beelzebub**, a word used in the New Testament for the prince of the demons (Matt. x: 25; xii: 24, 27; Mark iii: 22; Luke xi: 15, 18, 19). Beelzebub, not Beelzebub, is the correct reading in those passages, probably signifying lord of dung, the dung-god. A contemptuous appellation for Beelzebub, the god of Ekron, which may, moreover, have been, as Hug suggests, a dung-rolling scarabæus beetle, like that worshipped by the Egyptians.

**Bee Moth**, or **Wax Moth**, any individual of the family *galleridæ*; specifically, *galleria mellonella*, the larva of which feeds on wax in hives.



BEE MOTH.

**Beer**. See BREWING.

**Beer, Adolf** (bār), an Austrian historian, born in Prossnitz, Moravia, Feb. 27, 1831. His publications include "Geschichte des Welthandel" (1860-1864); "Holland und der osterruchische Erbfolgekrieg" (1871); "Die erste Teilung Polens" (1873-1874), and other works on Austrian history.

**Beerbohm-Tree, Herbert**, an English actor, born in London, in 1853; became a member of the Irrationals Amateur Dramatic Club about 1870, and made his first



success in "The Private Secretary," at the Prince of Wales' Theater. He then played the spy Macari in "Called Back." In 1887 he became manager of the Comedy Theater and produced "The Red Lamp." In the autumn of 1887, he took the management of the Haymarket Theater, where he produced with large success "Captain Swift," "A Man's Shadow," "The Village Priest," "Hamlet," "The Dancing Girl," "Hypatia," "Mr. H. A. Jones," "The Tempter" (1893); "A Bunch of Violets," "John-a-Dreams" (1894); "Trilby" (1895), and "Henry IV." (1896). In 1897 he opened his new theater, Her Majesty's, in the Haymarket.

**Beers, Ethel Lynn**, an American poet, born in Goshen, N. Y., Jan. 13, 1827; was a descendant of John Eliot, the apostle to the Indians. She was author of "All Quiet Along the Potomac, and Other Poems" (1879). She died in Orange, N. J., Oct. 10, 1879.

**Beers, Henry Augustin**, an American author, born in Buffalo, N. Y., July 2, 1847. He graduated from Yale in 1859; became tutor there in 1871, and Professor of English Literature in 1880. He has published, among other works, "A Century of American Literature" (1878); "The Thankless Muse," poems (1886); "From Chaucer to Tennyson" (1890); "Initial Studies in American Letters" (1892); "A Suburban Pastoral, and Other Tales" (1894); "The Ways of Yale" (1895), etc.

**Beers, Jan van**, a Flemish poet (1821-1888); from 1860 Professor at the Athenæum in Antwerp. His principal works, full of sentiment and melodious quality, are "Youth's Dreams" (1853); "Pictures of Life" (1858), and "Sentiment and Life" (1869).

**Beers, William George**, a Canadian dentist, born in Montreal, May 5, 1843; educated in his native city. Having entered the dental profession, he founded the first dental journal in Canada, and remained its editor for several years. In 1900, he was editor of "The Dominion Dental Journal" (Toronto), and Dean of the Provincial Dental College, as well as Professor of Dental Pathology, Therapeutics, and Materia Medica, in McGill University. He wrote the first book on the game of lacrosse, and is regarded as its originator. He organized and captained the first lacrosse team that visited England in 1876, and also the second one in 1883. He is noted as a lecturer and public speaker, and since 1862 has been a constant contributor to the principal American magazines.

**Beersheba** (now Bir-es-Seba, "the well of the oath"), the place where Abraham made a covenant with Abimelech, and in common speech, representative of the south-

ernmost limit of Palestine, near which it is situated. It is now a mere heap of ruins near two large and five smaller wells, though it was a place of some importance down to the period of the crusades.

**Beet** (*Beta*), a genus of plants belonging to the natural order *Chenopodiaceæ*, distinguished by its fruit being inclosed in a tough woody or spongy five-lobed enlarged calyx. Two species only are of special note, namely, the sea beet (*B. maritima*) and the common or garden beet (*B. vulgaris*). The former is a tough-rooted perennial, common on many parts of the seacoast of Great Britain, where it forms a spreading, dark green bush, with narrow, oblong, shining, rather fleshy, wavy leaves, and a stem about three feet high, covered with distant green clustered flowers. Its leaves are an excellent substitute for spinach, on which account this plant is sometimes cultivated in gardens. The garden beet, or beet of general cultivation, differs from the last in being of only biennial duration, and in forming a tender fleshy root. It grows wild in Sicily and on the coast of Barbary, and by some botanists is looked upon as a mere variety of the sea beet. Two principal forms of it are known to cultivators, the chard beet and the common beet. In the chard beet the roots are small, white, and rather tough, and the leaves are furnished with a broad, fleshy midrib, for the sake of which the variety is grown in gardens. The leaves vary in color, some having white ribs, others being brilliantly yellow, red, orange, and crimson. Some writers regard this as a peculiar species, and call it *Beta cicla* or *hortensis*. The common beet includes all the fleshy-rooted varieties bearing the names of red beet, yellow beet, sugar beet, mangold-wurzel, etc. They differ in the size, form, color, and proportional sweetness of the roots, but in other respects are the same, all requiring the same treatment under cultivation.

For garden purposes the best is the red beet of Castelnaudary, so called because it is raised chiefly in a place of that name in the S. W. of France (La Gironde); its roots are small, deep crimson, inversely conical, and almost wholly formed underground; its leaves, too, are deep purple. Other varieties of less moment are the yellow Castelnaudary, the white Silesian—very sweet, rather too large for gardens, but excellent for field culture, and much employed in the continental sugar districts—the green-topped white, and two round-rooted sorts, called Bassano and the round yellow. The former is more highly esteemed than any other in Italy. All these should be sown in the month of May, in drills, where they may be set off with the hoe to nine inches or a foot apart, according to their size. They require a deep, rich, light soil, and should be taken



## Beethoven

up in the beginning of winter, and packed in dry sand, or stored in pits, like potatoes, the succulent leaves having been first removed. Red beet is principally used at table, in salad, boiled, and cut into slices, as a pickle, and sometimes stewed with onions; but if eaten in great quantity it is said to be injurious to the stomach. The beet may be taken out of the ground for use about the end of August, but it does not attain its full size and perfection till the month of October. When good, it is large and of a deep red color, and when boiled is tender, sweet, and palatable.

**Beethoven, Ludwig von** (bā-tō'ven, or bā'tō-ven), one of the greatest musical composers of modern times, was born in Bonn, in 1770. His genius was very early displayed, and his musical education was begun by his father, and continued by the court organist, who introduced him to the works of Sebastian Bach and Händel. He soon attempted composition, and showed wonderful facility in improvisation. About 1790 he settled at Vienna, where Mozart quickly recognized his marvellous powers. When about 40 years of age, he was attacked with deafness, which became total, and lasted through life. He became, gradually, the victim of morbid irritability and hopeless melancholy, ending in confirmed hypochondria, and, finally, dropsy and delirium. He continued to compose, however, long after he had ceased to hear himself play, and received homage and honors from all parts of Europe. He died unmarried, in Vienna, March 26, 1827. The works of Beethoven are very numerous, and in every variety of style—orchestral, chamber music, piano-forte and vocal music. Among the most celebrated are the opera of "Fidelio"; the oratorio of the "Mount of Olives"; the cantata "Adelaide"; "Sinfonia Eroica" ("Heroic Symphony"); "Sinfonia Pastorale" ("Pastoral Symphony"); "Concerto in C Minor," "Sonata Pathétique," and the "Sonata with Funeral March." Vast power, intense passion, and infinite tenderness are manifested in all his compositions, which abound no less in sweetest melodies than in grand and complicated harmonies. A statue of Beethoven, by Hülmel, was erected at Bonn, in 1845.

**Beets, Nicolaus** (bāts), a Dutch poet and writer, born at Haarlem, Sept. 13, 1814; studied theology at Leyden. After serving at Heemstede, near Haarlem, he was in 1854 appointed to the pastorate of Utrecht, and in 1874 to the Chair of Theology there. His poetical works have been collected (4 vols., 1873-1881). Through the earlier pieces runs a strong vein of misanthropic sentiment, due probably to Byron, some of whose works he translated into Dutch (2 vols., 1835-1837). His prose writings in-

## Beet Sugar

clude "Camera Obscura" (13th ed., 1880), a series of tales and sketches of life and scenery in Holland, published under the pseudonym of HILDEBRAND; they display keen observation and considerable humor. Besides several critical works, he published in theology, notes on the life of St. Paul (3d ed., 1858), and "Stichtelijke Uren" (new ed., 8 vols., 1872). He died March 13, 1903.

**Beet Sugar**, the sugar obtained from the beet; similar to cane sugar; but inferior in sweetening power. Beet root contains an average of about 10 per cent. of saccharine matter; sugar cane, 18 per cent. Of the varieties, the white Selvig beet is richest.

In June, 1902, the United States Treasury Department issued a statement concerning the sugar consumption of the United States, showing that the amount had grown from 1,272,426,342 pounds in 1870 to 5,313,987,840 pounds in 1901, or from 33 to 63 pounds per capita in that time. Of the amount consumed in 1901, 985,568,640 pounds, or more than one-sixth, was produced in the United States; 852,205,760 pounds, or about another one-sixth, was produced in the insular possessions, while the remainder, amounting to 3,476,213,440 pounds, or about two-thirds of the total consumption, represented imports of the commodity. Of the 985,568,640 pounds of sugar produced in the United States in 1901, about one-third was from beets and two-thirds from cane, and of the 599,774,613 pounds of beet sugar imported, 484,344,004 pounds came unrefined.

The abolition of the European beet sugar bounties ultimately must compel those countries to seek other markets than the United States for the sale of their raw products, and it seems more than probable that the refiners of cane sugar will in time look to the culture of beets as an industry on which they must figure and in which it will be to their benefit to become interested. The annual statement of the American Beet Sugar Company furnishes ample proof of the advance which has been made by the beet sugar industry in the United States. In 1880 the domestic production of beet sugar was 357 tons, and in 1901 it had increased to 124,859 tons, a gain in 20 years of nearly 350 per cent.

In 1901 there were 52 beet sugar factories in the United States and Canada, each having a daily capacity of from 350 to 3,000 tons. Of these, 17 were situated in the State of Michigan, 15 in the West, 4 in the Middle West, 10 in the States bordering on the Pacific coast, 2 in New York State, and 4 in Canada.

Other companies had been organized by 1902 with a total capitalization of \$49,000,000, which would require annually an additional working capital of \$9,080,000, and would purchase from the farmer annually beets to the amount of \$14,700,000, besides



## Beet Sugar

many other crude materials. The number and aggregate capital of these prospective plants by States were as follows:

|                    |    |             |
|--------------------|----|-------------|
| Arizona .....      | 2  | \$1,500,000 |
| California .....   | 5  | 3,500,000   |
| Colorado .....     | 7  | 5,000,000   |
| Indiana .....      | 1  | 1,000,000   |
| Iowa .....         | 6  | 3,100,000   |
| Idaho .....        | 1  | 500,000     |
| Michigan .....     | 28 | 14,900,000  |
| Minnesota .....    | 5  | 2,400,000   |
| Montana .....      | 1  | 500,000     |
| New York .....     | 2  | 1,500,000   |
| New Jersey .....   | 1  | 500,000     |
| North Dakota ..... | 2  | 1,000,000   |
| Ohio .....         | 3  | 1,350,000   |
| Oregon .....       | 1  | 500,000     |
| Pennsylvania ..... | 1  | 500,000     |
| South Dakota ..... | 2  | 1,000,000   |
| Utah .....         | 3  | 2,500,000   |
| Wisconsin .....    | 10 | 3,150,000   |
| Wyoming .....      | 2  | 1,500,000   |

The West is particularly adapted to the growth of the sugar beet, it being about as hardy a crop as can be grown, and as the beet is made rich in sugar by the chemical effects of the rays of the sun on the leaf of the beet, one can readily imagine the wonderful development which can take place in this industry as one travels through the far West and the miles of arid country in New Mexico, Arizona, and Southern California. All this land can be irrigated. Much of it is superbly located for irrigation, and miles and miles of it can be found where the soil is 15 to 20 feet deep and as black as ink, without a pebble as large as a pea. Localities where successful beet sugar factories have been erected, are most prosperous. In Oxnard and Chino, both in Southern California, the American Beet Sugar Company has large refineries. The Oxnard factory has a capacity of working up 2,000 tons of beets daily, and the Chino factory a capacity of 1,000 tons. Where these factories are located great prosperity is found. They have a crop absolutely free from speculative influences and which is contracted to be sold before the seed is planted. The same company also has a large refinery in Rocky Ford, Colorado, where the beets are grown by some 3,000 farmers under a most perfect system of irrigation. The success of these three factories has been most remarkable.

No industry has come to the country which has meant so much to our agricultural success as the culture of the beet and the manufacture of sugar therefrom. Its benefits are felt by all branches of trade—the coal mines, the coke ovens, the limestone quarries, the manufactories of bags and barrels, the producers of lubricating oils, the blacksmith's shop, the manufacturers of chemicals and chemical instruments, the railroads, the laborers, and the merchants. From the time that the beet seed is planted until the standard, granulated sugar is produced, the beet sugar industry is of intense interest. In Europe, beet seed is produced just as carefully as our fine stock in

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this country is bred, and in the near future the United States will unquestionably take up in a most intelligent way, the growing of acclimated seed, which will produce a far richer beet than the seed that is now imported. In Southern California, the beet seed is planted from the first of January to the middle of April, so that a factory there would be able to commence its campaign about the middle of June and run continuously till about the first of December, while in the Middle West, the beets are planted from about the first of April up to about the middle of May, and the factory generally commences its campaign about the middle of September, running continuously till all the beets are sliced.

The beets furnished a factory are generally produced within a radius of between 50 and 75 miles, those coming by wagon being always more desirable than those brought in by car, owing to the fact that they are fresher, and slice better. The wagons employed are built large enough to hold several tons and are generally drawn by four to six horses. Frequently 8 to 10 horses are used, bringing in several wagons, one trailing behind the other. Before loading, the farmer places in the bottom of the wagon a large rope net, which he fastens at one side. Arriving at the factory, the wagons are weighed, then taken to the beet shed, where the process of unloading is accomplished in about half a minute. Hooks attached to a beam are caught on the loose end of the net which hangs over the side of the wagon, the net is drawn up and the beets go tumbling out on the other side into the beet shed. The wagons are then weighed again and the net tons of beets delivered by the farmer are placed to his credit. As these beets tumble out of the farmer's wagon, a boy catches a basketful, which he takes to the beet laboratory. This basket is weighed to tip the scale exactly at 50 pounds. Then the beets in the basket are dumped into a machine and thoroughly washed, and when taken out are examined to see if they have been properly topped, and if not, a boy tops them correctly. The beets are then put back in the basket and weighed on the same scale, and the difference in weight is the tare that is charged up to the particular load of beets. Five or six of the beets are taken out and ground into a mash, which is folded in a cloth and put under heavy pressure. The juice taken from these beets, after being purified, is put into a polariscope, which indicates the saccharine contents and purity, so that the farmer receives for this particular load, the price set as specified in his contract for a load of beets of such a test in sugar. The farmer, if he desires, may employ an experienced tareman to see that the weights and tests of the factory are correct.

The sheds of the larger beet sugar fac-



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tories are about 300 feet in length, having V-shaped bottoms, with slats on the sides to provide perfect ventilation. Underneath is a water-tight canal about two and one-half feet wide and two feet deep, which has a gradual fall from the farther end of the shed to the wash-house of the factory. Movable slats cover the canal, and when it is desired to empty the shed and send the beets into the factory the water is turned on, the slats removed, and the beets are floated into the wash-house. After all the dirt has been taken off the beets are thrown into an endless chain elevator, which carries them to the top of the house and dumps them into an automatic scale, which opens and shuts itself and registers their weight as they pass through into the slicer. Here the beets are cut up into "cossettes," which are pieces about as long as a lead pencil and cut in a V-shape, so as to open up all the little octagon cells in the beet, which are full of the sweet substance going to make sugar. From the slicer, the cossettes are carried to iron receptacles, somewhat resembling large bottles. These receptacles are 14 in number and are called the "diffusion battery." They are arranged either in a circular form or in a straight line, and each receptacle is so made that it can be opened at both the top and the bottom, which is covered with a wire sieve.

After the battery has been filled with cossettes, the tops are securely fastened. Pure water, which is forced in at the top of the first cell, is carried down through the cossettes and through the sieve at the bottom, where it is forced through a steam coil into the top of cell No. 2. Here it goes through the same process, and passes through all the 14 cells into a receiving tank. As cell No. 1 has had 14 times as much water pass through it as the last cell, it is now cut out of the battery, the bottom opened, and the cossettes allowed to drop out. The cell is then closed, filled with new cossettes, and now becomes cell No. 14. And so on, night and day, these cells open and shut, the idea being that the water going through the little open cells of the beets, melts and carries with it all of the sweet matter. The liquid which goes into the receiving tank is about the color of vinegar, and contains not only the sugar in a liquid form, but some impurities. To get rid of these impurities the liquid is carried along to a tank where about 10 per cent. of milk of lime is mixed with it, carefully stirred, and then carried along to a carbonation tank. The milk of lime employed is very pure and high in carbonate of lime and when mixed causes the lime to crystallize. The liquid now is carried into a filter press, which is made up of a long series of iron frames operated by hydraulic pressure. The lime, which has taken up much of the impurities, is removed thus, and when discharged has an appearance re-

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sembling putty. The liquor, which is rendered clear and transparent, now undergoes a second similar operation, except that it is mixed with a smaller percentage of milk of lime.

From this point it is carried to what is known as the sulphuring station, where sulphur is introduced to remove any impurities which may still remain. The liquid is now sent to concentrators, usually known as quadruple effect evaporators. On entering the evaporators the juice is thin, containing about 14 per cent. of solid matter, and on leaving them, is known as thick juice, containing about 62 to 65 per cent. solid matter. This thick juice is again treated for the removal of impurities and is given a final filtering through what are called mechanical filters before going to the final concentration process, wherein it is reduced by boiling to a thick mass, containing about one-half crystallized sugar and molasses. This operation is carried on in a vacuum "pan," the boiling under vacuum assisting in the formation of the crystals.

This mass, as it comes from the pan is ready for the separation of the molasses from the crystallized sugar, which is effected in what is known as a centrifugal machine which is similar to that used in creameries, for separating the cream from the milk, or, to better describe it, is a large metal basket, the sieve of which is very fine. This basket sets inside of a larger iron receptacle. When the raw sugar is dropped into this basket the inner basket is revolved at the rate of 1,000 to 1,100 revolutions a minute, which permits the sugar to travel at about the rate of three miles a minute. By these rapid revolutions of the inner basket, the mass of raw sugar runs up around the sides of this sieve, and the liquid, part of which is molasses, forces its way out through the little holes, leaving in the inner basket a crystallized sugar. After several minutes the process of washing takes place, which is done while the centrifugal is revolving, by allowing water and compressed air, which is pushed through a hose pipe, to force out of the end of the pipe a moist fog, as it were. This washes each of the little crystals, and passes out through the little pin holes of the sieve and leaves the sugar absolutely white. When this operation is finished the sugar is damp like snow. The centrifugal is stopped, the bottom of it is opened, and the damp sugar is dropped out into a large receptacle where it is conducted to a bucket elevator and carried up to what is called a drying room or granulator. This granulator resembles a big boiler, which is placed in a slanting position so that one end, where the sugar enters, is a foot higher than the end where the sugar is discharged.

The granulator has in it little ribs, and is revolved at about the rate of two revolu-



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tions a minute. The purpose of the ribs in the granulator is to permit of carrying the damp sugar as the granulator revolves, till by its own weight it drops off onto a steam cylinder which revolves more rapidly, so that the sugar will be immediately thrown off of the steam cylinder again and not allowed to be burned. Each time the sugar drops off the steam cylinder it is carried up again by the ribs and drops on the cylinder till it gets down to the lower end of the granulator, when it is perfectly dry and passes through different meshes of sieves, thereby making a fine and a coarse granulated sugar. While the granulator is revolving, there is a heavy hammer which constantly hits the top, preventing any of the sugar sticking to the sides. As the sugar passes out through the sieve, it is caught in 100-pound sacks, when it is ready for the market. The operation from the time the beets go into the washer till the granulated sugar is produced, occupies a period of about 36 hours.

A well conducted beet sugar refinery has absolute control over the workings of the house by having the beets and the cossettes sampled at each different operation. There are boys employed to take samples of the juice to the laboratory, where chemists are continuously testing them, thereby determining just where sugar is lost. The laboratory in a well managed beet sugar refinery is a most interesting place, and the entire operation of making sugar from beets is one requiring careful study and scientific methods of work in every department during the entire process.

The cossettes which are dropped down from the iron cells are carried along and elevated into a hydraulic press, where they are subjected to a great pressure. All the water is squeezed out and they are discharged into a receptacle, which carries them along and deposits them on the outside of the factory, where the farmers take them away as beet pulp. This pulp makes a most desirable fodder for cattle, and can be used for feed when fresh, or can be put in silos and allowed to ferment, when it takes on other chemical properties that make it far more valuable as a cattle food than when fresh. This is especially so when the factory is located in a section of the country where the weather is cold, as the fermented pulp will not freeze and in such state is more desirable as feed. Cattle have to learn to eat this pulp, but when they do so, they are ravenous for it, and take on a good quality of flesh very rapidly. The lime cake becomes a very valuable fertilizer and is deposited outside the factory where the farmers may get it and take it away free of charge.

In the season of 1909-1910 the beet-sugar production of the world was estimated at 6,185,000 long tons. Germany led with

## Beggars

2,020,000 tons, Austria, Russia, and France followed, with 1,269,100, 1,169,150, and 822,500 tons respectively. The United States had 384,010 tons. The cane sugar output in 1909-1910 was 8,560,000 tons. Cuba produced 1,800,000 tons; Java, 1,150,000; Hawaii, 475,000; Brazil, 275,000; Porto Rico, 270,000; Louisiana, 330,000; and Mauritius, 225,000. The total sugar product has been:

|                  | 1909-10    | 1901-02    | 1900-01   |
|------------------|------------|------------|-----------|
| Beet sugar.....  | 6,185,000  | 6,825,000  | 6,046,518 |
| Cane sugar ..... | 8,560,000  | 3,530,000  | 3,100,801 |
| Totals .....     | 14,745,000 | 10,355,000 | 9,147,319 |

The beet sugar industry was started by Marggraf, in Germany, in 1747, who was the first to discover that sugar could be extracted from the common beet. The first factory for its manufacture was erected by Archard, at Kunern, in Silesia, in 1802. Napoleon issued an imperial decree in the early part of his reign establishing this industry in France, and in 1812 he ordered the building of 10 factories and placed Delessert in charge of their construction. In 1830 attempts were made in the United States to introduce the cultivation of the sugar beet. It was not, however, till 1876 that the first successful beet sugar factory was built, being erected in Alvarado, Cal. See SUGAR.

**Beggar-my-Neighbor**, a game at cards, usually played by two persons, who share the pack, and, laying their shares face downward, turn up a card alternately until an honor appears. The honor has to be paid for by the less fortunate player at the rate of four cards for an ace, three for a king, two for a queen, and one for a knave; but if in the course of payment another honor should be turned up, the late creditor becomes himself a debtor to the amount of its value.

**Begg, Alexander**, a Canadian author, born in Quebec, July 19, 1840; educated in Aberdeen, Scotland, and in St. John's, P. Q. He was the pioneer of Canada trade (1867), in Manitoba, and in the Northwest Territories. During the rebellion of 1869, he advocated representative government for the people. In 1878-1884 he was deputy treasurer of the Province of Manitoba. He was commissioner for Manitoba to the Dominion Exhibition in 1879, and had charge of the Manitoba exhibits through Ontario, Quebec, and the Maritime Provinces in 1879-1880. His works include "Dot it Down," "The Creation of Manitoba," "A Story of the Saskatchewan," "A Practical Guide to Manitoba," "Ten Years in Winnipeg," "A History of the Northwest" (3 vols.), etc.

**Beggars**, a term first applied to the 300 Protestant deputies under Henri de Brederode and Louis de Nassau, who protested against the establishment of the Inquisition



## Begging the Question

in Holland, in April, 1566. The Dutch patriots assumed this designation when they rebelled against Spain in 1572.

**Begging the Question**, assuming a proposition which, in reality, involves the conclusion. Thus, to say that parallel lines will never meet because they are parallel, is simply to assume as a fact the very thing you profess to prove. The phrase is a translation of the Latin term, *petitio principii*, and was first used by Aristotle.

**Beghards, Beguards, or Bogards**, various spellings of a name said by some to be derived from their begging favor from God in prayer, and to the fact that they were religious mendicants. Another opinion is that they are named after St. Begghe, whom they took for their patroness. Skeat confidently suggests the Namur dialectic word *beguiant* = a stammer, as the real etymology.

In general Church history, "the tertiaries" of several monastic orders, Dominicans and Franciscans. In a special sense, the tertiaries of the Franciscans. By the third rule of St. Francis, those might have a certain loose connection with this order, who, without forsaking their worldly business, or forbearing to marry, yet dressed poorly, were continent, prayerful, and grave in manners. In France they were called *Beguini*, and in Italy, *Bizochi*, and *Bocasoti*. They were greatly persecuted by successive Popes.

The name was also applied to certain religious people who associated themselves into a kind of monastic lodging house under a chief, while they were unmarried, retiring when they pleased. As they often supported themselves by weaving, they were sometimes called "Brother Weavers." They first attracted notice in the Netherlands in the 13th century. They were established at Antwerp in 1228, and adopted the third rule of St. Francis in 1290.

**Begin, Louis Nazaire**, a Canadian clergyman; educated at the College of St. Michael de Bellechasse, the Seminary of Quebec, Laval University, and the Grand Seminary of Quebec. About the time of his graduation from the last institution, its trustees decided to found a theological department in connection with Laval University, and it was their wish that the faculty of this theological school should be educated in Rome. Therefore, Dr. Begin, who had been elected a member of the faculty, was sent to Rome in 1863, and remained abroad till 1868. During this time, he traveled extensively and studied many branches of theology. On his return to Quebec, he was appointed Professor of Dogmatic Theology and Ecclesiastical History in Laval University. He held this chair till 1884. He became Principal of the Laval Normal School in 1885; was appointed Bishop of Chicoutimi in 1888; Coadjutor to Cardinal Taschereau,

## Beg-Shehr

with the title of Archbishop of Cyrene, in 1891; and in 1894 became Administrator of the Province of Quebec. His works include "La Primaute et l'Infaillibilité des Souverains Pontifes," "La Sainte Ecriture et la Règle de Foi" (1874); "Le Culte Catholique" (1875), etc.

**Beglerbeg**, the title among the Turks of a governor who has under him several begs, or beys, agas, etc.

**Begon, Michel**, a French administrator, born in Blois, France, 1638. He was a naval officer, and successively Intendant of the French West Indies, of Canada, of Rochefort, and La Rochelle. He is celebrated for his love of science, and the well known genus of plants, begonia, was named in his honor. He died in Rochefort, France, March 4, 1710.

**Begonia**, a genus of plants, the typical one of the order *begoniaceæ* (begoniads).



BEGONIA REX.

Several species are cultivated in greenhouses, in flower pots, in houses, and in similar situations.

**Begoniaceæ** (Latin), **Begoniads** (English), an order of plants, classed by Lindley under his 24th, or cucurbital, alliance. The flowers are unisexual. The sepals superior, colored; in the males four, two being within the others and smaller than them; in the females five, two being smaller than the rest. The stamina are indefinite; the ovary is inferior, winged, three-celled, with three double polyspermous placentæ in the axis. The fruit is membranous, three-celled, with an indefinite number of minute seeds. The flowers, which are in cymes, are pink; the leaves are alternate, and toothed with scarious stipules. Genera, 2; species, 159 (Lindley, 1847). Localities, the East and West Indies, etc.

**Beg-Shéhr** (-shār), or **Kereli Göl**, an extensive mountain lake, in Asia Minor, 44 miles S. W. of Konia, situated almost 3,700 feet above the sea. It is over 30 miles long, and from 5 to 10 miles broad, and contains several islands. Its only visible outlet is a



rivulet connecting it with the much smaller lake, Soghla Göl, the waters of which occasionally disappear altogether; and it is evident that a great part is carried off through subterranean channels in the limestone range of the Taurus. On its E. and N. shores are the towns of Begshehr and Kereli.

**Beguines** (beg-ēn'), **Beguins**, or **Beguinae**. (1) The females who acted on the third rule of St. Francis, and corresponded to the Beghards, or Beguins, of the other sex. They were called also Beguttæ. (2) Associations of praying women which arose in the Netherlands in the 13th century, the first being formed at Nivelles, in Brabant, in A. D. 1226, and spread rapidly in the adjoining countries. They said they originated from a certain St. Begga, Duchess of Brabant, in the 7th century; while their enemies affirm that they were founded by Lambert le Begue, a priest of Liege, in the 12th century. Mosheim rejects both statements. They used to weave cloth, live together under a directress, and leave on being married, or indeed whenever they pleased. They still exist in some of the Belgian towns, notably at Ghent, where they are renowned as makers of lace, though under different rules from those formerly observed.

**Beguins** (beg-an'), the French name for the religious men called by the Germans Beghards. Used (1) of the Franciscan tertiaries; and (2) especially of the praying men established in the Netherlands in the 13th century in imitation of the similar institution for the other sex commenced by the Beguines.

**Begum** (a feminine form corresponding to beg, or bey), an Indian title of honor equivalent to princess, conferred on the mothers, sisters, or wives of native rulers. The Begum of Oudh is well known in Indian history.

**Behaim**, or **Behem**, **Martin**, a German mathematician and astronomer, born in Nuremberg about 1430. He went from Antwerp to Lisbon with a high reputation in 1480, sailed in the fleet of Diego Cam on a voyage of discovery (1484-1486), and explored the islands on the coast of Africa as far as the Kongo. He colonized the Island of Fayal, where he remained for several years, and assisted in the discovery of the other Azores; was afterward knighted, and returned to his native country, where, in 1492, he constructed a terrestrial globe, still preserved. He died in Lisbon in 1506.

**Beham**, **Bartel**, a German painter and engraver, born in Nuremberg in 1496; studied painting under Albert Dürer and later in Italy, and engraving under Marc Antonia Raimondi. Among his paintings are "Christ Bearing the Cross," "A Woman Raised from

the Dead by the True Cross," and "Marcus Curtius Leaping Into the Gulf." Among his prints are a portrait of William, Duke of Bavaria," "Adam, Eve, and Death Before a Tree," "The Virgin Suckling a Child," "Lucretia," "Cleopatra," "Apollo Causing Marsyas to be Flayed," and "Christ Giving His Charge to Saint Peter." He died in Rome, Italy, in 1540.

**Beham**, **Hans Sebald**, a German engraver, born in Nuremberg, in 1500; studied under Bartel Beham, his uncle, and later under Albert Dürer. His only oil painting represents scenes from the life of David. His prints include "Adam and Eve in Paradise," "The Virgin Suckling the Child," "The Death of Dido," "Adam and Eve," with a stag behind them; "Adam and Eve in Paradise: the Serpent Presenting the Apple," "Death Seizing a Young Woman," eight prints of the "Passion of Christ," and "Triumphal Entry of Charles V. into Munich." He died in Frankfort in 1550.

**Behar**, a province of Hindustan, in Bengal, area 44,186 square miles. It is generally flat, and is divided into almost equal parts by the Ganges, the chief tributaries of which in the province are the Gogra, Gandak, Kusi, Mahananda, and Soane. There is an extensive canal and irrigation system. Opium and indigo are largely produced. It is the most densely peopled province of India; pop. (1901) 24,241,305; capital, Patna. The town of Behar, in the Patna district, contains some ancient mosques and the ruins of an old fort; it is a place of large trade. Pop. (1901) 44,984.

**Behemoth**, the animal described in Job xl: 15-24. It is probably the hippopotamus, which, in the time of Job, seems to have been found in the Nile below the cataracts, though now it is said to occur only above them. A second opinion entertained is that Job's behemoth was the elephant; while a few scholars make the less probable conjecture that it was the rhinoceros.

**Behistun**, or **Bisutun**, a mountain near a village of the same name in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its sides—a rock rising almost perpendicularly to the height of 1,700 feet. These works, which stand about 300 feet from the ground, were executed by the orders of Darius I., King of Persia, and set forth his genealogy and victories. To receive the inscriptions, the rock was carefully polished and coated with a hard, siliceous varnish. Their probable date is about 515 B. C. They were first copied and deciphered by Rawlinson.

**Behm**, **Ernst** (bām), a German geographer, born in Gotha, Jan. 4, 1830. In 1856 he became Dr. Petermann's chief assistant in editing the famous geographical periodical, "Mitteilungen," to the editorship of which



he succeeded on his chief's death in 1878. In 1872 he commenced, in conjunction with H. Wagner, the useful "Population of the Earth" (vol. vii, 1882), intended as a statistical supplement to the "Mitteilungen;" and from 1876 he undertook the statistical department of the "Almanach de Gotha." His more extended writings of this nature are marked by fullness, accuracy, and marked lucidity of arrangement. He died in Gotha, March 15, 1884.

**Behmen.** See BOEHME, JAKOB.

**Behn** (bān), **Aphra**, or **Afra**, or **Aphara**, an English author, born in Wye, in 1640. Early in life she spent several years in the West Indies, where she met the Indians, who became the model of her famous "Oroonoko." She was the first woman writer in England who earned a livelihood by her pen. Her dramatic works include "The Forced Marriage" (1671); "The Amorous Prince" (1671); "The Dutch Lover" (1673); "Abdelazar" (1677); "The Rover" (1677); "The Debauchee" (1677); "The Town Fop" (1677); "The False Count" (1682). She also wrote "Poems" (1684), etc. She died in London, April 16, 1689.

**Behring**, another spelling of **BERING** (q. v.).

**Beige**, a light, woolen fabric, made of wool of the natural color; that is, neither dyed nor bleached.

**Beilan**, a town and pass in the N. of Syria, on the Gulf of Iscanderoon. The pass has more than once been of military importance, and was in 1832 the scene of a battle between Turks and Egyptians. The town, 1,584 feet above the Mediterranean, has 5,000 inhabitants.

**Beira** (bā-ē-ra'), a Province of Portugal, between Spain and the Atlantic, and bounded by the Douro on the N., and by the Tagus and Estremadura on the S. Area, 9,248 square miles. Pop. (1900) 1,518,406. Chief town, Coimbra. It is mountainous and well watered. The heir apparent of the crown is styled Prince of Beira.

**Beirut.** See BEYROUT.

**Beissel, Johann Conrad**, a German mystic, born in Eberbach, in 1690. He settled in Pennsylvania in 1720, and established the German Seventh-Day Baptists, at Ephrata, in 1728. He died in Ephrata, in 1768.

**Beitzke, Heinrich Ludwig** (bit'ske), a German historian, born in Muttrin, Feb. 15, 1798. His publications include "History of the German War for Freedom" (1855); "History of the Russian War—Year of 1812" (1856); "History of the Year 1815" (1865), etc. He died in Berlin, May 10, 1867.

**Bejapoor**, a ruined city of Hindustan, in the Bombay Presidency, near the borders of the Nizam's dominions, on an affluent of the Krishna. It was one of the largest cities in

India until its capture by Aurungzebe in 1686. The ruins, of which some are in the richest style of Oriental art, are chiefly Mohammedan, the principal being Mahomet Shah's tomb, with a dome visible for 14 miles, and a Hindu temple in the earliest Brahminical style. Pop. 13,245.

**Beke, Charles Tilstone**, an English geographer, explorer, and author, born in London, Oct. 10, 1800. In 1834 he published "Origines Biblicæ; or, Researches in Primeval History," one of the first attempts to reconstruct history on the principles of the young science of geology. His historical and geographical studies of the East led him to consider the great importance of Abyssinia for commercial and other intercourse with Central Africa; and he accordingly proceeded to Shoa, in South Abyssinia, which he reached in the beginning of 1851. Thence, he went alone into the interior, where he explored Godjam and the countries lying to the W. and S., previously almost entirely unknown to Europeans. The result of these researches was published in "A Statement of Facts" (1st ed., London, 1845). On his return to Europe, there appeared, successively, from his pen, "An Essay on the Nile and its Tributaries" (London, 1847); "On the Sources of the Nile in the Mountains of the Moon" (1848); "On the Sources of the Nile" (1849); and "Mémoire Justificatif en Réhabilitation des Pères Pacz et Lobo" (Paris, 1848). Among his other works are "On the Geographical Distribution of Languages in Abyssinia" (Edinburgh, 1849); and "The Sources of the Nile, with the History of Nilotic Discovery" (London, 1860). He left England, in November, 1865, on a fruitless mission to obtain the release of his fellow countrymen in Abyssinia, and published "The British Captives in Abyssinia" in 1867. He died in London, July 31, 1874.

**Bekker, Elizabeth**, a Dutch novelist, born in Vlissingen, July 24, 1738; married to Adriaan Wolff, a Reformed Church minister at Beemster, who died in 1777; she lived afterward in closest friendship with Agathe Deken, who also collaborated in her most important works, to wit: "History of Sara Burgerhart" (1782); "History of William Leevend" (1784–1785); "Letters of Abraham Blankaart" (1787–1789); "Cornelia Wildschut" (1793–1796). She died in The Hague, Nov. 5, 1804.

**Bekker, Immanuel**, a German scholar distinguished by his recensions of the texts of Greek classics, born in Berlin, May 21, 1785; studied in Halle, and, in 1811, became Professor of Philology in his native city. The results of his researches in the libraries of France, Italy, England, and Germany, appear in his numerous recensions of texts derived solely from MSS., and independently of printed editions. The writers included



in these recensions are Plato, the Attic orators, Aristotle, Thucydides, Theognis, Aristophanes, as well as Livy and Tacitus. He died in Berlin, June 7, 1871.

**Bel**, in Accadian, Assyrian and Babylonian mythology, a god; mentioned in Scripture, in Is. xlv: 1; Jer. 1: 2, li: 44; in the Septuagint, in Baruch vi: 40, and in the apocryphal additions to the Book of Daniel, as well as by classical authors. Much new light has recently been thrown on Bel's characteristics and position in the heavenly hierarchy, by the examination of the cuneiform tablets and sculptures. It has been discovered that, prior to 1600 B. C., the highly interesting Turanian people called Accadians, the inventors of the cuneiform writing, who wielded extensive authority in Western Asia before the Semitic Assyrians and Babylonians had come into notice, worshipped as their first triad of gods, Anu, ruling over the heaven; Elu, Belu, or Bel, over the earth; and Ea, over the sea. Bel's three children, or three of his children, were Shamas, the sun-god; Sin, the moon-god; and Ishtar, the Accadian Venus. Sayce shows that some first born children were vicariously offered in sacrifice by fire to the sun-god. From the Accadians, human sacrifice passed to various Semitic tribes and nations. Bel's name Elu identifies him with the Phœnician El, who, in a time of trouble, offered his first born son, "the beloved," on a high place, by fire. It is not settled whether or not Bel was the same also as the Phœnician Baal. To the wrath of Bel the deluge was attributed. In Scripture times he was known exclusively as a Babylonian divinity, being distinguished from both Nebo and Merodach. In the later Babylonian Empire, however, Merodach came to be generally identified with Bel, though sometimes distinguished from him, being called "the lesser Bel."

**Bela**, the name of four Kings of Hungary belonging to the Arpad dynasty. BELA I., son of Ladislaf, competed for the crown with his brother Andrew, whom he defeated, killed, and succeeded in 1061. He died in 1063, after introducing many reforms. BELA II., the Blind, mounted the throne in 1131, and after ruling under the evil guidance of his Queen, Helena, died from the effects of his vices in 1141. BELA III., crowned 1174, corrected abuses, repelled the Bohemians, Poles, Austrians, and Venetians, and died in 1196. BELA IV. succeeded his father, Andrew II., in 1235; was shortly after defeated by the Tartars and detained prisoner for some time in Austria, where he had sought refuge. In 1244 he regained his throne, with the aid of the Knights of Rhodes, and defeated the Austrians, but was in turn beaten by the Bohemians. He died in 1270.

**Bel and the Dragon**, one of the books of the Apocrypha, or, more precisely, certain apocryphal chapters added to the canonical Book of Daniel. The Jews consider them as no part of their Scriptures. They were penned probably by an Alexandrian Jew, the language used being not Hebrew, nor Aramaean, but Greek. The Church of Rome accepts Bel and the Dragon as part of the Holy Scripture; most, if not all, Protestant churches reject it. In Roman Catholic worship it is read on Ash Wednesday, and was so in the old lectionary of the English Church on the 23d of November. The new lectionary has it not either on that or any other date. The story of Bel and the Dragon tells how Daniel enlightened Cyrus, who is represented as having been a devout worshiper of Bel, by proving that the immense supplies of food laid before the idol were really consumed, not by it or by the inhabiting divinity, but by the priests and their families. On Cyrus urging that the dragon, also worshiped, was at least a living God, Daniel poisoned it, for which he was thrown into a lions' den, where the Prophet Habakkuk fed him. Ultimately he was released, and his persecutors put to death.

The above narrative must not be confounded with one called also "Bel and the Dragon," translated by Fox Talbot from the cuneiform tablets. Mr. Talbot believes that the dragon, seven-headed, like the one in Revelation, would, if the tablets were complete, prove the same being that seduced some of the heavenly "gods," or angels, from their allegiance (Rev. xii: 4; Jude 6), for which he was slain by Bel. The resemblance is not to the apocryphal book now under consideration, but to the combat between Michael and the Dragon in Rev. xii: 7-17.

**Belcher, Sir Edward**, an English naval officer, born in 1799; entered the navy in 1812, and, in 1816, took part in the bombardment of Algiers. In 1825 he was appointed assistant surveyor to the expedition about to explore Bering Strait under Captain Beechey; and from 1836 to 1842 he commanded the "Sulphur," commissioned to explore the W. coast of America. Knighted in 1843, and for five years employed on surveying service in the East Indies, he was, in 1852, appointed to the command of the unfortunate expedition sent out by the government to search for Sir John Franklin. Belcher published "Narrative of a Voyage Round the World in the Sulphur" (1843); "Narrative of a Voyage to the East Indies" (1848); "The Last of the Arctic Voyages" (1855), etc. In 1861 he became Rear-Admiral of the Red, in 1866 Vice-Admiral, in 1867 K. C. B., and Rear-Admiral in 1872. He died March 18, 1877. Belcher Channel, an inlet of Jones' Sound, (Baffins Bay) is named from him, its discoverer.



**Belcikovski, Adam** (bel-chē-kov-skē), a Polish dramatist, born in Cracow, in 1839. Among his numerous historical dramas and comedies are "King Don Juan" (1869); "Hunyadi" (1870); "Francesca da Rimini" (1873); "The Oath" (1878); "King Boleslav the Bold" (1882). He also wrote valuable essays on Polish literature.

**Belem**, a town in Portugal, W. of Lisbon; noted for a monastery founded in 1500, to commemorate the voyage of Vasco da Gama, and now used as an orphan asylum. It is one of the most florid examples of the Pointed Style. The church is divided into three aisles by slender and lofty pillars, and has a raised choir at the W. end. Here are buried Vasco da Gama, Camoens, and many Portuguese sovereigns.

**Belemnite**, a genus of fossil chambered shells, the typical one of the family *belemnitidæ*; held by Von Tressau, Klein, Brey-nius, Da Costa, Brander, and Plott to be shells, the proper position of which they could not determine. Cuvier and Lamarck made a great step forward in ranking them as cephalopods with an internal shell, a conclusion confirmed by Buckland, Owen, and others. The last named palæontologist placed the belemnite in the dibranchiate order of cephalopods.

One essential part of the shell is a phragmocone or chambered cone, that is, a portion conical in form, and divided transversely by septa or partitions, like a pile of watch-glasses, into shallow chambers, connected with each other by a siphuncle or small pipe or siphon near the margin of the cone. The entire cone is enveloped in a sheath, which rises above the chambers and gives support to the soft body of the animal (called the *pro-ostracum*), and this again in a conical cavity or alveolus excavated in the base of a long, tapering body, resembling the head of a javelin, and called the guard. It is from this fact that the name belemnite has arisen. Dr. Buckland and Agassiz discovered in specimens from Lyme Regis, collected by Miss Anning, a fossil ink-bag and duct. There have been found also traces of the contour of the large sessile eyes, the funnel, a great proportion of the muscular parts of the mantle, the remains of two lateral fins, eight cephalic arms, each apparently provided with 12 to 20 pairs of slender, elongated horny hooks. Owen considers that the belemnite combined characters at present divided among the three cephalopodous genera *sepia*, *onychoteuthis*, and *sepiola*.

These animals seem to have been gregarious, living in shallow water with a muddy bottom rather than one studded with projecting corals. Owen thinks that they preserved a tolerably vertical position when swimming, at times rising swiftly and stealthily toward the surface, infixing their claws in the abdomen of a supernatant fish, and

dragging it down to the depths to be devoured. Belemnites are found all over Europe, and also in India. In 1875, Tate estimated the known species at more than 100, ranging from the lias to the chalk.

**Belemnitidæ**, a family of mollusks belonging to the class *cephalopoda*, the order *dibranchiata*, and the section *decapoda*. The shell consists of a "pen," terminating posteriorly in a chambered cone, technically called a phragmocone, from the Greek *fragmos* = a hedge, fence, paling, fortification, or inclosure, and *konos* = the mathematical figure termed a cone. The phragmocone is sometimes invested with a fibrous guard, and it has air cells connected by a siphuncle piercing the several chambers close to the ventral side. Dr. S. O. Woodward arranges the *belemnitidæ* between the *teuthidæ*, or calamaries and squids, on the one hand, and the *sepiadæ* or sepias on the other. In geological time they extend from the lias to the chalk. The genera are *belemnites*, *belemnitella*, *xiphoteuthis*, *acanthoteuthis*, *belemnoteuthis*, and *conoteuthis*.

**Belfast**, a seaport and municipal and parliamentary borough of Ireland (in 1888 declared a city), principal town of Ulster, and county town of Antrim, built on low, alluvial land on the left bank of the Lagan, at the head of Belfast Lough. Ballymacarret, in county Down, on the right bank of the Lagan, is a suburb. The streets are spacious and regular, the houses mostly of brick. The chief Episcopal churches are St. Ann's, Trinity, and St. George's, but the most magnificent is the Roman Catholic, St. Peter's. The chief educational institutions are Queen's College, with about 20 professors; and the theological colleges of the Presbyterians and Methodists. Chief public buildings include the town hall, the county courthouse, the Commercial Buildings and Exchange, the White and Brown Linen Halls, the range of buildings for the customs, inland revenue and post-office, the county jail, the Ulster Hall, the Albert memorial clock tower, 143 feet high, the theater, etc. In the suburbs are two extensive public parks, a botanic garden of 17 acres, and the borough cemetery. Belfast Lough is about 12 miles long, and 6 miles broad at the entrance, gradually narrowing as it approaches the town. The harbor and dock accommodation is extensive. Belfast is the center of the Irish linen trade, and has the majority of spinning mills and power loom factories in Ireland. Previous to about 1830 the cotton manufacture was the leading industry of Belfast, but nearly all the mills have been converted to flax spinning. The iron ship-building trade is also of importance, and there are breweries, distilleries, flour mills, oil mills, foundries, print works, tan yards, chemical works, rope works, etc. The commerce is large. An ex-



## Belfast

tensive direct trade is carried on with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic, besides the regular traffic with the principal ports of the British Islands. Belfast is comparatively a modern town. In 1662 there were not more than 150 houses within the walls. Its prosperity dates from the introduction of the cotton trade by Robert Jay in 1777. In the war between Charles I. and Parliament, the citizens at first took the side of the people and afterward espoused the cause of the king. It has suffered severely at various times from faction fights between Catholics and Protestants, the more serious having occurred in the years 1864, 1872, and 1886. It returns four members to Parliament. Pop. (1901) 348,876.

**Belfast**, city, port of entry, and county-seat of Waldo co., Me.; at the head of Penobscot Bay, and on the Maine Central railroad; 30 miles from the ocean, and 132 miles N. E. of Portland. It has a fine harbor, a large domestic trade, and important manufactures. The most notable industry is ship-building, which was begun here in 1793. In recent years a number of the famous 3-master and 4-master barkentines and several schooners that have become well known in shipping circles, were built here. In March, 1900, the ship-building firm of C. P. Carter & Co., which began work in 1840, retired from business and was succeeded by another concern. Belfast was settled in 1770; was invested by the British in 1815, and was given a city charter in 1853. Pop. (1900) 4,615; (1910) 4,618.

**\*Belgium** (French, Belgique; German, Belgien), a kingdom of Europe, bounded N. by Holland, N. W. by the North Sea, W. and S. by France, and E. by the duchy of Luxemburg, Rhenish Prussia, and Dutch Limburg; greatest length, N. W. to S. E., 165 miles; greatest breadth, N. to S., 120 miles; area, about 11,400 square miles. Belgium, in shape, resembles a triangle, which has its vertex in the W.; the base resting on Germany on the E., the shorter side facing Holland and the sea, and the larger forming the frontier of France. For administrative purposes it is divided into nine provinces—Antwerp, South Brabant, East Flanders, West Flanders, Hainaut, Liège, Limburg, Luxemburg, and Namur. These provinces do not differ much in area, and are so arranged as to form a compact and commodious division of the kingdom. South Brabant, which from containing Brussels, the capital, may be considered the metropolitan province, occupies the center, while the others eluster round, and, with the exception of the extreme provinces of Luxemburg and West Flanders, actually touch it.

## Belgium

The following table shows the areas of the different provinces, with their population, on Dec. 31, 1900:

|                      | Area in<br>sq. miles. | Pop-<br>ulation. |
|----------------------|-----------------------|------------------|
| Antwerp .....        | 1,093                 | 819,000          |
| Brabant .....        | 1,268                 | 1,263,807        |
| Flanders, East ..... | 1,158                 | 1,029,971        |
| Flanders, West ..... | 1,249                 | 805,236          |
| Hainaut .....        | 1,437                 | 1,142,951        |
| Liège .....          | 1,117                 | 820,175          |
| Limburg .....        | 931                   | 240,796          |
| Luxemburg .....      | 1,706                 | 219,200          |
| Namur .....          | 1,414                 | 346,512          |
|                      | 11,373                | 6,687,651        |

*Physical Features.*—A general idea of the surface of the country may be obtained by regarding it as an inclined plane, somewhat rugged, and considerably elevated in the S. E., from which it slopes, more or less gradually, N. and W., till it sinks into low plains, only a few feet above the level of the sea. The elevated districts are formed by ramifications of the Ardennes, which, entering Belgium from France, stretch along the S. of Namur, occupy the greater part of Luxemburg, and attain their culminating point in the S. E. of Liège at Stavelot, in the neighborhood of Spa, where the height exceeds 2,000 feet. The rocks appear to rest on Primary formations; but those which reach the surface generally consist of slate, old red sandstone, and mountain limestone. Proceeding N. W., in the direction of the dip, these rocks take a cover, and the coal formation becomes fully developed. This coal field is a continuation of that of the N. of France, and stretches through Belgium in a N. E. direction, occupying the greater part of the province of Hainaut, and a considerable part of that of Liège, and skirting the provinces of Namur and Luxemburg. It contains numerous workable seams, both of coal and iron. N. and W., beyond the limits of this coal field, a more recent formation is found, covered by deep beds of clay and sand, the former prevailing more in the interior, and the latter near the coast, where it has been drifted into hillocks or downs, and forms the only barrier against the enroachments of the sea. Some of the clay in this district is fit for the manufacture of fine pottery; but the greater part of it is fit only for coarse ware, or for bricks.

In accordance with the general slope of the surface already mentioned, the main streams of Belgium have a N. direction; and the whole country lies within the basin of the German Ocean. In the S. E., where the surface is elevated and broken, numerous torrents descend with rapidity; and becoming confined within rocky, precipitous, and richly wooded banks, often furnish, if not the grandest, the most picturesque and enchanting of landscapes. On reaching the lower country their speed is slack-

\*For Map. see THE NETHERLANDS.



ened, and their augmented volume moves along in a slow winding course. Only two of them—the Meuse and the Scheldt—have a magnitude which entitles them to the name of rivers; but so important are these two in themselves, and so numerous their affluents, that no country in Europe is better supplied with water communication. Besides the Scheldt or Schelde, and Meuse or Maas, the navigable streams are the Ambleve, Demer, Dender, Darne, Dyle, Lys, Great Nethe, Little Nethe, Ourthe, Ruppel, Sambre, Yperlee, and Yser. The climate of Belgium bears a considerable resemblance to that of the same latitudes in England. Though subject to sudden change, it is on the whole temperate and agreeable. Luxemburg and Namur, where the surface is high, and the numerous hills and dales which diversify it both cheer the animal spirits and freely circulate an air at once keen and pure, are most favorable to health and longevity. The only parts of the country which can be considered unhealthy are the low flats which prevail in Flanders, and the polders or rich alluvial tracts which have been gained from the rivers by embankment, chiefly in Antwerp. There agues and other diseases engendered by a humid and sluggish atmosphere are prevalent.

*Woods and Forests.*—Nearly one-fifth of the whole surface of the kingdom is occupied by wood. The distribution of it, however, is by no means equal; and hence, while the two Flanders and Antwerp fall far below the average amount, Luxemburg and Namur rise far above it, and are very densely wooded. In these provinces extensive tracts are covered with natural woods, in which the wolf and wild boar still have their haunts. These woods are the remains of the ancient forest of Ardennes, which Cæsar describes as stretching far out into France from the banks of the Rhine. They consist of hard wood, principally oak, which is often of great size, and furnishes large quantities of the most valuable timber. By carefully dressing the stools after it is cut, a fine oak copse is raised, the cuttings of which annually produce many tons of bark, which not only supplies the tanneries of the country, but leaves a considerable surplus for exportation, chiefly to England, while the wood unfit for the carpenter is partly employed as fuel and partly converted into charcoal for the use of the iron works, where the superiority of the iron smelted and wrought by it is well known. South Brabant also possesses several fine forests, among others that of Soignies, with which the field of Waterloo has made us familiar. In the other provinces scarcely anything deserving the name of forest is seen. Wood is distributed over them in occasional patches, and more frequently in the form of hedge-row. The timber thus grown is by no means small in

aggregate amount, and forms a well-known feature in the rich rural landscapes which the old Flemish masters loved to paint; but taking into account the injury which the cultivated crops sustain from it, it is very questionable whether it ought to be regarded as a source of profit either to individual proprietors or to the country at large. The timber itself, consisting principally of various kinds of poplar, is soft and of an inferior description.

*Agriculture.*—The greater part of the country is well adapted for agricultural operations, and the inhabitants have so happily availed themselves of their natural advantages that they early began, and in some respects still deserve, to be regarded as the model farmers of Europe. In the high lands traversed by the Ardennes the climate is ungenial, and the soil so shallow and stony as almost to forbid the labor of the plow. Here the occupants display their skill, not so much by what they do, as by what they refrain from attempting. Instead of vain endeavors to force the growth of corn where it could never yield an adequate return, they have been contented to turn the natural pastures of the district to the best account by employing themselves chiefly in the rearing of stock. In particular they produce a hardy breed of horses, which, being admirably adapted for light cavalry, are largely exported to France for that purpose, while vast herds of swine are fed almost at no expense on the mast of the forests. At the same time no part of the surface is allowed to lie waste. Where arable land occurs it is carefully applied to its proper use. Even the vine has not been forgotten, and sunny slopes on which little else could have been grown have been made to yield a tolerable wine.

In the opposite extremity of Belgium, chiefly in the province of Antwerp, and partly in that of Limburg, an extensive tract occurs which strikingly contrasts in appearance with the hilly districts of the S. E., but is perhaps still less adapted for the ordinary operations of agriculture. This tract, known by the name of Campine, is a vast expanse of moorland waste of the most dreary appearance, a dead monotonous flat composed for the most part of barren sand, in which the ordinary heaths and lichens will scarcely grow. The greater part of this tract seems destined to remain forever in its natural state, but whenever a patch of more promising appearance occurs the hand of industry has been at work, and corn fields and green pastures have become not infrequent even in the Campine. Agricultural colonies, partly free and partly compulsory, have been planted in different parts of the district. The former consist of persons generally in poor circumstances who have voluntarily engaged in reclaiming



barren tracts as the means of procuring a maintenance and saving them from the degradation of pauperism. The latter consist of convicts, who, having forfeited their liberty, give compulsory labor as the penalty of their offenses. By the united exertions of both a wondrous improvement has been made, and on parts of this waste some of the finest cattle of the country are reared, and much dairy produce of excellent quality is obtained. Still, however, about 300,000 acres remain untouched.

With the exception of the two districts just described, there is no part of Belgium in which agriculture does not flourish; but the husbandry which has been so much lauded is seen in its greatest perfection in the two Flanders. Its excellence is owing not to any superior knowledge of what may be called the theory of agriculture, nor to any remarkable ingenuity in the invention of implements by which its operations are more efficiently or more cheaply performed, but chiefly to an innate spirit of economy and industry—an economy which carefully appropriates every gain, however small, and an industry which grudges no labor, however great, provided it is possible, by the application of it, to obtain an additional amount of valuable produce. In fact, the Flemish husbandry partakes more of the nature of garden than of field culture. In many of its operations, no doubt, horse labor is employed. The plow and the harrow are in frequent requisition, but the implement on which the greatest dependence is placed is the earliest and simplest of all—the spade. To give full scope for the use of it, the ground is parcelled out into small fields of a square form, which have their highest point in the center, and slope gently from it in all directions toward the sides, where ditches of sufficient size carry off the superfluous water as it filters into them. To promote this filtration the ground is trenched to a uniform depth, so that the slope of the subsoil corresponds as nearly as possible to that of the surface. In performing this trenching a considerable degree of skill and ingenuity is displayed. The performance of the whole at once would be a formidable and not a very efficient process. In a few years a new subsoil would be formed, and the trenching would require to be renewed. This is rendered unnecessary in the following manner: The land is laid out in ridges about five feet wide, and when the seed is sown it is not covered as usual by the harrow, but by earth dug from the furrows to the depth of two spits, and spread evenly over the surface. By changing the ridges and throwing the furrow of the previous year into the ridge of the next, the whole ground becomes furrow in the course of five successive crops, and is consequently trenched to the depth of about 18 inches. This process

of trenching never ceases, and is unquestionably one of the most important characteristics of the Flemish husbandry.

The only other process particularly deserving of notice is the care and skill manifested in securing an adequate supply of manure. Every farm is fully stocked, and the cattle, instead of being grazed in the fields, are fed at home, in winter on turnips and other roots, and in summer on green crops carefully arranged, so as to come forward in regular succession, and yield a full supply of rich, succulent food. In addition to this, every homestead has a tank, built and generally arched with brick, into which all the liquids of the cattle sheds are conveyed, and have their fertilizing properties increased by the dissolution of large quantities of rape cake. This liquid manure is of singular efficacy in promoting the growth of flax, which enters regularly into the Flemish rotation, and is perhaps the most valuable crop of all, the produce of an acre being not infrequently sold for £50. As this crop is one of the most exhausting which can be grown, and requires the richest manure, while it yields none, the growth of it to any great extent must, without the aid of the tank, have been impossible. At present, in Flanders alone, the value of flax annually raised has been estimated to amount to £1,500,000 sterling.

About two-thirds of the whole kingdom is under cultivation, and nearly eight-ninths profitably occupied, leaving only about one-ninth waste. Of this last the far greater part belongs to the comparatively barren districts of the S. E. and N. E., already described; and hence, in the more favored provinces, particularly those of South Brabant, the two Flanders, and Hainaut, the quantity of waste is so very small that the whole surface may be regarded as one vast garden. It is an error, however, to assert, as is sometimes done, that Belgium raises more corn than it consumes. For many years the import has considerably exceeded the export. Considerable attention has been paid in Belgium to the rearing of stock, and the breeds both of cattle and horses are of a superior description. The horses of Flanders in particular are admirably adapted for draught, and an infusion of their blood has contributed not a little to form the magnificent teams of the London draymen. In general, however, Belgium stock of all kinds is inferior to that of England.

*Mines.*—The mineral riches of Belgium are great, and, after agriculture, form the most important of her national interests. They are almost entirely confined to the four provinces of Hainaut, Liège, Namur, and Luxemburg, and consist of lead, manganese, calamine or zinc, iron, and coal. The lead is wrought to some extent at Vedrin, in Liège; but the quantity obtained



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forms only a small part of the actual consumption. Manganese, well known for its important bleaching properties, is obtained both in Liège and Namur. The principal field of ealamine is at Liège, where it is worked to an extent which not only supplies the home demand, but leaves a large surplus for export. All these minerals, however, are insignificant compared with those of iron and coal. The former has its seat in the country between the Sambre and the Meuse, and also in the province of Liège. At present the largest quantity of ore is mined in that of Namur. The coal field, already described, has an area of above 500 square miles. The export is about 5,000,000 tons, forming one of the largest and most valuable of all the Belgian exports. Nearly the whole of the coal thus exported is taken by France. There cannot be a doubt that this export adds largely to the national wealth; but a question has been raised as to the policy of thus lavishly disposing of a raw material which is absolutely essential to the existence of a manufacturing community, and the quantity of which, though great, is by no means inexhaustible. One obvious effect of the great foreign demand is to raise the price, and thus place some of the most important manufacturing interests of the country in an unfavorable position for competing successfully with so formidable a rival as Great Britain. Besides minerals, properly so called, Belgium is abundantly supplied with building stone, pavement, limestone, roofing slate, and marble. Of the last, the black marble of Dinant is the most celebrated. In 1899 the products of 1,601 quarries were valued at 55,448,745 francs; of the iron mines, 1,073,100 francs; of 220 coal mines (22,072,000 tons), 274,444,000 francs.

*Manufactures.*—The industrial products of Belgium are very numerous, and the superiority of many of them to those of most other countries is confessed. The fine linens of Flanders, and lace of South Brabant, are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay, the cloth of Verviers, the extensive foundries, machine works, and other iron and steel establishments of Liège, Seraing, and other places. The cotton and woolen manufactures, confined chiefly to Flanders and the province of Antwerp, have advanced greatly. Other manufactures include silks, glass and glassware, hosiery, paper, beet sugar, beer. There were 17 pig iron works in operation in 1899; 46 iron manufactories; 15 steel works; 123 sugar factories, and 25 refineries; and 240 distilleries.

*Trade and Commerce.*—The geographical position, the admirable facilities of transport, and the indefatigable industry of the inhabitants, early combined to place Bel-

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gium at the very head of the trading countries of Europe. The gradual rise of competitors still more highly favored has deprived her of this preëminence, and with the limited extent of her seacoast it is not to be expected that she can ever take high rank as a naval state; but her trade is still of great importance, and within recent years has made a rapid advance. Her coal and iron, and the numerous products of her manufactures, furnish in themselves the materials of extensive traffic; while the possession of one of the best harbors in the world (Antwerp), situated on a magnificent river, which directly, or by canals, stretches its arms into every part of the kingdom, and now made accessible by a system of railways with every kingdom of Central Europe, naturally renders Belgium the seat of a transit trade even more important than that which it monopolized during the Middle Ages. This she owes chiefly to the admirable system of railway communication which, in the exercise of an enlightened policy, was early established throughout the kingdom. This system has its center at Malines, from which a line proceeds N. to Antwerp; another W. to Ostend; another S. W. through Mons, and on to the Northern Railway of France, which communicates directly with Paris; and another S. E. to Liège, and on into Prussia, where it first communicates with the Rhine at Cologne, and thence by that river and by rail gains access both E. and S. to all the countries of Central Europe. In addition to these great trunks, one important branch connects Liège with Namur and Mons; and another from Antwerp, after crossing the W. trunk at Ghent, passes Courtray, and proceeds directly toward Lille. The ramification is thus complete; and there is not a town in Belgium of any importance which may not now, with the utmost facility, convey the products of its industry by the safest and speediest of all means of transport. The railways have a length of about 2,900 miles, three-fourths belonging to the State. The value of the general commerce in 1900 was: Imports, 3,594,425,067 francs, and exports, 3,297,509,775 francs; imports for home consumption, 2,215,700,000 francs; exports of Belgian produce and manufactures, 1,922,900,000 francs; transit trade, 1,374,600,000 francs.

The articles of import for home consumption include grain and flour, raw cotton, wool, hides, coffee, tobacco, chemicals, oil-seeds, yarn, timber, petroleum, etc. The exports are principally coal, yarn (chiefly linen and woolen), cereals, machinery, flax, woolens and cottons, chemicals, steel and iron, glass and glassware, sugar (raw and refined), zinc, manure, eggs, etc. The trade with Great Britain has grown considerably of late years; for while in 1869 the exports to Great Britain amounted to £9,391,403,



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and the imports of British produce from Great Britain to £4,003,535, these were in 1898 respectively £21,534,000 and £13,850,900. The chief exports to Great Britain are silks, woolen yarn, cottons, flax, glass, eggs; the chief imports cottons, woollens, raw cotton, metals, and machinery. The trade with France is even greater than with Great Britain. The external trade is chiefly carried on by means of foreign (British) vessels, and the great bulk of the shipping enters and clears from the port of Antwerp. Of the tonnage entered in 1896 only about 7 per cent. belonged to the Belgian flag. The total burden of the Belgian mercantile marine is over 113,250 tons.

*People.*—The Belgian population is the densest in Europe, and is composed of two distinct races—Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liège, Namur, and part of Luxemburg. The language of each corresponds with their origin—the Flemings speaking a Germanic dialect, and the Walloons a dialect, or rather a corruption, of French, with a considerable infusion of words and phrases from Spanish and other languages. This distinct mixture of races, and the repeated changes of masters to which they have been subjected, have necessarily been very unfavorable to the formation of a national character. Still, in some leading features there is a remarkable uniformity in the population. Though the position of the country between France and Germany has made it the battlefield of Europe, the inhabitants show few warlike tendencies, and are unwearied in pursuing arts of peace. Hostile armies have frequently met upon their soil to decide the fate of kingdoms, carrying devastation into every quarter; but no sooner have they withdrawn than the labors of the field and the workshop have been quietly resumed, and almost all traces of devastation been in a few years effaced. The fact bears strong testimony to the patient endurance of the Belgians, but bespeaks, perhaps, a deficiency of physical and moral courage.

Almost the entire population belong to the Roman Catholic Church. Protestantism is fully tolerated, and even salaried by the State, but cannot count above a mere fraction (some 10,000) of the population among its adherents. An interesting circumstance connected with this state of matters is, that Belgium early embraced, and at one time seemed on the eve of being gained to the Reformation. Persecution of the most fearful kind took place, and did what perhaps it has never done in any other part of the world—not only forced the

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people back to a religion which they had given up, but induced them to return to it as willing converts. The country is divided into six dioceses, each of which possesses an ecclesiastical seminary. Monks and nuns are numerous, especially the latter (over 25,000). Education is in a very unsatisfactory state. At the census of 1890 nearly 27 per cent. of the population above 15 years of age could neither read nor write. By law each commune must have an elementary school, and the expense of primary instruction falls partly upon the communes, partly upon the State. In all the towns colleges and middle-class schools have been established, where a superior education may be obtained; while a complete course for the learned professions is provided by four universities, two of them, at Ghent and Liège respectively, established and supported by the State; one at Brussels, called the Free University, founded by voluntary association; and one at Louvain, called the Catholic University, controlled by the clergy. French is the official language of Belgium and in general use among the educated classes, and there can scarcely be said to be a national literature. Of late, however, patriotic feelings, to which the Belgians were too long strangers, have acquired new strength; and one of its first manifestations has been an eager desire to cultivate the vernacular Flemish, which differs little from Dutch.

The population generally is moral, and apparently in comfortable circumstances. The far larger proportion of it is rural; and though landed property is very much subdivided, the Belgians, instead of exhibiting the wretchedness so common among the small occupiers in Ireland, manage, by a happy combination of agricultural with other industrial employments, to derive from their little holdings all the necessaries and not a few of the comforts of life. It is not to be denied, however, that in some of the provinces, particularly in Flanders, population, in so far at least as it can be maintained by agricultural resources, has reached its limit, and that a deficiency of other employment, particularly spinning and hand-loom weaving, has placed large numbers on, if not within, the verge of pauperism. In Flanders and South Brabant a fourth of the people is dependent on total or occasional relief; and pauper riots have repeatedly occurred. Still the population continues to move on, as if with accelerated pace.

*Government.*—The Belgian constitution combines monarchical with a strong infusion of the democratic principle. The executive power is vested in a hereditary king; the legislative in the king and two chambers—the Senate and the Chamber of Representatives—the former elected for eight years, the latter for four, but one-



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half of the former renewable every four years, and one-half of the latter every two years. The senators are elected partly directly, partly indirectly (by the provincial councils), and must be 40 years of age. Their numbers depend on population. The deputies or representatives are elected directly, one for every 40,000 inhabitants at most. All citizens of 25 years of age are electors, and according to certain qualifications one elector may have three votes. Each deputy is allowed 4,000 francs per annum, and a free railway pass between his place of residence and the capital. The army is raised by conscription, to which every able man who has completed his 19th year is liable, and also by voluntary enlistment. The peace strength of the army in 1899 amounted to 51,270 officers and men; in time of war the total strength is about 140,000 men. Besides this standing army there is a *garde civique*, numbering about 43,000 men in time of peace, in addition to which there are 90,000 non-active men belonging to this force. The navy is confined to a few steamers and a small flotilla of gunboats. The estimated revenue for 1902, chiefly from railways, customs, excise, and direct taxation, was 489,040,050 francs; the estimated expenditure, 488,344,403 francs. About one-fourth of the expenditure is in payment of the interest of the national debt, the total of which in 1901 was 2,650,898,150 francs. The coins, weights, and measures are the same, both in name and value, as those of France.

*History.*—The history of Belgium as a separate kingdom, beginning in 1830, when it was constituted an independent European State, would not truly represent the life of the people, or account even for the events of the period embraced in it. Situated between the two leading States of Europe, and deeply interested in all the political agitations resulting alike from their rivalries and their alliances, the Belgian people often changed masters. Moreover, the Belgian territory contained within itself one leading element of the dissensions which raged around it. The two great races of different origin and habits, the Celtic and Teutonic, or Latin and German-speaking peoples, whose different policies have divided Europe from the time of the Romans, were combined in its population, the Walloon provinces, Hainaut, Namur, Luxemburg, being nearly allied to the French, while Flanders, Brabant, and Limburg approximated more in character and language to the Germans. Thus not only were the great rivalries of Europe represented here in miniature, but their compression within the narrow limits of what is now one of the smallest of European States, has resulted in the formation of a distinct national character. While, therefore, the chief

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events in which Belgium was interested prior to 1830 are matters of European history, a brief outline of them is needed here to give a distinct conception of the character of the people which they contributed to form.

The territory anciently known as Belgian differed considerably from that which has assumed the name in modern times. According to Cæsar the territory of the Belgæ, who were one of the principal tribes of ancient Gaul, extended from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire, and subsequently formed part of the kingdom of Clovis, who subdued nearly the whole of Gaul from the Rhine to the Mediterranean. The Franks at this time did not recognize the law of primogeniture. On the death of a monarch his dominions were divided among his sons, the more ambitious of whom again strove to reunite them under their own sway. Thus the Frankish kingdoms under the descendants of Clovis were subject to continual vicissitudes, in which the Belgian territory shared, forming successively a portion of the kingdoms of Metz, Soissons, and Austrasia, till the whole was reunited under Charlemagne or Charles the Great.

This great conqueror and administrator, the first who strove to unite the States of Europe in a civilized commonwealth, was of Belgian extraction. It was at Landen and Herstal, on the confines of the forest of Ardennes, that his predecessors, the great mayors of the palace, held sway, while his own capital was established at Aix.

Charlemagne in great measure destroyed his own work by adopting the Frankish custom of dividing his kingdom among his sons at his death. This practice, which had proved so disastrous to the dynasty of Clovis, was continued for some time in his family, but was ultimately abolished in France. It long prevailed among the principalities of Germany, hindering their unity, and contributing to the ascendancy of France in Europe. Thus Belgium fell to Lothaire, the grandson of Charlemagne, forming part of the kingdom of Lotharingia, which was dependent on the German empire; but by the treaty of Verdun (843) Artois and Flanders were united to France.

For more than a century this kingdom was contended for by the kings of France and the emperors of Germany. In 953 it was conferred by the Emperors Otto upon Bruno, Archbishop of Cologne, who assumed the title of archduke, and divided it into two duchies: Upper Lorraine, containing modern Lorraine, Luxemburg, and the dioceses of Metz, Toul, Verdun, and the Palatinate; and Lower Lorraine, containing Brabant, Guelders, the bishoprics of Co-



logne, Liège, and Cambray. These duchies were temporarily reunited under Gonthelan I., Duke of Lower Lorraine, who acquired Upper Lorraine in 1033. Among the dukes of Lower Lorraine may also be mentioned Godfrey of Bouillon, the great Crusade leader, who, in 1099, was crowned King of Jerusalem.

The feudal system, which had established itself over the greater part of Europe, likewise prevailed in the Belgian territory, which in the 11th century was divided into duchies, counties, and marquisates, under the sway of chiefs owing allegiance to the empire, or other of the greater princes, but exercising an almost absolute dominion over their own subjects. Thus were formed the counties of Holland, Brabant, Zealand, Friesland, Namur, Hainaut; the duchies of Limburg, Guelders, Juliers, Luxemburg; the marquisate of Antwerp, and others. In the frequent struggles which took place during this period, Luxemburg, Namur, Hainaut, and Liège were usually found siding with France, while Brabant, Holland, and Flanders commonly took the side of Germany. The princes and the people, however, particularly of Flanders, were not always found on the same side.

The 12th and 13th centuries were distinguished by a general uprising of the industrial communities, which had begun to grow in importance throughout Europe, against the feudal system. This movement was very strongly manifested throughout the Netherlands, less strongly perhaps in Belgium than in Holland. In both countries prosperous municipalities began to arise and assert their freedom; but the spirit of centralization, more strongly developed among the Latin-speaking races, prevailed more in the S. provinces, while the love of individual liberty, more characteristic of the German races, was more strongly manifested in the N. Many of the towns of Flanders and Brabant, however, became extremely democratic. Ghent in particular distinguished itself for the violence and frequency of its revolts against its rulers.

From this time the popular and civic element began to count for something in political combinations. If one potentate secured the alliance of a count, another might strengthen himself by secretly encouraging insurrection in his towns. The people of Flanders often allied themselves with the English, with whom their commercial intercourse and their love of freedom gave them many common interests and feelings, and both their own counts and the French monarchy often felt the effects of this alliance.

The battle of Courtray in 1302 greatly weakened the feudal authority, but the ascendancy of the popular element led to various excesses. The organization of popular power was reserved for a later age, and the battle of Rosebeque, 1382, in which the

Ghentese under Philip van Artevelde (who had offered the crown of France to Richard II. of England as the price of his assistance) were totally defeated, restored the authority of the nobles.

In 1384, Flanders and Artois fell to the house of Burgundy by the marriage of the duke, a scion of the French crown, with Margaret, daughter of Louis II., Count of Nevers, the last ruler of these provinces. By a succession of happy marriages, by purchase, or by force, Holland, Zealand, Hainaut, Brabant, Limburg, Antwerp, and Namur had all by 1430 become the inheritance of the same house. In 1442 the duchy of Luxemburg was acquired, and in 1470 Guelders and Friesland. This extraordinary prosperity induced Charles the Bold, who succeeded in 1467, to attempt to unite his territories by the conquest of Alsace, Lorraine, and Liège, and raise his duchy to a kingdom. The details of this enterprise, which forms one of the most exciting episodes in European history, belong more immediately to the history of France. It ended in his defeat and death at the battle of Nancy in 1477.

His daughter Mary, who succeeded him, carried the fortunes of her house still higher or rather she carried them into a house still more fortunate than her own, by her union with the Archduke Maximilian, son of the Emperor Frederick. Her splendid possessions had been coveted by many potentates, and there were five candidates for her hand, among whom the most important were the dauphin, son of Louis XI., and the archduke.

It now became the part of France to excite troubles in Flanders. The policy of Maximilian, conformably to the traditions of the house of Austria, was directed to the aggrandizement of his house. He was frequently at feud with his Netherlandish subjects, whose manners he took little pains to understand, and for whose liberties he had little respect. Wars and leagues succeeded each other, which belong to the history of the great states of Europe. The Netherlands were by this union again brought under the German empire, and especially under the house of Austria, destined soon to become the most powerful in Europe. In 1512 they were formed into a division of the empire, under the title of the circle of Burgundy. East Friesland was included in the circle of Westphalia.

On being called to the empire, Maximilian conferred the government of the Netherlands on his son Philip the Fair, under whom they began to experience the material advantages of an alliance with the house of Austria. The vast European possessions of this house opened up to its subjects the greatest facilities of the age for commercial intercourse, while the discovery of America gave them in addition the



commerce of a new world. The industrial skill and enterprise of the Netherlanders fitted them much more than the Spaniards, whose haughty disposition made them apt to substitute rapacity for industry, to derive permanent benefit from these opportunities. Margaret, the aunt, and Mary, the sister of Charles V., who succeeded to the government of the Low Countries, exercised it in many respects wisely and well. The former, a patroness of arts and letters, kept her court surrounded with poets, artists, and men of learning. A Council of State, consisting of the governors or stadtholders of the 17 provinces, assisted them in the administration of affairs, and such was the prosperity of the country that more than one of the cities of the Netherlands rivalled in extent and opulence the capitals of the greatest European kingdoms.

This bright day was too soon clouded. The reign of Charles V. is less distinguished for the political struggles excited by a too prosperous ambition, which shook nearly every nation of Europe, than for the religious dissensions, and the social troubles resulting from them, which attended the dawn of the Reformation. The reformed opinions made great progress in the Netherlands; but here again a remarkable illustration was afforded of the strength of those differences of race, language, and sentiment which divided their populations. In Holland, as in Germany, the Reformation triumphed. On the Belgian territory, especially where the Walloon or French element of the population prevailed, although these opinions spread widely, they yielded at length, as in France, to the force of authority, or the sentiment of unity. In 1535 Mary published at Brussels an edict condemning all heretics to death. An insurrection excited by persecution was suppressed by Charles V. in 1540, and the Netherlands were inseparably united by the law of primogeniture with the crown of Spain. No union could have been more unfortunate. The bigotry of the Spanish branch of the Austrian family has become proverbial, and a country torn with religious dissensions could not have found itself under a worse rule.

Charles V., himself a Netherlander, born in Ghent, and still more his son Philip II. of Spain, strove to extinguish the reformed opinions among their Netherland subjects in seas of blood. Philip discarded all respect for the liberties of the Netherlands, and subjected them under his governors, particularly the Duke of Alva, to all the horrors of a hostile military rule. Thousands of victims perished by every variety of execution which a barbarous cruelty could devise, hanging, beheading, burning, drowning, interring alive; to which tortures and imprisonments were added in still greater number. During this period of desolation,

great numbers of artisans, abandoning their country, carried elsewhere, especially to England and Germany, which sympathized with their opinions, the arts which had enriched their own country, and which now acquired through them a wider scope, and contributed to the industrial progress of Europe.

William of Orange, the Silent, now made himself the champion of the liberties of his country. Supported chiefly by the Northern States, thwarted by the jealousy of the Flemish nobles, and opposed by the Walloon provinces, which remained faithful to Spain, and even supplied her with troops, he at length succeeded in freeing the seven Northern States, and forming them into the confederation of the United Provinces, whose independence, declared in 1581, was ultimately acknowledged by Spain. These events belong chiefly to the history of Holland.

Requesens, the successor of Alva, had tried too late a more humane policy. At Antwerp and Ghent the Spanish soldiers broke out into excesses. The confederates assembled in the latter town signed the pacification of Ghent, proclaiming liberty of conscience, and convoking the Estates-General. The Estates called in the aid of France, and offered the crown to Henry III., who declined to accept it, dreading the Catholic league in his own country. It is a special feature of the history of those days, that while the great rulers, particularly those of France and Germany, persecuted their reformed subjects, each was ready to protect the Protestant subjects of the others when opposed to their political policy. The success of the revolutionary party, consummated in the N., was at length checked in the S. provinces by the ability of Alexander Farnes, Duke of Parma, the Spanish commander, and by the reactionary spirit evoked in the provinces themselves, strengthened by the emigration of many influential reformers to the Northern States, and the Belgian Netherlands remained attached to Spain.

From 1596 to 1633 the Spanish Netherlands were transferred to the Austrian branch of the family by the marriage of Isabella, daughter of Philip II., with the Archduke Albert of Austria. On the death of Isabella they reverted to Spain. By the treaty of Rastadt in 1714 they were again placed under the dominion of Austria. During this period they were the subject of continual intrigues, and frequently of open warfare among the European States. Twice conquered by Louis XIV., conquered again by Marlborough, coveted by Holland, Spain, Germany, France, and England, they lay continually open to the invasions and the struggles of foreign armies, and it was at this period especially that they were, as they have been called, the battlefield of Eu-



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rope. Some portions of maritime Flanders, Brabant, and Limburg, which had remained to Spain, were during this period conquered and annexed by Holland, while France acquired Artois and Walloon Flanders, the S. of Hainaut, and part of Namur and Luxemburg, including the important towns of Douai, Lille, Valenciennes, Dunkirk, and many others.

From 1714 Austria was left in undisturbed possession of the remainder of the Southern Netherlands. Joseph II., styled the Philosophical Emperor, excited by his reforms a revolt, headed or stimulated by the monks of Flanders and Brabant, whom he had dispossessed of their convents. The Estates of the two provinces refused to vote the imposts, and were dissolved. The populace took to arms. The Virgin was proclaimed generalissimo of the patriot army. The Austrian army concentrated at Turnhout was totally defeated. After applying in vain for assistance to Holland and France, neither of which could be expected to have much sympathy with their movement, the insurgents were at length subdued, and the Austrians reëntered Brussels, October, 1790.

Soon after the whole Netherlands were conquered by the revolutionary armies of France, and the country was divided into French departments, a change which, as might be expected, provoked as much resistance as the people were able to offer. When Napoleon ruled France, his brother Louis became King of Holland.

Just before the battle of Waterloo, fought on Belgian territory, had once more changed the fate of Europe, Belgium was united by the Congress of Vienna to Holland, under the title of the kingdom of the Netherlands. This fusion had much to recommend it. The ports and colonies of the N. formed a suitable complement to the arts and industry of the S. The Flemings and the Dutch spoke the same language and had the same origin; but there remained outside of this harmony the Walloon provinces, French in language and extraction. A most injudicious measure of the Dutch government, an attempt to assimilate the language of the provinces by prohibiting the use of French in the courts of justice, excited an opposition, which, encouraged by the success of the French revolution of 1830, broke out into revolt. The electoral system, moreover, gave the preponderance to the N. provinces, though inferior in population, and the interests of the provinces were diametrically opposed in matters of taxation. Belgium was agricultural and manufacturing, Holland commercial; the one wished to tax imports and exports, the other property and industry. In the chambers three different languages were spoken, Dutch, German, and French; and the members frequently did not understand each other. Nothing

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but the most skillful government could have overcome these difficulties, and no statesman appeared fitted to grapple with them. The revolutionary movement became general in the S., and the Dutch troops, at first successful before Brussels, were finally repulsed, and compelled by the arrival of fresh bands of insurgents from all quarters to retire. The Flemings saluted the volunteers of Liège, Mons, and Tournay by the ancient title of Belgians, and this name, which properly distinguished only a section of the people of the S. provinces, became henceforth recognized as the patriotic designation of the whole.

A convention of the great powers assembled in London to determine on the affairs of the Netherlands and stop the effusion of blood. It favored the separation of the provinces, and drew up a treaty to regulate it. In the meantime the National Congress of Belgium offered the crown to the Duke of Nemours, second son of Louis Philippe, and, on his declining it, they offered it, on the recommendation of England, to Leopold, Prince of Saxe-Coburg, who acceded to it under the title of Leopold I., on July 21, 1831. In November of the same year the five powers guaranteed the crown to him by the treaty of London. Some disputes with Holland in regard to the partition of territories still remained. A convention was concluded between France and England to bring these differences to a close, and in 1839 Holland acceded to a treaty, by which Belgium surrendered to her portions of Limburg and Luxemburg, which she had retained since 1830.

During the reign of Leopold, a prosperous period of 34 years, Belgium became a united and patriotic community. Arts and commerce flourished, and a place was taken in the family of nations upon which the Belgian people could look with complacency. On the outbreak of the French Revolution of 1848 Leopold declared his willingness to resign the crown if it was contrary to the wishes of his subjects that he should retain it. This declaration disarmed the Republican party, and confirmed the stability of the monarchy at a critical moment. During his reign Belgium concluded various treaties of commerce, with Great Britain in 1851 and 1862, and with France in 1861. Leopold II. succeeded his father in 1865. In recent years the chief feature of Belgian politics has been a keen struggle between the clerical and the liberal party. At the elections in June, 1878, the liberals gained a majority, which they lost in 1884, and failed to regain in 1890. Then followed a revision of the constitution, and in 1894 the clericals were returned with a great majority. Leopold II. became sovereign of the Kongo Free State (*q. v.*) in 1885; died Dec. 17, 1909; and was succeeded by his nephew, Prince Albert of Flanders.



## Belgrade

**Belgrade**, a city and capital of Servia, on the right bank of the Danube in the angle formed by the junction of the Save with that river, consists of the citadel or upper town, on a rock 100 feet high; and the lower town, which partly surrounds it. Of late years many modern improvements have been introduced and many fine edifices have been built. The chief buildings are the royal and episcopal palaces, the government buildings, the cathedral, barracks, bazars, theater, and educational institutions. It manufactures carpets, silk stuffs, etc; and carries on an active trade. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks, remaining, however, for the most part, in the hands of the Turks till its evacuation by them in 1867. Since the treaty of Berlin (July, 1878) it has been the capital of an independent State. Pop. (Dec. 31, 1905) 80,747.

**Belief**, a term sufficiently definite for most ordinary purposes; but it is used with some variety in meaning, and psychologists do not always agree in the tests they give for distinguishing belief from other states of mind. The word is used to mean the acceptance of a proposition, statement, or fact as true on the ground of evidence, authority, or irresistible mental predisposition; the state of trust in and reliance on a person, thing, or principle; as also for the fact believed, and sometimes specifically for the Apostles' Creed. Belief is by some distinguished from knowledge, inasmuch as the latter rests on evidence, while belief rests on authority. Belief should, some say, not to be used of facts such as are occurring in one's own experience, or principles of which the opposite implies absurdity, such as the axioms of geometry. These we know, and, according to this view, the term should be limited to cases where a proposition is accepted without evidence, or where such evidence as is available implies only probability. On the other hand, the psychologists of what is called the intuitive school are accustomed to regard as beliefs the fundamental data on which reasoning rests; and to say that all knowledge rests ultimately on belief. Belief, they say, may admit of all degrees of confidence, from a slight suspicion to full assurance. There are many operations of mind in which it is an ingredient—consciousness, remembrance, perception. Kant defined opinion as a judgment which is insufficiently based, subjectively as well as objectively; belief, as subjectively sufficient but objectively inadequate; knowledge, as both subjectively and objectively sufficient. The strongest beliefs may, of course, be false; beliefs in ghosts, astrological prognostications, etc., are usually treated as superstitions. Be-

## Belize

liefs as such rest on grounds regarded as sufficient by the person believing, who is prepared to act on his belief; but their grounds may have absolutely no validity for any other person. Such beliefs are, nevertheless, very real. On the other hand, there are many propositions accepted traditionally, and spoken of as beliefs, which are not real, vital, abiding truths for those who nominally accept them; which have no influence on character or mental tone, and on which those who hold them would not be prepared to act. Faith is a word used in very much the same sense as belief, but especially signifies the acceptance of and reliance on the truths of religion.

**Belisarius**, the great general of the Roman Emperor Justinian, was a native of Illyria. He commanded an expedition against the King of Persia about 530; suppressed an insurrection at Constantinople; conquered Gelimer, King of the Vandals, and put an end to their dominion in Africa; was recalled and honored with a triumph. In 535, Belisarius was sent to Italy to carry on war with the Goths, and took Rome in 537. He was there unsuccessfully besieged by Vitiges, whom he soon after besieged in turn, and captured at Ravenna, but was recalled, through jealousy, before he had completed the conquest of Italy. Belisarius recovered Rome from Totilus in 547, and was recalled the next year. He was afterward sent against the Huns. He was charged, in 563, with conspiracy against Justinian, but was acquitted. That he was deprived of sight, and reduced to beggary, appears to be a fable of late invention. Died in 565.

**Belize**, or **British Honduras**, a British colony washed on the E. by the Bay of Honduras, in the Caribbean Sea, and elsewhere surrounded by Guatemala and Mexico. It forms the S. E. part of the peninsula of Yucatan, and measuring 180 by 60 miles, has an area of 7,562 square miles. The river Belize traverses the middle of the country, and the Rio Hondo and the Sars-ton form respectively its N. W. and its S. boundary. The Cockscorn Mountains (4,000 feet) are the highest eminences, the land all along the coast being low and swampy. The country has a general tropical fertility; its chief exports are mahogany and logwood, besides sugar, coffee, cotton, sarsaparilla, bananas, plantains, and india rubber. The yearly value of the imports ranges between £160,000 and £269,000; of the exports, between £124,500 and £317,500. The name Belize is probably a Spanish corruption of the name Wallis, one of the early British settlers; otherwise it is usually referred to the French *balise*, a beacon. Those early settlers, buccaneers at starting, then logwood cutters, were fre-



## Belknap

quently attacked by the Spaniards; but since 1798, when they repulsed a fleet and a land force of 2,000 men, their occupation has been formally acquiesced in. Since 1862 Belize has ranked as a British colony, with a lieutenant-governor, whose rank was raised, in 1884, to that of governor. Pop. (1901), 39,998. Belize, the capital, is a depôt for British goods for Central America, and has a population of about 6,600.

**Belknap, George Eugene**, an American naval officer, born in Newport, N. H., Jan. 22, 1832; was appointed midshipman in the navy in 1852; became Lieutenant-Commander in 1862; Commander in 1866; Captain in 1872; Commodore in 1885, and Rear-Admiral in 1889; and was retired in 1894. He took part in the capture of the Barrier Forts on the Canton river, China, in 1856; and in the Civil War was present at the bombardment of the forts and batteries in Charleston harbor, and in both of the attacks on Fort Fisher. In 1873, while engaged in deep sea sounding in the North Pacific Ocean, he made discoveries concerning the topography of the bed of the ocean that found high favor among scientists. He was appointed Superintendent of the United States Naval Observatory in 1885, and, among other works, published "Deep Sea Soundings." He died April 7, 1903.

**Belknap, Jeremy**, an American clergyman, born in Boston, Mass., June 4, 1744; graduated at Harvard in 1762; was pastor of the Congregational Church in Dover, N. H., in 1767-1786, and of the Federal Street Church in Boston in 1787-1798. The Massachusetts Historical Society, organized in 1790, recognizes him as its founder. In 1792 he became an overseer of Harvard College. He was the author of a "History of New Hampshire" (1784-1792); "A Discourse Intended to Commemorate the Discovery of America by Columbus, with Four Dissertations" (1792); "An Historical Account of Those Persons Who Have Been Distinguished in America," generally known as the "American Biography," etc. He died in Boston, June 20, 1798.

**Belknap, William Worth**, an American military officer, born in Newburg, N. Y., Sept. 22, 1829; graduated at Princeton, and read law in Keokuk, Ia., where he was elected to the Legislature in 1857. In 1861 he entered the Union army as Major of the 15th Iowa Volunteers and was engaged at Shiloh, Corinth, and Vicksburg; but became most prominent in Sherman's Atlanta campaign. He was promoted to Brigadier-General, July 30, 1864, and Major-General, March 13, 1865. He was collector of internal revenue in Iowa from 1865 to Oct. 13, 1869, when he was appointed Secretary of War, which office he occupied till March 7, 1876. He resigned in consequence of

## Bell

accusations of official corruption. Subsequently he was tried and acquitted. He died in Washington, D. C., Oct. 12, 1890.

**Bell**, a hollow, sounding instrument of metal. The metal from which bells are usually made (by founding), is an alloy, called bell-metal, commonly composed of 80 parts of copper and 20 of tin. The proportion of tin varies, however, from one-third to one-fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The clearness and richness of the tone depend upon the metal used, the perfection of its casting, and also upon its shape; it having been shown by a number of experiments that the well known shape with a thick lip is the best adapted to give a perfect sound. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the body or barrel, the ear or cannon, and the clapper or tongue. The lip or sound bow is that part where the bell is struck by the clapper.

Bells were used very early in the form of cymbals and hand bells in religious services. In Egypt the feast of Osiris was announced through the ringing of bells. Bronze bells have been found in Assyria. Bells of gold were worn by Aaron and the high priests of the Jews on the border of their robes, and in Athens the priests of Cybele used them in their offerings. The Romans also used bells which they called tintinabula, to announce the public assemblies, and, according to Suetonius, Augustus had a bell suspended before the temple of Jupiter. In the Christian churches a similar custom early came into use, though it is not known that in the first Christian churches divine service was announced by any such method. They were used, however, in the early monasteries to announce the hours of prayer. Generally they were made of tubes struck with a hammer. They are said to have been first introduced into Christian churches about 400 A. D., by Paulinus, Bishop of Nola in Campania (whence campana and nola as old names of bells); although their adoption on a wide scale does not become apparent until after the year 550, when they were introduced into France. Benedict Biscop, abbot of Wearmouth, seems to have imported bells from Italy to England in 680, but their use in Ireland and Scotland is probably of earlier date. The oldest of those existing in Great Britain and Ireland, such as the "bell of St. Patrick's well" and St. Ninian's bell, are quadrangular and made of thin iron plates hammered and riveted together.

Until the 13th century they were of comparatively small size, but after the casting of the Jacqueline of Paris (6½



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tons) in 1406, their weight rapidly increased. Among the more famous bells are the bell of Cologne, 11 tons, 1448; of Dantzic, 6 tons, 1453; of Halberstadt,  $7\frac{1}{2}$ , 1457; of Rouen, 16, 1501; of Breslau, 11, 1507; of Lucerne,  $7\frac{1}{2}$ , 1636; of Oxford,  $7\frac{1}{2}$ , 1680; of Paris,  $12\frac{4}{5}$ , 1680; of Bruges,  $10\frac{1}{4}$ , 1680; of Vienna,  $17\frac{3}{4}$ , 1711; of Moscow (the monarch of all bells), 193, 1736; three other bells at Moscow, ranging from 16 to 31 tons, and a fourth of 80 tons, cast in 1819; the bell of Lincoln (Great Tom),  $5\frac{1}{2}$ , 1834; of York Minster (Great Peter),  $10\frac{3}{4}$ , 1845; of Montreal,  $13\frac{1}{2}$ , 1847; of Westminster (Big Ben),  $15\frac{1}{2}$ , 1856; (St. Stephen),  $13\frac{1}{2}$ , 1858; the great bell of St. Paul's,  $17\frac{1}{2}$ , 1882. Others are the bells of Ghent (5), Görlitz ( $10\frac{3}{4}$ ), St. Peter's, Rome (8), Antwerp ( $7\frac{1}{4}$ ), Olmutz (18), Brussels (7), Novgorod (31), Pekin ( $53\frac{1}{2}$ ). See BELL, LIBERTY.

Besides their use in churches bells are employed for various purposes, the most common use being to summon attendants or domestics in private houses, hotels, etc. Bells for this purpose are of small size and may be held in the hand and rung, but most commonly are rung by means of wires stretched from the various apartments to the place where the bells are hung. Bells rung by electricity have now become common in hotels and other establishments.

Bells, as the term is used on shipboard, are the strokes of the ship's bell that proclaim the hours. Eight bells, the highest number, are rung at noon and every fourth hour afterwards, *i. e.*, at 4, 8, 12 o'clock, and so on. The intermediary periods are indicated thus: 12:30, 1 bell; 1 o'clock, 2 bells; 1:30, 3 bells, etc., until the eight bells announce 4 o'clock, when the series recommences 4:30, 1 bell; 5 o'clock, 2 bells, etc. The even numbers of strikes thus always announce hours, the odd numbers half hours.

**Bell, Acton.** See BRONTE, ANNE.

**Bell, Alexander Graham,** inventor of the telephone, was born in Edinburgh, March 3, 1847; son of Alexander Melville Bell. He was educated at Edinburgh and in Germany, and settled in Canada in 1870. In 1872 he went to the United States and introduced for the education of deaf mutes the system of visible speech contrived by his father. He became Professor of Vocal Physiology in Boston University, and at the Philadelphia Exhibition, in 1876, exhibited his telephone, designed and partly constructed some years before. He was also the inventor of the photophone in 1880, of the graphophone in 1887, and of kindred instruments.

**Bell, Alexander Melville,** a Scotch elocutionist, born at Edinburgh in 1819; in 1865 he removed to London to act as a

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lecturer in University College; in 1870 went to Canada and became connected with Queen's College, Kingston; and subsequently settled in Washington, D. C. He is inventor of the system of visible speech, in which all the possible articulations of the human voice have corresponding characters designed to represent the respective positions of the vocal organs. This system has been successfully employed in teaching the deaf and dumb to speak. Besides this subject he wrote on elocution, stenography, and the like. He died Aug. 7, 1905.

**Bell, Andrew,** a Scotch benefactor, founder of the "Madras System of Education," was born at St. Andrews, March 27, 1753, and educated at the university of that place. After acting as a tutor in Virginia (1774-1781), he took orders in the Church of England, sailed for India in 1787, and within two years was appointed to eight army chaplainships, all of which he managed to hold simultaneously. In 1789 he became Superintendent of the Madras Orphanage for the sons of soldiers. Finding it impossible to obtain the services of properly qualified masters, he, at length, resorted to the expedient of conducting the school by the aid of the scholars themselves. Hence originated the far famed monitorial system. The state of his health forced him to return to England, where, in 1797, he was pensioned by the East India Company. His pamphlet entitled "An Experiment in Education, Made at the Male Asylum of Madras" (1797), attracted little attention, until a Quaker commenced to work upon the system, and succeeded in obtaining for it a large measure of public recognition. Wordsworth, Coleridge, and Southey, who all had faith in the system, encouraged Bell; but it was found that, although powerful service had been rendered to education by its aid, many evils, such as ignorance and inefficiency on the part of teachers, had also resulted from the system. Rector of Swanage till 1809, Bell then was made master of Sherburn Hospital, Durham, and in 1818-1819 a prebendary of Hereford and of Westminster. He died at Cheltenham, Jan. 27, 1832, bequeathing £120,000 for the purpose of founding educational institutions.

**Bell, Andrew James,** a Canadian educator, born in Ottawa, May 12, 1856; educated at the University of Toronto, and at Breslau University; became Professor of Latin and Literature in Victoria University, in 1889. He is an active member of the Canadian Institute, and has contributed some important papers to its "Transactions."

**Bell, Benjamin Taylor A.,** a Scotch-Canadian mining expert, born in Edinburgh, July 2, 1863; was educated in Edinburgh;



went to Canada in 1882, and became editor of the "Canada Mining Review," and of the "Canada Mining, Iron and Steel Manual." In 1890 he was appointed by the Dominion Government, with Dr. Selwyn, to conduct the excursions through the mining and industrial centers of Canada of the Iron and Steel Institute of Great Britain, and the Verein Deutscher Eisenhüttenleute. The same year he organized the General Mining Association of the Province, and in 1892 he was instrumental in uniting the coal, gold, and other mineral interests of Nova Scotia into a like organization.

**Bell, Sir Charles**, a Scotch anatomist, and Professor of Surgery in the University of Edinburgh, where he was born in November, 1774. In 1804, he settled in London, where he speedily made a high reputation. He was the author of many professional works of the highest authority, but he is chiefly celebrated for his discoveries in connection with the nervous system, which gained for him an European name. He died April 28, 1842.

**Bell, Currer.** See BRONTE, CHARLOTTE.

**Bell, Ellis.** See BRONTE, EMILY JANE.

**Bell, George Joseph**, a Scotch lawyer, a brother of Sir Charles and John Bell, born in Edinburgh in 1770. He was the author of several standard law books, the most important of which is "The Principles of the Law of Scotland," which has gone through several editions. He died in 1843.

**Bell, Henry**, a Scotch engineer, born in Linlithgowshire in 1767. He was apprenticed as a millwright, and afterward served under several engineers, including Rennie. He settled in Glasgow in 1790, and subsequently in Helensburgh. In 1798 he turned his attention especially to the steamboat, the practicability of steam navigation having been already demonstrated. In 1812 the "Comet," a small 30-ton vessel built at Glasgow under Bell's directions, and driven by a three horse-power engine made by himself, commenced to ply between Glasgow and Greenock, and continued to run till she was wrecked in 1820. This was the beginning of steam navigation in Europe. Bell is also credited with the invention of the "discharging machine" used by calico printers. He died in Helensburgh, in 1830. A monument has been erected to his memory at Dunglass Point on the Clyde.

**Bell, Henry, Haywood**, an American naval officer, born in North Carolina, about 1808; was appointed a midshipman from that State in 1823; served on the "Grampus" when she was engaged in clearing the coast of Cuba of pirates. For many years he served with the East Indian squadron, and commanded one of the vessels of the squadron which, in November, 1856, destroyed four forts near Canton, China.

Shortly after the outbreak of the Civil War, he became Fleet Captain of the Western Gulf Squadron. He commanded one of the three divisions of the fleet which captured New Orleans, and was sent to raise the United States flag over the custom house and the city hall. In 1865 he took command of the East India squadron with the rank of Commodore; in 1866 was promoted to Rear-Admiral; and, in 1867, retired. He was drowned at the mouth of the Osaka river, Japan, Jan. 11, 1868.

**Bell, Isaac**, an American philanthropist, born in New York city, Aug. 4, 1814; began his business life in a banking house when 14 years old, and, in 1836, became interested in large financial and other concerns. About this time he began to devote himself to the work of benevolent institutions, and was president of the Department of Charities and Correction from 1857 till 1873. It was principally through his efforts that the Bellevue Hospital, and also the Bellevue Hospital Medical College, were founded. In connection with the first institution he established the system of ambulance service. He was also largely instrumental in the establishment of the Normal College, and was responsible for the schoolship "Mercury," which came under the control of the Department of Charities and Correction, and of the "St. Mary's," as well, loaned by the Navy Department to the Department of Education, of which he was also for a long time a member. During the Civil War he was active in raising and disbursing money for the benefit of New York Volunteers, and in aiding soldiers' wives, widows, and orphans. He died in New York city, Sept. 30, 1897.

**Bell, James**, a Canadian physician, born in North Gower, Ont., Oct. 10, 1852; graduated at McGill University in 1877; became house surgeon of the Montreal General Hospital the same year, and Medical Superintendent of it in 1881. In 1885 he became a member of the hospital staff as assistant surgeon, and, in 1886, full surgeon. In 1894 he was made Consulting Surgeon to the General Hospital, Surgeon of the Royal Victoria Hospital of Montreal, and Professor of Clinical Surgery in McGill University.

**Bell, James Franklin**, an American military officer, born in Kentucky; was graduated at the United States Military Academy; commissioned 2d Lieutenant, 9th Cavalry, 1879; promoted to 1st Lieutenant, 7th Cavalry, Dec. 29, 1890, Captain, March 2, 1899, and Brigadier-General, Feb. 19, 1901. On July 5, 1899, he was commissioned Colonel of the 36th Infantry, and, in an action with the Filipino insurgents near Porac, Luzon, Sept. 9, following, he so signally distinguished himself that President McKinley directed that a Congressional medal of honor be presented to him. General



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Bell had much to do with the establishment of the United States War School for Cavalry and Light Artillery at Fort Riley, Kan.; commanded the Staff College; and became Chief of Staff in 1906 and Major-General in 1907.

**Bell, John**, an English sculptor, born in Norfolk in 1811. His best known works are the "Eagle Slayer," "Una and the Lion," "The Maid of Saragossa," "Imogen," "Andromeda," statues of Lord Falkland, Sir Robert Walpole, Newton, Cromwell, and the Wellington Memorial in Guildhall. He was one of the sculptors of the Guards' Monument in Waterloo Place, London, and the Prince Consort Memorial in Hyde Park. He was the author of several professional treatises, and of a drama, "Ivan: A Day and a Night in Russia." He died in March, 1895.

**Bell, John**, a Scotch surgeon, born in Edinburgh, in 1763; elder brother of Sir Charles Bell. After completing his professional education he traveled for a short time in Russia and the N. of Europe; and, on his return to Edinburgh, began to deliver extra-mural lectures on surgery and midwifery. These lectures, which he delivered between the years 1786 and 1796, were very highly esteemed, and speedily brought him into an extensive practice as a consulting and operating surgeon. His principal works are "The Anatomy of the Human Body," "Discourses on the Nature and Cure of Wounds," "The Principles of Surgery," and "Letters on Professional Character." He died in Rome in 1820.

**Bell, John**, an American statesman, born near Nashville, Tenn., Feb. 18, 1797; was admitted to the bar in 1816; member of Congress from 1827 to 1841; Speaker in 1834, and Secretary of War in 1841. During this period he became from an ardent free trader, a protectionist and supporter of the Whigs, and favored the reception of petitions for the abolition of slavery in the District of Columbia; afterward (1858) he vigorously opposed the admission of Kansas as a slave State. He sat in the United States Senate from 1847 to 1859, and, in 1860, was nominated for the Presidency by the "Constitutional Union" Party, but received only 39 electoral votes, cast by the States of Tennessee, Kentucky, and Virginia. He afterward took no active share in politics, and died at Cumberland Ironworks, Sept. 10, 1869.

**Bell, Liberty**, a famous bell which was rung when the Continental Congress declared the independence of the United States in 1776. The order for founding it was given in 1751. The State House of Pennsylvania, in Philadelphia, work on which had been suspended for a number of years, was then approaching completion. The lower floors were already occupied by the Supreme Court in the Chamber, while in the other assembled the

## Bell

Freemen of the Province of Pennsylvania, then consisting of one body. A committee was appointed by the Freemen, with Peter Norris as chairman, and empowered to have a new bell cast for the building. The commission for the bell was, in the same year, awarded to Robert Charles, of London, the specification being that the bell should weigh 2,000 pounds and cost £100 sterling. It was to be made by the best workmen, to be examined carefully before being shipped, and to contain, in well shaped letters around it, the inscription: "By order of the Province of Pennsylvania, for the State House in the City of Philadelphia, 1752." An order was given to place underneath this the prophetic words from Leviticus xxv: 10: "Proclaim liberty throughout the land and to all the inhabitants thereof." The reason for the selection of this text has been a subject of much conjecture, but the true reason is apparent when the full text is read. It is as follows: "And ye shall hallow the 50th year and proclaim liberty throughout the land and to all the inhabitants thereof." In selecting the text the Quakers had in memory the arrival of William Penn and their forefathers more than half a century before. In August, 1752, the bell arrived, but though in apparent good order, it was cracked by a stroke of the clapper while being tested. It could not be sent back, as the captain of the vessel who had brought it over could not take it on board. Two skilful men undertook to recast the bell, which, on being opened, revealed a bell which pleased very much. But it was also found to be defective. The original bell was considered too high, and a quantity of copper was added to the composition, but too much copper was added. There were a great many witticisms on account of the sound failure, and the ingenious workmen undertook to recast the bell, which they successfully did, and it was placed in condition in June, 1753. On Monday, the 8th of July (not the 4th), at noon, true to its motto, it rang out the memorable message of "Liberty throughout the land and to all the inhabitants thereof." For 50 years the bell continued to be rung on every festival and anniversary, until it eventually cracked. An ineffectual attempt was made to cause it to continue serviceable by enlarging the cause of its dissonance and chipping the edges. It was removed from its position in the tower to a lower story, and only used on occasions of public sorrow. Subsequently, it was placed on the original timbers in the vestibule of the State House, and, in 1873, it was suspended in a prominent position immediately beneath where a larger bell, presented to the city in 1866, now proclaims the passing hours. In 1893 it was taken to Chicago and placed on exhibition at the World's Columbian Exposition.



## Bell

**Bell, Lilian**, an American novelist, born in Kentucky in 1867. She has written "The Love Affairs of an Old Maid," and "A Little Sister to the Wilderness."

**Bell, Robert**, an Irish author and editor, born in Cork, Jan. 16, 1800; educated at Trinity College, Dublin, and went to London in 1828. He became editor of magazines and useful editions of books. He is best known for his annotated edition of "English Poets, from Chaucer to Cowper" (24 vols., 1854-1857). He wrote "History of Russia" (3 vols., London 1836); "Life of Canning" (1846); "Wayside Pictures Through France, Belgium, and Holland" (1849); two novels; three comedies; and a collection of "Early Ballads" (1864). He died in London, April 12, 1867.

**Bell, Robert**, a Canadian geologist, born in the township of Toronto, Ont., June 3, 1841; educated at McGill and Queen's Universities. In 1867 he joined the Canada Geological Survey, and in 1900 was an assistant director of it. In 1861 he was elected a member of the American Institute of Mining Engineers; in 1881 became a Fellow of the Royal Society of Canada; and in 1888-1889 was a member of the Ontario Commission, which reported on the mineral resources of that province. During his 39 years' connection with the geological survey, he made more extensive explorations throughout the Dominion than any other man. He was the author of about 130 reports and papers, a list of which is found in the "Biblio of the Royal Society."

**Bell, Samuel Dana**, an American jurist, born in Francestown, N. H., Oct. 9, 1798; graduated at Harvard in 1816; studied law in Exeter; and began practice in Meredith. He became a member of the Legislature about 1825, and was the clerk of that body for several years. In 1830, 1842, and 1867, he was a member of the commissions appointed to revise the State "Statutes." In 1855 he was appointed Justice of the Supreme Court of New Hampshire, and in 1859, became Chief Justice of the court, which office he held till 1864. He joined the New Hampshire Historical Society soon after its organization, and the Manchester Public Library was founded largely through his efforts. He died in Winchester, N. H., July 31, 1868.

**Belladonna**, a European plant, *atropa belladonna*, or deadly nightshade, natural order *solanaceæ*. It is native in Great Britain. All parts of the plant are poisonous, and the incautious eating of the berries has often produced death. The inspissated juice is commonly known by the name of extract of belladonna. It is narcotic and poisonous, but is of great value in medicine, especially in nervous ailments. It has the property of causing the pupil of the eye to dilate. The fruit of the plant is a dark, brownish-

## Bellamy

black shining berry. The name signifies beautiful lady, and is said to have been given from the use of the plant as a cosmetic.

**Belladonna Lily**, so called on account of its beauty, a species of *amaryllis* (*A. belladonna*), with delicate blushing flowers clustered at the top of a leafless flowering stem. It is a native of the Cape of Good Hope and of the West Indies.

**Bellaire**, a city in Belmont county, O.; on the Ohio river, and several railroads; 5 miles S. of Wheeling, W. Va. The river is here crossed by a costly iron railroad bridge. Bellaire is the center of a region rich in coal, iron, cement, brick, clay, and limestone, and has manufactories of stoves, glass, carriages, boilers, and foundry and machine shop products. The city has a National bank, high grade educational institutions, daily and weekly newspapers, and an assessed property valuation of over \$3,000,000. Pop. (1900) 9,912; (1910) 12,946.

**Bellamy, Edward**, an American writer, born in Chicopee Falls, Mass., March 29, 1850. He was educated in Germany; admitted to the bar; was on the staff of the "Evening Post" of New York in 1871-1872; and on his return from the Sandwich Islands in 1877, he founded the Springfield "News." He is best known by his novel "Looking Backward" (1888), a socialistic work, of which an immense number of copies were sold in two years. His other books are "Six to One: a Nantucket Idyl" (1878); "Dr. Heidenhoff's Process" (1880); "Miss Ludington's Sister" (1884); and "Equality" (1897). He died in Chicopee Falls, Mass., May 22, 1898.



EDWARD BELLAMY.

**Bellamy, Mrs. Elizabeth Whitfield (Croom)**, an American novelist, writing under the pseudonym KAMBA THORPE, born at Quincy, Fla., 1839. She has written "Four Oaks" (1867); "Little Joanna" (1876); "Old Man Gilbert" (1888); "The Luck of the Pendennings." Died in 1900.

**Bellamy, George Anne**, an English actress, born most likely at Lisbon, in 1727, was the natural daughter of a Quaker school girl and Lord Tyrawley, by whom she was educated. Having forfeited his favor by going to live with her mother, she secured an engagement at Covent Garden in 1744,



and appeared with Quin as Monimia in "The Orphan." Mrs. Bellamy's professional career was brilliant; but her extravagance and profligacy were notorious. In 1785, after many alternations of fortune, a free benefit released her from the debtors' prison, and in the same year she published an "Apology" for her life (6 vols.). She died in 1788.

**Bellamy, Jacobus**, a Dutch poet, born at Vlissingen, Nov. 12, 1757. First known through his Anacreontic "Songs of My Youth" (1782), which were followed by the inspired "Patriotic Songs" (1783), he is now chiefly remembered for his poetical romance "Roosje" (1784), which in touching simplicity and ardent feeling is unequaled in Dutch literature. He died in Utrecht, March 11, 1786.

**Bellamy, Joseph**, an American clergyman and educator, born in Cheshire, Conn., in 1719; graduated at Yale in 1735; in 1740 became pastor of the church in Bethlehem, where he remained until his death. About 1742 he established a divinity school, in which many celebrated clergymen were trained. Among his published works, besides his "Sermons," are "True Religion Delineated" (1750); "The Nature and Glory of the Gospel" (1762), and "The Half-Way Covenant" (1769). He died in Bethlehem, Conn., March 6, 1790.

**Bellarmino, Roberto** (bel-är-mē-nō), an Italian cardinal, born in Montepulciano, Tuscany, Oct. 4, 1542; noted as a theologian and controversialist. He was Professor in the Roman College, and in Louvain, and also Archbishop of Capua. His publications include "Disputations on Controversies, Faith, etc." (1581); "On the Pope's Temporal Sovereignty," "Christian Doctrine" (1603). He died in Rome, Sept. 17, 1621.

**Bellay, Joachim du**, a French poet and prose writer, born at the Château de Liré, near Angers, about 1524; next to Ronsard, the most prominent member of the famous "Pléiade." He had few of the advantages of a school education, but by his own industry became acquainted with the poets of antiquity and of France. His first volume of poems was a collection of his "Sonnets to Olive." His "Antiquities of Rome" was done into English verse by Edmund Spenser, "The Ruins of Rome" (1591). His principal work is a "Defense and Illustration of the French Language" (1549), in which he depreciates the old forms of French poetry and sets up the classic poets of antiquity as models. After his death were published more of his sonnets, also odes, and some translations. He died in Paris, Jan. 1, 1560.

**Bell Bird**, a bird, called also the arapunga (*arapunga alba*), belonging to the family *ampelidæ*, and the sub-family *gymnoderinæ* (fruit crows). It is pure white in color,

about a foot in length, and has a voice like the tolling of a bell. It inhabits Guiana.

**Belleau, Rémy** (bel-lo'), a French poet, born at Nogent-le-Rotrou, in 1528; one of the "Pléiade," and ranked by some as its best poet, in preference to Bellay. His poems are graceful and melodious, and show less affectation of sentiment than those of many of his contemporaries. He made an elegant and spirited translation of "The Odes of Anacreon" (1576). His "Bergerie" (1572), a compound of prose and verse, is of unequal merit; but it contains some passages — *c. g.*, the "April" — which are of consummate beauty. A curious work is his fanciful "Loves and New Exchanges of Precious Stones" (1566); it is perhaps his best performance. He died in Paris, March 16, 1577.

**Belle de Nuit** (-nwē'), a name sometimes given to the Marvel of Peru (*mirabilis jalapa*), sometimes also to certain tropical American and West Indian species of *convolvulaceæ*, with extremely beautiful and fragrant flowers, which open only during the night.

**Bellefontaine**, village and county-seat of Logan co., O.; on the Cleveland, Cincinnati, Chicago and St. Louis railroad; 57 miles N. E. of Dayton. It occupies the highest elevation in the State; and is surrounded by an agricultural region containing the extensive car shops, round house, switch yard, etc., of the "Big Four" railroad. It has 2 National banks; daily and weekly newspapers; an assessed property valuation of \$2,250,000; a total debt of about \$200,000. Pop. (1900) 6,649; (1910) 8,238.

**Bellegarde** (bel-gard'), **Henri, Comte de**, a French writer, born in Piræ, Aug. 30, 1648; member of the community of priests of St. Francis de Sales, and the recognized author of the "Universal History of Voyages" (1707). He died in Paris, in 1707.

**Belle-Isle** (bel-ēl), or **Belle-Isle-en-Mer**, a French island in the Bay of Biscay, Department of Morbihan, 8 miles S. of Quiberon Point; length, 11 miles; greatest breadth, 6 miles. Pop. about 10,000, largely engaged in the pilchard fishing. The capital is Le Palais, on the N. E. coast.

**Belle-Isle**, a rocky island 9 miles long, at the E. entrance to the Strait of Belle-Isle, the channel, 17 miles wide, between Newfoundland and the coast of Labrador. Steamers from Glasgow and Liverpool to Quebec around the N. of Ireland commonly go by this channel in summer as being the shortest route.

**Belle-Isle, Charles Louis Auguste Fouquet, Duke of**, a Marshal of France, born in 1684. He distinguished himself in the war of the Spanish Succession, became Lieutenant-General in 1732, took part in



## Bellerophon

the siege of Philipsburg, and procured the cession of Lorraine to France. Created marshal of France about 1740, he commanded in Germany against the Imperialists, took Prague, was sent as Ambassador to the Diet at Frankfort, and procured the election of Charles VII. Being taken by the English, he was conveyed to England, where he was confined some months. He was afterward created duke and peer, admitted to the French Academy, and made Minister of War in 1757. He died in 1761.

**Bellerophon**, a son of Glaucus, King of Ephyre, by Eurymede, was at first called Hipponous. The murder of his brother, whom some call Alcimenus and Bellerus, procured him the name of Bellerophon, or murderer of Bellerus. After this murder,



BELLEROPHON AND THE CHIMÆRA.

Bellerophon fled to the court of Prætus, King of Argos, whose wife became enamored of him; and because he slighted her passion, she sought to destroy him. He, however, escaped her machinations, was introduced to the court of Jobates, King of Lycia, and, after a number of adventures, in one of which he conquered the Chimæra, he married the daughter of Jobates, and succeeded to the throne of Lycia.

**Bellerophon**, a genus of gasteropodous mollusks, belonging to the family *atlantidæ*. The species have symmetrically convoluted globular, or discoidal shells, some of them whorled, and with a deeply notched aperture. In 1875, Tate estimated the known species at 128, ranging from the Lower Silurian to the Carboniferous rocks.

**Belles Lettres** (bel-let'r), polite, or elegant literature: a word of somewhat vague signification. Rhetoric, poetry, fiction, history, and criticism, with the languages in which the standard works in these departments are written, are generally understood to come under the head of *belles lettres*.

## Belli

**Belleville**, city and county-seat of St. Clair co., Ill.; on several railroads; 14 miles E. of St. Louis, Mo. It is in the midst of very productive coal mines; has a large trade in flour, and general produce; and is chiefly engaged in the manufacture of glass, stoves, flour, nails, and machinery. The city has trolley lines to St. Louis, a public library, St. Peter's Cathedral (Roman Catholic), convent, National bank, and an assessed property valuation of over \$2,250,000. Pop. (1900) 17,484; (1910) 21,122.

**Belleville**, town, port of entry, and county-seat of Hastings co., Ont., Canada; on the Bay of Quinte, at the mouth of the Moira river; and on the Grand Trunk and Midland railways; 60 miles W. of Kingston. It has an excellent harbor, and abundant water power; is in direct steamboat communication with many United States and Canadian points; is principally engaged in manufacturing and commerce; and is a popular summer resort. Belleville is the seat of Albert University (Methodist Episcopal), which comprises Albert College for men, and Alexandra College for women; and in the suburbs is a large deaf and dumb asylum. The city has agencies for the principal banks of Canada; about a dozen churches, convent, and daily and weekly newspapers. Pop. (1891) 9,916; (1900) 9,117.

**Bellevue**, the name of a castle near Sevres, built by Madame Pompadour, and destroyed during the French revolution; also of a famous castle near Cassel, Germany, possessing a picture gallery, rich in old masters.

**Bell Flower**, the English name of the great genus *campanula*. It is so called because the corollas have a close resemblance to a bell. There are many species of this genus, the most common being *campanula rotundifolia*, the round-leaved bell-flower, or harebell; and after it *C. trachelium*, or nettle-leaved bell-flower; and *C. hederacea*, or ivy-leaved bell-flower. The finest species is the giant bell-flower (*campanula latifolia*).

**Belli, Giuseppe Gioachino** (bel'lē), a Roman humorist and satirical poet, born in 1791. He wrote in the popular dialect of the Trastevere; and in early life scourged with stinging, irreverent, and often vulgar satire, the tyranny of the Popes and the scandalous lives of the clergy. Becoming afterward a zealous convert to the faith of the Roman Church, he endeavored to call in and destroy the wicked indiscretions of his youth. In his last years, he published a beautiful translation of the Roman Breviary. His published sonnets amount to more than 2,000; his other published Italian verses fill four considerable volumes; while two-thirds of his vast remains have never been gathered and edited. Of this last, much is clothed in language too coarse to bear the light of modern culture. He died in 1863.



## Belliard

**Belliard** (bel-yär'), **Augustin Daniel, Comte**, a French military officer of phenomenal courage, who played an active part in all the wars of Napoleon I.; born in Fontenay-le-Comte, March 25, 1769. For his services in the Egyptian campaign he was made governor of Cairo, but, on account of insufficient stores, was obliged to surrender that city to the English, June 27, 1801. Made governor of Madrid in 1808, minister extraordinary during the Hundred Days, and ambassador to Belgium (1831), he signed the decisive peace treaty which made that country independent of Holland. A statue has been erected in his honor at his birthplace. He died in Brussels, Jan. 28, 1832.

**Belligerent**, a nation or a large section of a nation engaged in carrying on war. When a revolted party of great numerical strength are able to form a regular government and rule over the whole or part of the territory which they claim, humanity dictates that they should not be treated as rebels guilty of treason, but should, if captured, be regarded as prisoners of war. To attain this result, it is needful for those who have risen in arms against the government to make every effort to obtain for their party the position of belligerents. In the contest between the Federals and Confederates, in the war of 1861-65, the latter section of the American people, at the very commencement of the struggle, claimed the privileges of belligerents. Their demand was promptly acceded to by the British government, on which the Federal authorities took umbrage, contending that the recognition had been premature, while the British maintained that it could not have been refused or delayed.

The rules of belligerency have occupied a prominent place in history. Recognized belligerents in civilized usage are those who have publicly declared war against an enemy. In the earlier ages of the Roman republic such a declaration was solemnly made to the foreign state by the *feciales* or priests, who acted as guardians of public faith. So now, in order to constitute an enemy, in the sense understood in international law, there must be a public declaration of war made by an organized state or government. Many questions concerning belligerent rights of nations and the incidental interests of individuals, private property, etc., still remain unsettled. In modern times, however, the usual practice has been to respect the property of individuals on the outbreak of war. Repeated endeavors to regulate these and other matters pertaining to belligerency have been made by the Court of Arbitration at The Hague (*q. v.*). For many years after the rise of modern international law the conduct of warfare was discussed only with reference to belligerents, and no intermediate relation between an ally and an enemy was recognized, but since the middle of the

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eighteenth century the conditions of neutrality (*q. v.*) have been progressively determined, and systematic efforts have been made by nations to regulate the relations thereby involved and to define reciprocal rights and duties. See BLOCKADE; CONTRABAND OF WAR; ENEMY; INTERNATIONAL LAW: etc.

**Bellin, Jacques Nicolas** (bel-an'), the first hydrographic engineer in the marine service of France, and the author of several excellent geographical works. Among his publications are an "Account of the Maps of the Coasts of North America" (1755); "French Hydrography" (1756); a "Small Maritime Atlas" (1764); and a "Description of the Gulf of Venice and of the Morea" (1771). He died in Versailles, March 21, 1772.

**Bellingham**, a city of Washington, county-seat of Whatcom co.; situated near the N. E. corner of the State, 48 miles S. of Vancouver, B. C., 80 miles N. of Seattle, and 760 miles N. by E. of San Francisco, on the E. shore of Bellingham bay, the practically land-hemmed N. branch of Puget Sound, forming a good harbor about 10 miles long and 5 miles wide. The city is the Puget Sound terminus of 3 transcontinental railroads, the Great Northern, Northern Pacific, and Canadian Pacific, and the headquarters of the Bellingham Bay and British Columbia railroad. Its public buildings include a city hall, a court house, State Normal School, and 2 Carnegie Library buildings. The Normal School has 300 students, a museum, and a library. There are 38 churches, a Y. M. C. A. building, 2 public hospitals, and 12 public schools, including 2 high schools; a free industrial school, 2 commercial schools, a Lutheran parochial school, and a Japanese school; 3 daily and 4 weekly newspapers; 2 theaters, the Beck having a seating capacity of 2,200; 2 men's and 2 women's social clubs and a yacht club, with well-equipped club houses, a chamber of commerce, merchants' and grocers' associations, etc.

**Industries and Commerce.**—The industrial interests of the city include saw and shingle mills, a tin can factory, salmon canneries, a cold storage plant, a beer brewery, brickyards, etc. Near the city are valuable deposits of clay and of sandstone. Oyster culture along Bellingham bay is now an important industry. According to the United States Census of Manufactures of 1905, which was limited to industries carried on under the factory system, to the exclusion of neighborhood industries and hand trades, there were in the city 73 manufacturing establishments, with \$2,981,000 of capital, employing 1,314 wage-earners (exclusive of salaried officials and clerks), who received \$858,000 in wages, used materials valued at \$1,651,000, and turned out products valued at \$3,294,000. According to



## Bellingham

local information, the industries of the city had in 1906 5,267 employees, with an output of \$7,751,000. Bellingham is a sub-port of entry and the shipping handled at the port was valued at \$9,991,000 in 1906. In the same year there were 2 National banks, with a capital of \$200,000; surplus and profits, \$94,000; and total resources and liabilities, \$2,838,000. There are also 2 State banks, and the deposits in the 4 banks aggregated over \$3,500,000 in 1907.

**Administration and Public Interests.**—The government is vested in a mayor, chosen biennially, and a unicameral council. The administrative officers include a treasurer, comptroller, corporation counsel, boards of public works, health, parks, etc. The board of education is distinct from the general municipal government. The city owns its water works, costing about \$1,000,000, the supply being drawn from Whatcom lake, 2½ miles E. of the city, than which it is 318 feet higher. South Bellingham is served by a private water company. An expenditure of over \$600,000 on street improvements was authorized for 1907. The city charter limits the number of saloons to 1 for each 1,000 inhabitants. The electric street railroad has over 17 miles of track, reaching all parts of the city, and as far as Whatcom falls and Whatcom lake. An interurban electric railway, to cost over \$1,500,000, was building in 1907, to connect the city with Sedro Woolley, 18 miles S. E., and Burlington and Mount Vernon, 18 miles and 23 miles respectively S. by E.

**History and Population.**—The city of Bellingham came into existence Dec. 28, 1903, when the cities of Whatcom and Fairhaven were consolidated. The first settlement in Whatcom was made in 1852, when a sawmill was erected on Whatcom creek. Whatcom was consolidated with New Whatcom in 1891. Fairhaven was platted in 1883, and incorporated as a city in 1890, when the adjoining town of Bellingham was annexed. Bellingham bay, from which the present city derives its name, was named by Vancouver in 1792. The population of Whatcom was 4,827 in 1890, and 6,834 in 1900; of Fairhaven, 4,076 in 1890, and 4,228 in 1900. An official local census in 1904 gave the population of Bellingham as 22,632, and in 1910 it was 24,298.

**Bellingham, Richard**, an English colonial governor; born in 1592; arrived in Boston in 1634, and in the following year became deputy governor of Massachusetts. In 1641 he was candidate for governor against Winthrop, and was elected; was re-elected in 1654 and 1665; and held the governorship at the time of his death. In 1664 he refused to go to England at the command of the king, to defend his administration. He became major-general in the same year. He died Dec. 7, 1672.

**Bellini** (bel-lē'nē), the name of a Vene-

## Bellman

tian family which produced several remarkable painters. The earliest was JACOPO BELLINI, who died in 1470. He was a pupil of the celebrated Gentile da Fabriano, and one of the first who painted in oil. His eldest son, GENTILE BELLINI, born in 1421, died in 1501, was distinguished as a portrait painter, and also as a *medaillieur*. Along with his brother, he was commissioned to decorate the council chamber of the Venetian senate. Mohammed II., having by accident



GIOVANNI BELLINI.

seen some of his works, invited Gentile to Constantinople, employed him to execute various historical works, and dismissed him laden with presents. The "Preaching of St. Mark" is his most famous piece. His more celebrated brother, GIOVANNI BELLINI, born in 1426, died in 1512, was the founder of the older Venetian school of painting, and contributed greatly to its progress. His works are marked by naïveté, warmth, and intensity of coloring. His best works are altar pieces. His picture of the "Infant Jesus" slumbering in the lap of the Madonna, and attended by angels, is full of beauty and lively expression. His "Holy Virgin," "Baptism of the Lord," and "Christ and the Woman of Samaria" are also much admired.

**Bellini, Vincenzo**, a musical composer, born in Catania, Sicily, in 1802. He was educated at Naples, under Zingarelli, and before he had completed his twentieth year he had produced "Bianca and Fernando" at the Theater St. Carlo. This was succeeded by various other operas, of which "Il Pirata," "La Sonnambula," "Norma," and "I Puritani" (1827-34) are the best, and have gained for him an undying celebrity. His moral character stood high, and his manners and compositions were in harmonious accordance—agreeable, tender, and elegant. He died near Paris, Sept. 23, 1835.

**Bellinzona**, a town of Switzerland, capital of the canton of Ticino; charmingly situated on the left bank of the Ticino, about 5 miles from its embouchure in the N. end of Lago Maggiore. It occupies a position of great military importance.

**Bellis**, the genus to which the daisy belongs.

**Bellman, Carl Michael**, a Swedish poet; born in Stockholm, Feb. 4, 1740. His poems were often improvisations, and the airs of his songs were largely of his own composition. As singer of the rollicking life of a



capital city, he is unsurpassed. A colossal bronze bust of Bellman, by Byström, was erected in the Zoölogical Garden at Stockholm in 1829, and there a popular festival is held yearly in his honor. He died in Stockholm, Feb. 11, 1795.

**Bello, Andres**, a Spanish-American diplomatist and author, born in Caracas, Venezuela, Nov. 30, 1780. From 1810 to 1828 he represented Venezuela in London; in 1829, became an official of the Bureau of Finance; in 1834, Minister of Foreign Affairs for Chile; in 1842, the first rector of Santiago University. He was the author of "Principles of International Law" (1832), and his entire works were printed after his death at the expense of the State. He died in Santiago, Chile, Oct. 15, 1865.

**Bellona**, the goddess of war, and sister or wife, or sister-wife and charioteer of Mars. The Romans paid great adoration to her. The Temple of Bellona in Rome, stood in the Circus Flaminius, near the Porta Carmentalis, and was the place where foreign ambassadors and generals returning from their campaigns were received by the Senate. Before its gates was raised a column, called Columna Bellica, against which a javelin was hurled as one of the previous forms in the declaration of war. Her priests were named after her, Bellonarii. Lactantius (i: 21) describes them as cutting their flesh most ferociously in her worship; and Tertullian adds that, having collected the blood which flowed from these gashes, in the palms of their hands, they pledged the neophytes who were initiated into their mysteries, and then broke out into the ravings of vaticination.

**Bellot, Joseph René**, a French naval officer, born in Paris in 1826. In 1851 he joined the expedition to the Polar regions in search of Sir John Franklin, and took part in several explorations. He was drowned in an attempt to carry despatches to Sir Edward Belcher over the ice, in 1853. His diary was published in 1855.

**Bellotti, Bernardo**, an Italian painter and engraver, born in Venice, in 1724; studied under his uncle, Antonio Canal; painted perspective and architectural views. He passed much time in Germany and was a member of the Academy of Dresden, where many of his pictures are exhibited. He etched, from his own designs, views of Vienna, Dresden and Warsaw. His pictures are called by the name of CANALETTO, which he assumed. He died in Warsaw, in 1780.

**Bellot Strait**, the passage on the N. coast of North America, which separates North Somerset from Boothia Felix, and connects Prince Regent Inlet with Franklin Channel. Its E. entrance was discovered in 1852 by Lieut. Joseph René Bellot. After four unsuccessful attempts, it was

explored for the first time by M'Clintock on his crowning voyage. It is about 20 miles long, and, at its narrowest part, about 1 mile wide, running pretty nearly on the parallel of 72°, between granite shores which, everywhere high, rise here and there to 1,500 or 1,600 feet. Through this funnel both the winds and the waters have full play; the latter, permanent currents and flood tides alike, coming from the W. A point on the S. shore, 71° 55' N., 95 ° W., is the most northerly point of the North American continent.

**Bellows**, literally, an instrument for blowing the fire in manufactories, forges or private houses. Its sides are so formed and worked that the upper one alternately rises and falls, with the effect of compelling the chest or bladder-like instrument first to expand and then to contract; the former process causing the air to enter the interior, and the latter one to leave it by means of a pipe or tube designed to conduct it to the portion of a fire which it is to blow. In a hand bellows there are handles to be grasped; in a larger instrument designed for a manufactory, and called a blowing machine, the propulsive power is obtained by machinery. A pair of bellows, worked chiefly by the feet, is figured on an Egyptian monument attributed to the time of Thothmes III., B. C. about 1490, and one is mentioned in Jer. vi: 29; both of these were used for smelting metals. The representation of a bellows for the hand, and presumably for domestic use, is found on an old Roman lamp; it is exactly of the modern type.

In hydrostatics, an instrument designed as a toy rather than for use. It is, however, of some utility as illustrating what is called the hydrostatic paradox. Two horizontal, flat boards, united by leather folded at the sides so as to be capable of expansion, constitute a chamber, into which water is introduced from a long, narrow pipe rising vertically. By hydrostatical law this water will act with such pressure on the interior of the chamber that it will force the upper board to rise as far as the leather will permit, even if heavy weights be put upon it to keep it down.

**Bellows, Albert F.**, an American painter born in Milford, Mass., Nov. 20, 1829; was one of the first to succeed with water colors. He studied in Antwerp, Paris and England, becoming a National Academician (1861), and an honorary member of the Royal Belgian Water Color Society (1868). He died in Auburndale, Mass., Nov. 24, 1883.

**Bellows, Henry Whitney**, an American Unitarian clergyman and writer, born at Walpole, N. H., June 11, 1814; became pastor of All Souls Church, New York, 1839; was chief founder and long editor of



## Bellows Fish

the "Christian Inquirer" (1846); chief originator of the United States Sanitary Commission, and its President during the Civil War (1861-1865). He wrote "Public Life of Washington" (1866); "Relation of Public Amusements to Public Morality;" "The Old World in its New Face" (2 vols., 1868-1869), a record of travel in Europe. He was an effective preacher and public speaker. He died in New York, Jan. 30, 1882.

**Bellows Fish**, an acanthopterygious fish of the genus *centriscus* (*C. scolopax*); called also the trumpet fish or sea snipe. It is not uncommon in the Mediterranean, but rare in the British seas. It is 4 or 5 inches long, and has an oblong, oval body and a tubular elongated snout, which is adapted for drawing from among sea-weed and mud the minute crustacea on which it feeds.

**Belloy, Pierre Laurent de**, properly **Buirette**, a French dramatist, born in 1727; won success with the tragedies "The Siege of Calais" (1765) and "Gaston and Bayard" (1771), and was elected to the Academy in 1771. He died in 1775.

**Bell Rock**, or **Inch Cape**, a dangerous reef surmounted by a lighthouse, situated in the German Ocean, about 12 miles from Arbroath, nearly opposite the mouth of the river Tay. It is said that in former ages the monks of Aberbrothock caused a bell to be fixed on this reef, which was rung by the waves, and warned the mariners of this highly dangerous place. Tradition also says that the bell was wantonly cut away by a pirate, and that a year after he perished on the rock himself with ship and plunder. Southey has a well-known poem on this subject. The lighthouse was erected in 1808-1811 by Robert Stevenson from Rennie's plan at a cost of upward of £60,000. It arises to a height of 120 feet; has a revolving light showing alternately red and white every minute, and visible for upward of 15 miles. It also contains two bells which are rung during thick weather. The reef is partly uncovered at ebb tides.

**Bell-Smith, Frederic Marlett**, an English artist, born in London, Sept. 26, 1846; went to Canada in 1866. He was for seven years Art Director at Alma College, St. Thomas, and teacher of drawing in the public schools of London, Ont. About 1888 he became a portrait and figure painter; but he is best known as a painter of landscapes. In 1894 he produced "Lights of a City Street," his greatest achievement up to that year, and later, two canvases depicting incidents connected with the death of Sir John Thompson.

**Belmont**, a town in the E. part of Cape Colony, midway between Orange River Junction and Kimberley. It was the scene of one of the earliest engagements in the war of

## Belmont

1899-1900, between the Boers and the British under Gen. Lord Methuen. The town was attacked by the British on Nov. 23, 1899, while on the march to the relief of Kimberley, and the battle resulted in a victory for them. Two days later Lord Methuen took Graas Pan, 10 miles N. of Belmont, after again defeating the Boers.

**Belmont, August**, an American banker, born in Alzey, Germany; educated at Frankfurt, and was apprenticed to the Rothschild's banking house in that city when 14 years old. In 1837 he went to Havana to take charge of the firm's interests, and soon afterward was sent to New York city, where he established himself in the banking business and as the representative of the Rothschilds. He was Consul-General of Austria, in 1844-1850; became Charge d'Affaires at The Hague in 1853; and was Minister-Resident there in 1854-1858. He was a delegate to the Democratic National Convention in 1860, and when a portion of the delegates withdrew and organized the convention in Baltimore, he was active in that body, and through it became Chairman of the National Democratic Committee an office he held till 1872. He was an active worker in the party till 1876, when he closed his political career. He died in New York city, Nov. 24, 1890.

**Belmont, August**, an American banker, born in New York city, Feb. 18, 1853; son of the preceding. He was graduated at Harvard University in 1875; at once entered his father's banking house, and on the death of his father became head of the firm of August Belmont & Co., also representing the European banking firm of the Rothschilds. In February, 1900, he organized the Rapid Transit Subway Construction Company to back John B. McDonald, who had been awarded the \$35,000,000 contract for the construction of a rapid transit system in New York city. The banking house also deposited with the comptroller of the city a certified check for \$1,000,000. The house, under the management of the son, has continued to exert the large influence in the financial and railroad affairs of the city and country that it gained under its founder.

**Belmont, Perry**, an American lawyer, born in New York, Dec. 28, 1851; son of August Belmont; graduated at Harvard University in 1872, and at Columbia College Law School in 1876; was admitted to the bar and practiced in New York till 1881, when he was elected as a Democrat to Congress, and served till 1887, being a member of the Committee on Foreign Affairs, and in that capacity in his first term in Congress came into notice by his cross-examination of Hon. James G. Blaine, then ex-Secretary of State, as to his relations with a syndicate of American capitalists inter-



ested in Peruvian guano. In 1885 he was appointed Chairman of the Committee on Foreign Affairs; 1887-1888 was United States Minister to Spain. In 1889 he was a commissioner to the Universal Exposition in Paris, and for his services received from the President of France, in 1890, the decoration of Commander of the Legion of Honor. He was one of the principals in the execution of the great contract for the construction of a rapid transit system in New York city, in February, 1900, becoming bondsman for the 50-year continuing bond for \$1,000,000.

**Belmontet, Louis** (bel-môn-tā'), a French poet and publicist, born in Montauban, March 26, 1799; studied and practiced law in Toulouse, until involved in difficulties with the magistracy on account of some satirical poems, when he went to Paris and there produced his principal works: "The Sad Ones" (1824), a cycle of elegies; "The Supper of Augustus" (1828); and with Soumet, "A Festival of Nero" (1829), a tragedy which exceeded 100 performances. Subsequently he became an ardent partisan of Bonapartism, pleading its cause as a journalist and poetically extolling the Napoleonic dynasty in many enthusiastic odes. He died in Paris, Oct. 14, 1879.

**Beloe, William**, an English clergyman and writer, born in 1756. He was educated at Cambridge, and latterly was presented to the rectory of All-hallows, London Wall, and subsequently to stalls in Lincoln Cathedral and St. Paul's. In 1803 he became keeper of the printed books in the British Museum. His chief publications are "Anecdotes of Literature and Scarce Books" (6 vols., 1806-1812); a translation of Herodotus with a commentary; and the "Sexagenarian, or Memoirs of a Literary Life" (1817). He died in 1817.

**Beloit**, a city in Rock county, Wis.; on the Rock river, and the Chicago and Northwestern, and the Chicago, Milwaukee and St. Paul railroads; 85 miles S. W. of Milwaukee. The city derives fine power for manufacturing from the river; and has the second largest wood-working machinery plant in the world, beside manufactories of gas-engines, windmills, iron, paper-mill machinery, ploughs, paper, rye flour (oldest mill of its kind in the country), and bicycles. The city is widely known as the seat of **BELOIT COLLEGE** (*q. v.*). Pop. (1910) 15,125.

**Beloit College**, a co-educational (non-sectarian) institution in Beloit, Wis.; organized in 1847 by the Congregational and Presbyterian churches; has grounds and buildings valued at over \$495,000; endowment, \$1,145,000; scientific apparatus, \$78,000; volumes in the library, over 42,000; professors and instructors, about 35; stu-

dents, 460; and graduates since opening, over 1,000.

**Belomancy**, divination by means of arrows or other missiles. It is alluded to in Scripture in Ezek. xxi: 21 (in Heb. ver. 26), where Nebuchadnezzar, standing at the divergence of two roads, in uncertainty as to whether he should first go against Rabbah or Jerusalem, had recourse to divination, and, according to our version, "made his arrows bright." Gesenius renders the words "moved about his arrows" or "shook together his arrows." Perhaps, as some think, he inscribed the name of a city on each arrow, shook them all together, and then drew one out at random, resolved to attack the city whose name came first forth.

**Belot, Adolphe** (be-lō'), a French novelist and dramatist, born in Pointe-a-Patre, Nov. 6, 1829; traveled extensively and settled at Nancy as a lawyer. He won reputation with a witty comedy, "The Testament of César Girodot" (1859, with Villetard); and being less successful with his following dramatic efforts, devoted himself to fiction. Of his novels may be mentioned "The Venus of Gordes" (1867, with Ernest Dandet); "The Drama of the Rue de la Paix" (1868); "Article 47" (1870); all of which were dramatized. He died in Paris, Dec. 17, 1890.

**Belshazzar**, the last of the Babylonian kings, who reigned conjointly with his father, Nabonadins. He perished B. C. 538, during the successful storming of Babylon by Cyrus. This event is recorded in the book of Daniel; but it is difficult to bring the particulars there given into harmony with the cuneiform inscriptions.

**Belt**, in astronomy, a varying number of dusky, belt-like bands or zones encircling the planet Jupiter parallel to his equator, as if the clouds of his atmosphere had been forced into a series of parallels through the rapidity of his rotation, and the dark body of the planet was seen through the comparatively clear spaces between.

In physical geography, two passages or straits connecting the Baltic with the German Ocean, viz. (a) the Great Belt, between the islands of Seeland and Laland on the N. and Fühnen and Langeland, on the W. (b) The Little Belt, between the mainland of Denmark on the W., and the island of Fühnen on the E.

**Beltane**, a superstitious observance now or formerly practiced among the Scottish and Irish Celts, as well as in Cumberland and Lancashire. The Scotch observe the Beltane festival chiefly on the 1st of May (old style), though in the W. of that country St. Peter's Day, June 29, was preferred. In Ireland there were two Beltanes, one on the 1st of May, and the other on the 21st of



June. The ceremonies varied in different places, but one essential part of them everywhere was to light a fire. At Callander, in Perthshire, the boys went to the moors, cut a table out of sods, sat round it, lit a fire, cooked and ate a custard, baked an oatmeal cake, divided it into equal segments, blackened one of these, drew lots, and then compelled the boy who drew out the blackened piece to leap three times through the fire, with the view of obtaining for the district a year of prosperity. In Ireland, cattle were driven through the fire. The name given suggests that the actual worship of Baal, as the sun, which could easily have come from the Phœnicians, existed in Great Britain in pre-Christian times. Originally human sacrifices may have been offered, and then, as primitive society began to discern the cruelty of this practice, it may have been deemed enough for the victim to pass through the fire in place of being burnt to death. Finally, cattle would tend to be substituted for human beings. Merry-makings came at length to attend the Beltane festival.

**Beluchistan.** See BALUCHISTAN.

**Beluga**, a species of fish—the great or Hausen, sturgeon, the *acipenser huso*. It is sometimes 12 to 15 feet in length, and weighs 1,200 pounds, or in rare cases even 3,000. The best isinglass is made from its swimming bladder. Its flesh, though sometimes eaten, is occasionally unwholesome. It is found in the Caspian and Black Seas and the large rivers which flow into them. The word is also applied to a cetacean, *delphinapterus leucas*. It is called also the white whale. It belongs to the family *delphinidæ*. It is from 18 to 21 feet in length, and inhabits Davis Straits and the other portions of the Northern Seas, and sometimes ascends rivers.

**Belus**, the Roman name of the Assyrian and Babylonian divinity called Bel in Isaiah xlv: 1.

**Belus**, a Phœnician river at the base of Mt. Carmel. Its fine sand, according to tradition, first led the Phœnicians to the invention of glass.

**Belus, Temple of**, an enormous temple in ancient Babylon, rebuilt by Nebuchadnezzar, about 604 B. C. Its site is thought, by some authorities, to be the modern Bers-Nimrud, and by others, Babil, both situated near Hillah.

**Belvedere**, or **Belvidere**, a room built above the roof of an edifice, for the purpose of viewing the surrounding country. In France the term belvedere is used occasionally for a summer house in a park or garden.

**Belvidere**, city and county-seat of Boone co., Ill.; on the Kishwaukee river, and the Chicago and Northwestern railroad; 78

miles N. W. of Chicago. It is an important farming and dairying trade center; and contains railroad shops, one of the largest sewing machine and bicycle works in the country, manufactory of sewing machine supplies, flour mills, creamery, and other industries; and has 2 National banks, several daily and weekly periodicals, and a property valuation of about \$2,000,000. Pop. (1890) 3,867; (1900) 6,937; (1910) 7,253.

**Belzu, Manuel Isodoro**, a Bolivian revolutionist who led the revolutions of 1847 and 1848, born in La Paz, in 1808; was killed in a street battle there while leading a revolt against Melgarijo, in March, 1866.

**Belzoni, Giovanni Battista**, an Italian traveler, whose researches in Egypt have been of great service to those engaged in the study of its antiquities, was born in Padua, in 1778. He went to England in 1803; and, becoming involved in pecuniary difficulties, while residing in London, he obtained a livelihood by the display of feats of strength and activity at Astley's amphitheater, for which his colossal stature and extraordinary muscular powers eminently qualified him. At length he left England and entered on his travels through Egypt, in 1815. In 1816 he sent the busts of Jupiter, Memnon, etc., to the British Museum; published a narrative of his operations in 1820; and in the following year exhibited a model of the splendid tomb which he had discovered near Thebes. But, while making preparations for passing from Benin to Houssa and Timbuctoo, he was attacked by dysentery, and died at Gato in 1823.

**Bem, Joseph**, a Polish general, born in Galicia in 1795. His first experience was in the French expedition against Russia in 1812. He was afterward professor in the School of Artillery, at Warsaw; took part in the insurrection of 1830, and, in 1848, joined the Hungarian army. He obtained several successes against the Austrians and Russians in the following year, but, after the defeat at Temesvar, he retired into Turkey, and was made a pasha. He died in 1850.

**Bembatoka, Bay of**, a safe and commodious bay on the N. W. coast of Madagascar, lying in 16° S. lat. and 46° E. long. The river Betsiboka, with the Ikiopa, drain into the bay; the former, which is about 300 miles long, is navigable for small steamers for about 90 miles. Mojanga, on the N. side of the bay, is the second town in the island, with about 14,000 inhabitants, Bembatoka being but a village.

**Bembex**, a genus of hymenopterous insects, the typical one of the family *bembicidæ*. The species, which have a certain resemblance to wasps, are solitary burrowers; they store up flies for the support of their larvæ. They are found in hot countries.



## Bembicidæ

**Bembicidæ**, a family of insects belonging to the order *hymenoptera*, the tribe *aculeata*, and the sub-tribe *fossoria*. Type, *bembex*.

**Bembidiidæ**, a family of beetles belonging to the tribe *geodephaga* (feeders on land). It consists of minute predatory beetles, generally bright blue or green, with yellow spots and a metallic luster. They frequent damp places. Typical genus, *bembidium*.

**Bembidium**, a genus of foreign beetles, the typical one of the family *bembidiidæ*. They have large eyes and an ovate body.

**Bembo, Pietro**, an Italian scholar, born at Venice in 1470. He became one of a famous society of scholars which had been established in the house of the printer Aldus Manutius. In 1512 he became secretary to Leo X., after whose death he retired to Padua. He was next appointed historiographer to the Republic of Venice and librarian of the library of St. Mark. Pope



PIETRO BEMBO.

Paul III. conferred on him, in 1539, the hat of a cardinal, and soon after the bishoprics of Gubbio and Bergamo. The most important of his works are "History of Venice from 1487 to 1513," written both in Latin and Italian; "Le Prose," dialogues in which the rules of the Italian language are

laid down; "Gli Asolani," dialogues on the nature of love; and "Le Rime," a collection of sonnets and canzonets. He died in 1547.

**Bemis, Edward Webster**, an American economist, born in Springfield, Mass., April 7, 1860; graduated at Amherst College in 1880; was a pioneer lecturer in the University Extension System, 1887-1888; Professor of Economics and History, Vanderbilt University, 1889-1892; and Associate Professor of Economics, University of Chicago, 1892-1895. In 1897-1899 he was Professor of Economical Science in the Kansas State Agricultural College. He published "History of Coöperation in the United States" (1888); "Municipal Ownership of Gas" (1891); "Local Government for the South and Southwest" (1893); "Popular Election of United States Senators" (1893); "Relation of Labor Organizations to the American Boy and to Trade Instruction" (1894), etc.

## Benares

**Bemis (incorrectly BEMUS) Heights**, a village in Saratoga county, N. Y., on the Hudson river, famous as the scene of the first battle of Stillwater, Sept. 19, 1777.

**Ben** (Hebrew, "son"), a prepositive syllable signifying in composition "son of," found in many Jewish names, as Bendavid, Benasser, etc. Beni, the plural, occurs in several modern names, and in the names of many Arabian tribes.

**Ben**, a Gaelic word signifying mountain, prefixed to the names of many mountains in Scotland N. of the Firths of Clyde and Forth; as, Ben Nevis, Ben MacDhui, etc.

**Ben, Oil of**, the expressed oil of the ben-nut, the seed of *moringa pterygosperma*, the ben or horse radish tree of India. The oil is inodorous, does not become rancid for many years, and is used by perfumers and watchmakers.

**Benaiah**, the name of 12 different persons mentioned in the Bible, the one chiefly important being a son of Jehoida, a chief priest. He figures as a mighty and valiant warrior who overcame two Moabite champions, slew an Egyptian giant with the giant's own spear, went down into a dry cistern and slew a lion that had fallen in while it was covered with snow, and killed the rebels Adonijah and Joab. He was made commander-in-chief in Joab's place by Solomon.

**Benalcazor** (ben-al-kä-thär'), **Belalcazor**, or **Velalcazor**, **Sebastian de**, the name given to SEBASTIAN MOVANO from his native town; a Spanish soldier who figured in the Spanish conquests in South America. His gallant conduct attracted the attention of Pizarro, who promoted him. He took the city of Quito, made an expedition into Colombia and reduced Popayan, and was appointed governor of that part of the country in 1538. He was forced to resign this office in consequence of legal complications and died when about to return to Spain, in 1550.

**Benares**, a town in Hindustan, new United Provinces, administrative headquarters of a district and division of the same name, on the left bank of the Ganges, from which it rises like an amphitheater, presenting a splendid panorama of temples, mosques, palaces, and other buildings, with their domes, minarets, etc. Fine ghauts lead down to the river. It is one of the most sacred places of pilgrimage in all India, being the headquarters of the Hindu religion. The principal temple is dedicated to Siva, whose sacred symbol it contains. It is also the seat of government and other colleges, and of the missions of various societies. Benares carries on a large trade in the produce of the district and in English goods, and manufactures silks, shawls, embroidered cloth, jewelry, etc. The population, in-



cluding the neighboring cantonments at Sikraul (Secrole), in 1901, was 209,331. The commissionership or division has an area of 18,337 square miles, and a population of 9,820,728, of whom 76.53 per cent. depend on agriculture. The district has an area of 998 square miles, and a population of 892,694.

**Benaventé**, a town of Spain, in the Province of Zamora, on the western bank of the Esla, 34 miles N. from Zamora. It is overlooked by a huge, half-ruined castle, and is now a dull and poverty stricken place, built chiefly of mud cottages. It was here that Moore's retreat commenced, Dec. 28, 1808.

**Benavides y Navarrete** (ben-ä-vē'dās ē nav-ar-ā'te), **Francisco de Paola**, a Spanish priest, born in Baeza, May 14, 1810; was made Bishop of Sigüenza in 1857; Patriarch of the Indies in 1877; and Archbishop and Cardinal of Saragossa in 1881. He died in Saragossa, March 30, 1895.

**Benbow, John**, an English admiral, born in 1650 at Shrewsbury. His skill and valor, displayed during an action with a Barbary pirate at the head of a superior force, gained him the confidence of the nation, and he was made a captain in the Royal navy by James II. Rear-Admiral in 1700, he had his leg carried away by a chain-shot during an engagement with the French Commodore, Du Casse, in 1702, and he died in Jamaica, in 1702.

**Bench**, in law, the seat which judges or magistrates occupy officially in a court of justice; also the judges or magistrates sitting together to try cases. The Court of King's Bench (named, when a female sovereign is on the throne, the Court of Queen's Bench) formerly was one of the three chief courts in England. It grew up rather than was created in the early Norman times. The judicial business of the Great Council of the nation coming to be transacted in the King's palace, the court which attended to it was called that of the *Aula Regis*, viz., of the King's palace. It gradually separated into three—the Courts of King's Bench, of Common Pleas, and of the Exchequer. The first of these exercised control over the inferior courts, and took special cognizance of trespasses against the King's peace. From its very outset it was a court of record. Its separate existence was abolished by the judicature act of 1873, and now it is the King's Bench Division of the High Court of Judicature.

In engineering, a bench is a horizontal ledge on the side of a cutting; an embankment or parapet, a berme, a banquette.

**Benchers**, in England, senior members of the Inns of Court, who have the entire management of their respective inns, the power of punishing barristers guilty of misconduct, and the right to admit or reject candidates to the bar.

**Bench Warrant**, a warrant issued by the court before which an indictment has been found to arrest the accused, that he may appear and find bail for his appearance at the trial. It is used extensively in the United States to bring into court persons who have neglected to obey an order of court, such as delinquent jurymen.

**Bencoolen**, a seaport on the W. coast of Sumatra Island, Dutch East Indies; capital of a Residency of the same name. It was founded in 1685 by the English and ceded to the Dutch in 1824. Area of Residency, 9,690 square miles; pop. of Residency, 140,126; of town, 5,000.

**Bend**, in heraldry, one of the nine honorable ordinaries, containing a third part of the field when charged, and a fifth when plain, made by two lines drawn diagonally across the shield from the dexter chief to the sinister base point. The bend sinister differs only by crossing in the opposite direction, diagonally from the sinister chief to the dexter base. It indicates illegitimacy.

**Benda, Georg**, the most distinguished of a notable musical family, born at Jungbunzlau, in Bohemia, in 1721, and distinguished as a pianist, violinist, and composer; died at Köstritz in 1795. He was bandmaster to the Duke of Gotha (1748–1787), and in this period produced several operas and cantatas, such as "Ariadne auf Naxos" and "Medea."

**Bendemann, Eduard**, a German painter, born in Berlin, Dec. 3, 1811; studied under Schadow. As early as 1832 his great picture of the "Captive Jews" was exhibited at Berlin, and in 1837 he gained the gold medal at Paris. In 1838 he was appointed Professor of the Academy of Art at Dresden. Here he was intrusted with the execution of the larger frescoes in the palace, and on these his fame chiefly depends. In 1858 he succeeded his father-in-law as director of the Düsseldorf Academy, a post which he held until 1867. He afterward produced several large canvases and frescoes, some of which are among his best works. He died in Düsseldorf, Dec. 27, 1889.

**Bender, Louis Prosper**, a Canadian-American physician and author, born in Quebec, July 30, 1844; graduated at McGill University in 1865, after having interrupted his studies by a service in the medical department of the Union army during a portion of the American Civil War. In 1884 he settled in Boston, Mass., where he established himself in homœopathic practice. His writings include "Literary Sheaves," or "La Litterature au Canada-Francais" (1881); "Old and New Canada, 1753–1844," "Historic Scenes and Social Pictures, or the Life of Joseph François Perrault" (1882), etc. He has also frequently contributed to American magazines.



## Bendire

**Bendire, Charles Emil**, a German-American military officer and ornithologist, born in Darmstadt, Germany, April 27, 1836, came to the United States in 1852, and entered the army in 1854. He served through the Civil War, becoming a Captain in the 1st Cavalry. After the war he was transferred to the West, and was retired April 24, 1886. During his stay in the West he applied himself to the study of ornithology, and collected a vast amount of material in various branches of natural history. In 1870 he began to collect the eggs of North American birds, which finally numbered more than 8,000 specimens, and this collection he presented to the United States National Museum. He was the author of "The Life Histories of North American Birds, with Special Reference to their Breeding Habits and Eggs." He died Feb. 4, 1897.

**Benedek, Ludwig von**, an Austrian military officer, born in Odenburg, Hungary, July 14, 1804; fought against the Italians in 1848, and afterward against the Hungarian patriots. He distinguished himself at Solferino in the campaign of 1859; and in the war with Prussia in 1866 he commanded the Austrian army till after his defeat at Sadowa, when he was superseded. He died in Gratz, April 27, 1881.

**Benedetti, Vincent, Comte de**, a French diplomatist of Italian extraction, born in Bastia, Corsica, April 29 1817; was educated for public service, held consulates in Cairo, Palermo, Malta, and Tunis; and was Secretary of the Congress of Paris in 1856, and drew up the protocols of the treaty then agreed upon. In 1861 he was appointed Ambassador to Italy, and in 1864 to Prussia. In 1870 great excitement was aroused throughout Europe by the publication in the London "Times" of the alleged draft of a secret treaty between France and Prussia. The authenticity of the document was not denied. The French Government declared that although Benedetti had written the document, he had done so at the dictation of Bismarck. This declaration served to increase the excitement. At the same time Benedetti was under orders to protest against the candidature of Prince Leopold of the house of Hohenzollern for the crown of Spain. He became so infortunate in trying to carry out these orders that he was forbidden to seek further interviews with King William. The Ambassador had reiterated the demands of his government to the King while the latter was taking a walk on the promenade at Ems, thus committing a breach of court etiquette, and abusing his privileges as an ambassador. The refusal of the King to again receive Benedetti gave great offense in France, and was made a pretext for declaring war within a few days. After the fall of the Empire, Benedetti withdrew from public life. In 1871 he published

## Benedict

a pamphlet charging Bismarck with the whole responsibility of the secret treaty, to which the latter made a vigorous reply. Benedetti was author of "Studies in Diplomacy," an English translation of which appeared in 1895. He died in Paris, March 28, 1900.

**Benedetto da Majano**, an Italian architect and sculptor, born in Florence in 1442; began his career as a worker in wooden mosaic. With his brothers, Giovanni and Giuliana, he executed the "Madonna dell'Ulivo." His own work, represented in the "Madonna," far excels the work of his brothers. His most celebrated work as an architect was the Palazzo Strozzi, began in 1489. In 1490, he carved the busts of Giotto and Squarcilupo, in the Duomo at Florence. In 1491, the monument to Filippo Strozzi was erected in Santa Maria Novella, a work which Strozzi had commissioned Benedetto to make before his death. It is the *chef-d'œuvre* of the sculptor, and one of the most notable sculptures of the 15th century. He died in Florence in 1498.

**Benedicite** (Lord bless ye), the canticle in the "Book of Common Prayer" in the morning service, also called the "Song of the Three Holy Children:" "O, all ye works of the Lord, bless ye the Lord." It is as old as the time of St. Chrysostom.

**Benedict**, a married man; from the Latin *benedictus* (a happy man), and a skit on the order of St. Benedict, famous for their ascetic habits, and, of course, rigidly bound to celibacy. Shakespeare, in "Much Ado About Nothing," avails himself of this joke in making Benedick, the young lord of Padua, "rail against marriage," but afterward marry Beatrice, with whom he falls in love.

**Benedict I., Pope**, succeeded John III., 575; died in 578, and was himself succeeded by Pelagius II.

**Benedict II.** succeeded Leo II., 684; died in 685, and was succeeded by John V.

**Benedict III.** succeeded Leo IV., 855. During his pontificate, the Saracens were ravaging Apulia and Campania. He died in 858, and was succeeded by Nicholas I.

**Benedict IV.** succeeded John IX., about 900. He crowned Louis, son of Boson, Emperor and King of Italy. He died in 903, and was succeeded by Leo V.

**Benedict V.** succeeded John XII. in 964, and was appointed by the Romans in opposition to Leo VIII. The Emperor Otho, supporter of Leo, appeared before Rome with an army, reduced the city to famine, and a new assembly of the clergy declared to be null the election of Benedict, who was exiled. He died in 965.

**Benedict VI.** succeeded John XIII. in 972. After the death of the Emperor Otho I., the Romans imprisoned Benedict, who



## Benedict

was strangled in the castle of St. Angelo, in 974. We know nothing of Donus II., mentioned as the next Pope, except that he died after a few months, and was succeeded by

**Benedict VII.**, of the family of Conti, elected in 975. During his pontificate, the Emperor Otho II. came repeatedly to Rome, where he died in 984. Benedict died about the same time, and was succeeded by John XIV.

**Benedict VIII.** of the same family, succeeded Sergius IV., in 1012. In 1016, the Saracens from Sardinia having landed on the coast of Tuscany, Benedict attacked and defeated them. He crowned the Emperor Henry II., and his wife, in the Church of St. Peter. He died in 1024, and was succeeded by his brother, John XIX.

**Benedict IX.** a relative of the two preceding Popes, succeeded John XIX. in 1034. He was then very young, some say only 10 years old. He was distinguished by his licentiousness and profligacy, and by the state of anarchy in which Rome was plunged during his pontificate. He was deposed in 1048, and died in a convent in 1054, being succeeded by Leo IX.

**Benedict X.** was elected by a faction after the death of Stephen IX., in 1058; but the Council of Siena nominated Nicholas II. Benedict did not submit till the following year, when Nicholas made his entrance into Rome. He died in 1059.

**Benedict XI.** a Dominican, succeeded Boniface VIII., in 1303. Contemporary historians speak highly of his character and virtues. He died in 1304, and was succeeded by Clement V.

**Benedict XII., Jacques Fournier**, a native of France, succeeded John XXII., in 1334, the Popes residing then at Avignon. His strictness in enforcing discipline among the monastic orders excited many enemies against him, who endeavored to cast aspersions upon his character. He died in 1342, and was succeeded by Clement VI.

**Benedict XIII.**, Cardinal Orsini, succeeded Innocent XIII., in 1724, but it was with difficulty that he could be made to accept the pontificate. Benedict lived with the greatest frugality, and has been called more a monk than a Pope. His great fault was his implicit confidence in Cardinal Coscia, to whom he left the entire management of his government, and who much abused it. He died in February, 1731. His works were published in 1728, in three volumes folio. He was succeeded by Clement XII.

**Benedict XIV.** was born at Bologna in 1675, of the noble family of Lambertini. In 1728 he received a cardinal's hat; and in 1731 was nominated Archbishop of Bologna. On the death of Clement XII. (1740), the cardinals were a long time deliberating on the choice of a successor. Lambertini, by

## Benedict, St.

way of quickening them, said, "Why do you waste your time in discussions? If you wish for a saint, elect Gotti; a politician, choose Aldrovandus; a good companion, take me." This sally pleased them so much, that they elected him at once. He reformed abuses, introduced good regulations, cultivated letters, encouraged men of learning, and was a patron of the fine arts. His tolerance is well known, and it exposed him to the censure of the rigorists among the College of Cardinals. Without exhibiting anything like indifference to the doctrines of the Church of which he was the head, he showed urbanity and friendliness toward all Christians, of whatever denomination, whether Kings or ordinary travelers who visited his capital. His correspondence with Frederick the Great, concerning the ecclesiastical affairs of the Province of Silesia, which that sovereign had conquered from Austria was carried on by him in the most conciliatory and liberal spirit. The Protestants of Germany revered Benedict. With regard to France, he carefully avoided everything that could in the least encourage the fanatical party in that country in reviving the persecution against the Protestants of Languedoc. Seeing France distracted by quarrels between the Jesuits and the Jansenists, the court and the Parliament, the priests and the philosophers, and lamenting amid all this the licentiousness of Louis XV. and his courtiers, and the weakness and incapacity of the ministers he used to exclaim, that "France ought indeed to be the best governed country in the world, for its government seemed to be left entirely to the care of Providence." (Botta's "Storia d'Italia," lib. 46). Benedict was learned, not only in theology, but in history and literature, and had also a taste for the fine arts. His works were published at Rome, in 12 volumes quarto. He died in 1758, and was succeeded by Clement XIII.



BENEDICT XIV.

**Benedict, St.**, the founder of the Order of the Benedictine Monks, was born at Nursia, in the Dukedom of Spoleto, in Italy, in 480 A. D. He was sent to Rome when very young, and there received the first part of his education; when 14 years of age, he re-



## Benedict Biscop

moved to Subiaco, a desert place about 40 miles distant, where he was concealed in a cavern; his place of retirement, for a considerable time, being known only to his friend St. Romanus, who is said to have descended to him by a rope, and supplied him daily with provisions. The monks of a neighboring monastery subsequently chose him for their abbot; their manners, however, not agreeing with those of Benedict, he returned to his solitude, whither many persons followed him and put themselves under his direction, and in a short time he was enabled to build no fewer than 12 monasteries. About 528 he retired to Monte Cassino, where idolatry was still prevalent, and where a temple to Apollo yet existed. Having converted the people of the adjacent country to the true faith, he broke the statue of Apollo, overthrew the altar, and built two oratories on the mountain, one dedicated to St. Martin, the other to St. John. Here St. Benedict also founded a monastery, and instituted the Order of his name, which in time became so famous and extended all over Europe. It was here, too, that he composed his "*Regula Monachorum*," which does not, however, seem to have been confirmed till 52 years after his death, when Pope Gregory the Great gave his sanction to it. Authors are not agreed upon the place where St. Benedict died; some say at Monte Cassino; others affirm it to have been at Rome, whither he had been sent by Pope Boniface. Stevens, in the "*Continuation of Dugdale's Monasticon*," places his death about the year 543, others in 547; the day, however, stands in the calendar fixed to March 21. Gregory the Great, in the second "*Book of his Dialogues*," has written a "*Life of St. Benedict*," and given a long detail of his supposed miracles.

**Benedict Biscop**, an Anglo-Saxon monk, born of a noble Northumbrian family, in 628 or 629. At the age of 25, he accompanied Wilfrid on a pilgrimage to Rome. Here he lived for more than 10 years, when he returned to England; but not very long after he again went to Rome on a mission from the King of Northumbria. On his way back, he entered the Benedictine monastery of Lerins, in Provence, where he took the tonsure, and remained some time. On a third visit to Rome, he was commissioned to return to England as assistant and interpreter to Theodoric, Archbishop of Canterbury. In 674 he founded a monastery at the mouth of the Wear, and endowed it with numerous books, pictures, and relics obtained by him on his various journeys to Rome. He founded, in 682, a second monastery at Jarrow, dependent on that of Wearmouth. His great pupil, the Venerable Bede, who was made a monk in the monastery of Jarrow, and who wrote his life, was undoubtedly much indebted to the collections

## Benedictine

made by Benedict for the learning he acquired. He died in the monastery of Wearmouth in 1690.

**Benedict, David**, a Baptist clergyman and historian, born at Norwalk, Conn., in 1779; was pastor at Pawtucket, R. I., for 25 years, and preached till over 90 years of age. Among his chief works were "*History of All Religions*," "*Fifty Years Among the Baptists*," "*History of the Donatists*," etc. He died in 1874.

**Benedict, Frank Lee**, an American novelist and poet, born in New York in 1834. Among his numerous novels are "*John Worthington's Name*," "*Miss Van Kortland*" (1870); "*Her Friend Lawrence*" (1879); "*The Price She Paid*" (1883).

**Benedict, Sir Julius**, pianist and composer, born at Stuttgart, Nov. 27, 1804. He took up his residence in England in 1835, and was knighted in 1871. Principal works: the operas of "*The Gipsy's Warning*," "*Undine*," "*St. Cecilia*," "*Lily of Killarney*," and "*Graziella*." He died at London, June 5, 1885.

**Benedictine**, a liquor prepared by the Benedictine monks of the abbey of Fécamp, in Normandy, consisting of spirit (fine brandy) containing an infusion of the juices of plants, and said to possess digestive, antispasmodic, and other virtues, and to have prophylactic efficacy in epidemics. It has been made in the same way since 1510.

**Benedictine**, a follower of ST. BENEDICT (q. v.). In 529 he removed to Mt. Cassino, where, converting some pagan worshippers of Apollo, he transformed their temple into a monastery and became its abbot. He composed rules for its management, making every monk pledge himself to perfect chastity, absolute poverty, and implicit obedience in all respects to his superiors. He was to live in the monastery subject to his abbot. These vows were irrevocable, whereas up to that time the monks had been allowed to alter the regulations of their founder at their pleasure. The rule here instituted was adopted at an early period by various other monastic communities; it was confirmed, about 52 years after the death of its founder, by Pope Gregory the Great, and was ultimately accepted with more or less enthusiasm by nearly all the monkish communities of the West, though its pristine severity became modified with the lapse of time.

As long as the Benedictines remained poor, they were a blessing to the countries in which they lived, and especially to Germany, spending, as they did, several hours a day in gardening, agriculture, and mechanical labor, and another portion of their time in reading, besides keeping school outside the walls of their convents. Science and literature are also indebted to them for having copied many of the classical authors



## Benediction

and preserved such knowledge as existed in their age. When at length their merits had drawn much wealth to their order (individually they were not allowed to retain property), luxury and indolence sapped their virtues and diminished their influence for good. Afterward becoming reformed, especially in France, in the 17th century, the Benedictines again rendered service by the issue of an excellent edition of the "Fathers." The Benedictine habit seems to have been introduced after the age of St. Benedict. It consisted of a loose, black coat, or a gown, reaching to their feet, and having large, wide sleeves. Under it was a flannel habit, white in color and of the same size, while over all was a scapular. The head-dress was a hood, or cowl, pointed at the tip, and boots were worn upon the feet. From the predominantly black color of their attire, they were sometimes called Black Monks. They must not be confounded with the Black Friars, who were Dominicans.

There were Benedictine nuns as well as monks. When they originated is uncertain. There were first and last many branches of Benedictines, as the Carthusians, Cistercians, Celestines, Grandmontensians, Præmonstratensians, Cluniacensians, Camaldulensians, etc.

**Benediction** (from the Latin *benedicere*, literally, "to speak well of;" "to commend"), a solemn invocation of the Divine blessing upon men or things. The ceremony in its simplest form may be considered almost coeval with the earliest expressions of religious feeling. The Sabbath is said to have been blessed. Jacob blessed his two grandsons. Christ "took bread and blessed it," and "lifting up His hands," blessed His disciples. In the primitive Church the custom gradually developed itself in various liturgical forms. In Protestant churches a form of benediction is used at the close of religious services. In the Roman Church a priestly benediction has been defined as a formula of imperative prayer, which, in addition to the desire which it expresses, transmits a certain grace or virtue to the object over which it is pronounced. Such ecclesiastical benedictions are generally accompanied with the sprinkling of holy water and the use of incense, and universally with the sign of the cross. Prescribed forms may be gathered from the missal, breviary, and pontifical, or may be found collected in the "Benedictionale Romanum." Certain blessings form part of the liturgical services which only occur at stated seasons, as the blessing of the candles on Candlemas Day, of the ashes on Ash Wednesday, and of the palms, the sacred fire, the incense grains, the paschal candle, font and baptismal water, during Holy Week. Many ancient and curious ceremonies are used at the blessing of altars or of church bells by the bishop. Other ob-

## Benedix

jects for which special blessings are provided in the "Benedictionale" are fields, houses, ships, cattle, noxious animals, articles of food, and even railroads and telegraphs. Water mingled with blessed salt for the devotional use of the faithful in church or at home is, as a rule, prepared every week. This *aqua benedicta* or holy water in turn conveys a blessing to persons or objects aspersed with it. Priests having special faculties for the purpose may bless crosses and rosaries, which only, when so blessed, impart the papal indulgence to those who use them. So great was the importance attached by Roman Catholics to this delegated papal blessing, that, in 1571, the English Parliament, in retaliation against the Pope for attempting to depose Elizabeth, imposed the penalties of præmunire on anyone who should bring into the realm an Agnus Dei (a medal of wax), crosses, pictures, or beads consecrated or hallowed by the Bishop of Rome, or by authority derived from him. The papal benediction conveyed to a dying person carries with it a plenary indulgence. On certain occasions (as on Easter Sunday after mass), the Pope pronounces a solemn benediction *urbi et orbi* (on the city and the world).

Benediction is also the name given in some countries (in French, *Le Salut*) to a brief and popular service of comparatively modern origin in the Roman Church. It consists of certain canticles and antiphons sung in presence of the Sacred Host, which is exposed for the occasion on a "throne" above the altar. The service is concluded by the priest, wrapped in a veil, taking the monstrance which contains the Host, and therewith making the sign of the cross over the people, and giving to them in silence the benediction of the most holy sacrament.

**Benedictoff, Vladimir Grigorjevich**, a Russian poet (1810-1873), whose lyrics excel in deep sentiment and ideal enthusiasm; some, like "Two Apparitions," "The Lake," "The Mountain Peaks," may be ranked with the finest of any literature.

**Benedictus**, the name given to the hymn of Zacharias (Luke i: 68), used as a canticle in the morning service of the Church of England to follow the lessons. This position it has occupied from very ancient times. It is also used in the Church of Rome. The word is also applied to a portion of the mass service in the Church of Rome commencing "*Benedictus qui venit*," following the "Sanctus."

**Benedix, Julius Roderick**, a German actor, manager, and play writer, born in Leipzig in 1811. Of his numerous pieces, the best are his comedies, most of which are favorites in Germany, for their humorous, intricate plot, constant change of incident and scene, and natural, but witty, dialogue.



## Benefice

His dramatic works fill 27 volumes (1846–1874). He died in Leipsic, Sept. 26, 1873.

**Benefice**, under the feudal system, an estate held by feudal tenure, the name being given because it was assumed that such possessions were originally gratuitous donations, *ex mero beneficio* of the donor. At first they were for life only, but afterward they became hereditary, receiving the name of feuds, and giving that of benefices over to church livings.

Formerly, and even sometimes yet, the word was applied to an ecclesiastical living of any kind, any church endowed with a revenue, whether a dignity or not. More generally, however, the term is reserved for parsonages, vicarages and donatives, while bishoprics, deaneries, archdeacons, and prebendaries are called dignities. In the opinion of Blackstone a close parallel existed between the procedure of the Popes when they were in the plenitude of their power, and that of the contemporary feudal lords. The former copied from the latter, even to the adoption of the feudal word benefice for an ecclesiastical living.

**Benefit of Clergy**, the advantage derived from the preferment of the plea "I am a clergyman." When in medieval times, a clergyman was arraigned on certain charges he was permitted to put forth the plea that, with respect to the offense of which he was accused, he was not under the jurisdiction of the civil courts, but, being a clergyman, was entitled to be tried by his spiritual superiors. In such cases the bishop or ordinary was wont to demand that his clerks should be remitted to him out of the King's courts as soon as they were indicted; though at length the custom became increasingly prevalent of deferring the plea of being a clergyman till after conviction, when it was brought forward in arrest of judgment. The cases in which the benefit of clergy might be urged were such as affected the life or limbs of the offender, high treason, however, excepted. In these circumstances laymen often attempted to pass themselves off as clergymen, when the practice was to bring a book and ask the accused person to read a passage. If he could do so, his plea of being a clergyman was admitted; if he failed, it was rejected. The practical effect of this was to give the bishop the power, if he felt so disposed, of removing every reader from the jurisdiction of the courts.

In 1489, Henry VII. restricted the privilege. A layman able to read who pleaded his "clergy" could henceforth do so only once: and in order that he might be identified if he attempted it again, he was burned in the hand. Henry VIII., in 1512, abolished benefit of clergy with regard to murderers and other great criminals. The practice of requiring the accused person to read was put an end to in 1706; but it was not

## Benezet

till 1827 that the 7 and 8 George IV., chapter 28, known as Peel's Acts, swept the benefit of clergy itself away.

By the act of the American Congress of April 30, 1790, it is provided that the benefit of clergy shall not be used or allowed upon conviction of any crime, for which, by any statute of the United States, the punishment is, or shall be, declared to be death.

**Benet, Stephen Vincent**, an American military officer, born in St. Augustine, Fla., Jan. 22, 1827. He was graduated at the United States Military Academy in 1849, and assigned to the Ordnance Department; was Assistant Professor of Ethics and Law at the Military Academy in 1859–1861; instructor of Ordnance in 1861–1864; became Brigadier-General and Chief of Ordnance in 1874; and was retired in 1891. He was author of "Military Law and The Practice of Courts Martial" (1862); "Electro-Balistic Machines and the Schultze Chronoscope" (1866); and a translation from the French of Jomini's "The Campaign of Waterloo." He died in Washington, D. C., Jan. 22, 1895.

**Benevento** (ancient Beneventum), a city of Southern Italy, capital of a province of same name, between and near the confluence of the Calore and Sabato, 32 miles N. E. of Naples. The modern town is almost entirely constructed out of the ruins of the ancient; and, in fact, hardly any Italian town can boast of so many remains of antiquity as Benevento. Of these, the most perfect is the Arch of Trajan, erected about A. D. 114. Near Benevento, in 1266, was fought the great battle between Charles of Anjou and his rival, Manfred, in which the latter was killed, and his army totally defeated. During the reign of Napoleon I., Benevento was formed into a principality conferred on Talleyrand. In 1815, it again reverted to the Pope. In 1860, it was annexed to the kingdom of Italy. Pop. (1901) province, 256,504; city, 24,647.

**Benevolence**, in the history of the law of England, was a species of forced loan or contribution, levied by kings without legal authority. It was first so called in 1473, when asked from his subjects by Edward IV. as a mark of good will toward his rule, but similar compulsory free will offerings had not been uncommon in former reigns. Under Richard III., in 1484, an act of Parliament abolished benevolences as new and unlawful inventions, but, spite of this, they continued to be exacted by Richard himself and by Henry VII. In 1614 James I. tried, but with little success, to raise money by this expedient, and it was never again attempted by the crown; Charles I. expressly declining to have recourse to it.

**Benezet, Anthony**, a French-American philanthropist, was born in St. Quentin's,



## Benfey

France, Jan. 31, 1713; lived from infancy in England and the United States. The greater part of his writings were in the form of tracts against the slave trade and in favor of the American Indians. He also wrote about the Friends, of whose society both he and his parents were members. It is said that his writings on the slave trade first awakened the interest of Wilberforce on the subject. He died in Philadelphia, Pa., May 3, 1784.

**Benfey, Theodor**, a German Orientalist and comparative philologist, born of Jewish parents near Göttingen, Jan. 28, 1809. He studied in Göttingen, Munich, Frankfort, and Heidelberg, devoting himself especially to classical and comparative philology. In 1862 he was appointed to the chair of Sanskrit and Comparative Philology in the University of Göttingen, which he held till his death, June 26, 1881. One of his earliest literary efforts was a translation of "Terence" (Stuttgart, 1837); after this, however, he turned his attention almost exclusively to comparative philology, Oriental languages, especially Sanskrit, and mythology. In his 50 years devoted, with rare enthusiasm and persistency, to linguistic studies, he did more than any other scholar to enlarge the boundaries of Sanskrit philology. In comparative philology, though an adherent of Bopp, he deviated from his master in deriving all Indo-European words from monosyllabic primitive verbs. This conception depends on his theory of the origin of stem suffixes. These, he holds, are almost all derived from a fundamental form, *ant*, which appears in the present participle of verbs. To support this view he assumes the most violent permutations of sounds, which set all phonetic laws at defiance. For his theory, see his "Lexicon of Greek Roots" (Berlin, 1839); "Short Sanskrit Grammar" (London, 1868), and numerous essays. In Sanskrit he laid a foundation for the true study of the Veda by editing the "Sâma Veda" (Leipsic, 1848), with glossary and translation; and this work he continued by a scholarly translation of the first *mandala* of the Rig Veda in his magazine, "Orient und Occident" (Göttingen, 1863-1864). His Vedic grammar, for which he had been collecting materials for many years, was left unfinished. He also published a "Complete Sanskrit Grammar, Crestomathy and Glossary" (Leipsic, 1854), and a "Sanskrit-English Dictionary" (London, 1866). In comparative folk lore his principal work is a translation of the "Panchatantra," published at Leipsic in two volumes in 1859. It is accompanied with elaborate notes, and the first volume consists entirely of an introduction in which he traces the course of these Indian stories in their wanderings and transformations both in eastern and western literatures.

## Bengal

**Benga**, an African tribe, living on the Spanish island, Corisco, off the W. coast, having moved from the interior within a few generations. The American Presbyterian Board of Missions have Christianized many of the Bengas and translated books into their language, which closely resembles the Kamerun and Dualla.

**Bengal.** In the widest application the name presidency of Bengal is extended to the whole of British India, except what is under the governors of Madras and Bombay; so that it includes the provinces of Ajmir and Meirwara, Coorg, and Berar, which are under the direct administration of the governor-general; the lieutenant-governorships of Bengal, the United Provinces of Agra and Oudh, and the Punjab; the chief commissionerships of Assam, and the Central Provinces, besides various native States, etc. But the name is now usually restricted to that portion which is under the lieutenant-governor of Bengal, and which occupies the N. E. of India, comprising the following divisions:

| Divisions.        | No. of dists. | Area in sq. m. | Population in 1891. |
|-------------------|---------------|----------------|---------------------|
| Burdwan .....     | 6             | 13,855         |                     |
| Presidency .....  | 5             | 12,029         | 16,145,310          |
| Rajshahi .....    | 7             | 17,428         | 8,003,740           |
| Dacca .....       | 4             | 15,000         |                     |
| Chittagong .....  | 4             | 12,118         | 13,965,230          |
| Patna .....       | 7             | 23,647         |                     |
| Bhagalpur .....   | 5             | 20,492         | 24,284,370          |
| Orissa .....      | 5             | 9,053          | 3,865,020           |
| Chota Nagpur..... | 4             | 26,966         | 4,645,590           |

Total .....47 150,588 70,909,260  
The total population in 1901 amounted to 74,744,866.

The district composed of the first five of the above divisions forms the province of Bengal proper; Patna and Bhagalpur form the province of Behar. Besides these the lieutenant-generalship includes four native states under British protection, namely Cooch Behar, Hill Tipperah, Chota Nagpur (part of), and Orissa (part of), having a total area of 38,652 square miles, and a population in 1901 of 3,748,544.

The general physical character of Bengal is that of a practically level country, though it is surrounded with lofty chains of mountains; the N. part rests on the terraces of the Himalaya mountains, the E. is bounded by the Garos or Garrows chain, and the W. is ribbed with offsets of the Vindhya mountains. It is intersected in all directions by rivers, the principal of which are the Ganges and Brahmaputra, whose annual inundations render the soil which they reach extremely fertile. In those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth. The most inhospitable part of Bengal is what is called the Sunderbunds (from being covered with the soondru or sunder tree), that portion of the country through which the numerous



branches of the Ganges seek the sea, or the space lying between the Hoogly river and Chittagong, about 150 miles from E. to W., and about 160 from N. to S. This district is infested with tigers, is traversed in all directions by water-courses or nullahs, and interspersed with numerous sheets of stagnant water called jheels, which abound with fish and water-fowl, and are much resorted to by crocodiles.

*Geology and Minerals.*—In the N. part of Bengal, at the foot of the Himalayas, is a band of Tertiary formation; S. from which, and along the course of the Ganges, more especially E. from that river, and including the greater part of its delta and that of the Brahmaputra, the country is wholly composed of alluvium or modern detritus. Calcutta stands upon strata of the transition series, which stretch W. into Bahar, and are flanked N. and S. by tracts of crystalline formation. In the Garos hills coal, iron, and limestone are found; and niter effloresces on the surface round Calcutta and elsewhere. Mineral springs are not numerous.

*Rivers.*—The principal rivers, besides the Ganges and Brahmaputra, the latter of which enters the province at its N. E. extremity, and falls into the Bay of Bengal near the principal embouchure of the Ganges, are the Soobunreka, which falls into the Bay of Bengal, in lat.  $21^{\circ} 35' N.$ , S. S. W. of the Hoogly; the Cosi or Coosee, which rises near Khatamandoo in Nepal, and falls into the Ganges near Bhagalpur, in lat.  $25^{\circ} 20' N.$ ; and the Dumooda, which, rising in Bahar, falls into the Hoogly about 22 miles below Calcutta. There are numerous other streams of less note, mostly tributaries of the Ganges and Brahmaputra, or their larger affluents.

*Climate.*—There is more regularity in the changes of the seasons in Bengal than perhaps in any other part of India; but it is subject to great extremes of heat, which, added to the humidity of its surface and the heavy dews that fall, render it generally unhealthy to Europeans. The prevalence of hot winds, which are sometimes loaded with sandy particles, is another source of disease. The seasons are distinguished by the terms hot, cold, and rainy. The hot season continues from the beginning of March to the end of May, within which period the thermometer frequently rises to  $100^{\circ}$ , sometimes to  $110^{\circ}$ . The month of September is also often intensely hot, and when so is the most unhealthy period of the year to natives as well as Europeans, owing to the profuse exhalations from stagnant waters left by the inundations, and from a rank decaying vegetation. The rainy season commences in June, and lasts till October. During the first two months of this period the rain is frequently so heavy that five inches of water have fallen in one day,

the annual average being from 70 to 80 inches. It is in this season that the inundations take place, and that the Ganges overflows its delta, covering the land with its waters for more than 100 miles. The cold season, the most grateful and healthy of any to Europeans, continues from November to February, during which period N. winds prevail, with a clear sky.

*Forests.*—In Bengal, as in India generally, great attention has been paid of late to the management of forests. Great destruction is caused among forests by fires, which are sometimes the result of accident, but more frequently made purposely by the natives in pursuance of a system of jungle cultivation that appears to prevail throughout India. This consists in cutting down and burning a patch of forest, and raising a crop in the open space, no plowing or digging being necessary. The next year this patch is abandoned, and another treated in the same way. Another cause of destruction is the wastefulness of those who use the timber. The sunder trees, for example, which furnish the best wood for the boats which are built in great numbers throughout Eastern Bengal, have been cut down in so reckless a manner that the W. parts of the Sunderbunds have already been to a large extent exhausted. In order to limit the destruction that goes on by such proceedings certain portions of the Indian forests are reserved and placed under the entire control of the government, and additions are made to these reserves every year. Of the total 11,669 square miles of forest in Bengal, in 1896 5,877 were reserved and 3,437 protected.

*Animals.*—Among the wild animals are tigers, elephants, boars, bears, wolves, foxes, jackals, hyenas, leopards, panthers, lynxes, hares, deer, buffaloes, antelopes, and monkeys. The most formidable of all these animals (and more so even than the lion) is the tiger, which here attains its utmost size, and perhaps also its greatest ferocity. The domestic animals include native horses, thin, ill-shaped animals, and not well adapted for any kind of labor; cattle, of a very inferior breed, being extremely small and miserable looking; sheep, likewise of diminutive size, with very coarse hairy wool, but when well fed their flesh is excellent. Hogs and goats are also plentiful, and buffaloes are domesticated for the sake of their milk. Reptiles are numerous and formidable, including gavials, a kind of crocodile, with which the larger rivers are infested; and among the serpent tribe, many of which are highly poisonous, the deadly cobra-de-capello. Turtles, frogs, and lizards also abound, with swarms of mosquitoes. The turtle are chiefly procured from the island of Cheduba, in the Bay of Bengal. Fish are so exceedingly plentiful as to be within the reach of almost every class of in-



habitants. Game, poultry, and water-fowl of all descriptions abound in Bengal, particularly ducks, of which there is a great variety, and most of them of a superior kind. The gigantic crane, commonly called the adjutant, from the stately air with which he struts about, frequents the towns in considerable numbers, performing the office of scavenger by clearing the streets of garbage, in consideration of which duty he enjoys an entire immunity from all disturbance; his principal food is offal, toads, lizards, serpents, and insects. Crows, kites, sparrows, and other small birds are numerous.

*Agriculture.*—The staple crop of Bengal is rice, which is cultivated so as to produce three harvests in the year—spring rice, autumn rice, and winter rice. The last of these harvests is by far the most important. Besides sufficing for the wants of the population the rice crop leaves a large surplus for exportation. Oil seeds are also largely cultivated, chiefly mustard, sesamum, and linseed. The jute plant (*pât*) has long been cultivated, and in recent times the cultivation of it has greatly extended. It will grow on almost any description of land. Part of this crop is cultivated by those who use or manufacture it, almost all the Hindu farmers weaving cloth from it. It is now manufactured also in large mills under European management, and jute goods are now an export of some importance, though not nearly so much so as jute in the raw state for manufacture in Europe. The sunn plant, a plant somewhat resembling the Spanish broom, is now quite extensively cultivated and exported to Great Britain, affording excellent material for both sails and cordage, and being made into fishing nets by the natives. Cotton is grown over all India, but the best of the herbaceous kind is raised in Bengal and on the Coromandel coast; the finest grows on light rocky soil. The cotton of India is generally inferior to that of the United States; but this is believed to be wholly owing to careless cultivation, and to the slovenly manner in which it is prepared for the market. The cultivation of the date palm and the manufacture of date sugar are carried on to a considerable extent, forming a profitable business for the cultivator. This kind of sugar forms an article of export. The sugar cane is cultivated, but not nearly to such an extent as might be expected. There are two kinds of sugar cane, the one a yellow hard cane, about the thickness of a finger; the other is much thicker and deeply stained with purple. The latter is the most productive, but the most troublesome to cultivate, and therefore avoided by the most indolent farmers. Tobacco, which requires a light soil, is grown in three different situations—in rich spots of land contiguous to the farmer's house—in high

land suitable for the growth of sugar cane—and on the banks of rivers. The betel leaf, famous for its intoxicating quality and largely used over all India on that account, is cultivated in what is called a *voroj* or fort, and is carefully protected from the sun and wind. Indigo being one of the principal articles of foreign commerce with Bengal, is extensively cultivated in that province. The opium production of Bengal was a government monopoly under Mohammedan rule, and has been retained as such by the British. All the juice of the opium poppy must be sold to the government at a fixed price. This cultivation is carried on in the W. of Bengal in the divisions of Chota Nagpur and Patna. Orchards of mango trees are to be found in every part of Bengal, the fruit being in general demand during the hot months. The cinchona tree and the tea plant have both in recent times been added to the agricultural products of Bengal; the former in the native State of Sikkim, the latter especially in Cooch Behar (Darjiling), Chittagong, and Chota Nagpur.

The luxuriance of vegetation in Bengal is perhaps unequalled in any other part of the world. The cultivation of the land requires little effort, and large crops are obtained without the application of any other manure than the sediment or mud deposited by the inundations. It is doubtful, however, how far this facility is good, since it seems to have had the effect of preventing all attempts at improvement either in the science of agriculture itself or in the implements used in its practice. The Indian plow is of wretched construction, having neither colter nor moldboard, and in some districts it wants even the share, while the animals by which it is dragged, two oxen or cows, are miserable half-starved creatures. The reaping hook (*kastya*) is a most inefficient implement—the curved or cutting part of the blade is 6 inches long by  $1\frac{1}{2}$  broad, with teeth like a saw—the handle is about  $4\frac{1}{2}$  inches long. The *dengki*, by which the husks are separated from the grain, is another wretched implement, and so ill adapted to its purposes that one-fifth part of the whole grain is sacrificed in the operation. Nearly all the other implements in use are of an equally rude and imperfect description. Rotation of crops and the use of fallows are unknown to the farmers of India; the land is generally in an exhausted condition, and the inclosures everywhere bad. Grain is trodden out by oxen, and stacking corn is unusual, the corn being often left exposed to the weather. Irrigation, however, is well understood—necessity giving rise to invention—and is accomplished by the most ingenious and efficient means.

*Manufactures.*—The principal manufacture of Bengal is that of cotton goods, in-



cluding cotton piece goods of various descriptions, calicoes, thread, and sail-cloth. Muslins of the most beautiful and delicate texture were formerly made at Dacca, a city in this province, but the manufacture is almost extinct. "Some of these fabrics," says Tavernier, "were so fine that they could hardly be felt in the hand, and the thread when spun was scarce discernible." In Ward's "History" of the Hindus this character in the muslin of Dacca is confirmed; though perhaps in both cases it is a little exaggerated. "When this muslin is laid on the grass," says the latter, "and the dew has fallen on it, it is no longer discernible." The extraordinary fineness and beauty of India muslins, manufactured under the disadvantages of rude machinery and ill-prepared material, is attributed to the exquisitely fine sense of touch possessed by the Hindus, and to the hereditary continuance of a particular species of manufacture in families through many generations.

The modern decay of the muslin manufacture of India has been owing in a great measure to the successful competition of Great Britain, and to the circumstance of British fabrics being subject to no duty in Bengal, while high duties were levied on the fabrics of Bengal in Great Britain. These duties are now abolished. Large quantities of a coarse cloth, manufactured from jute, are made in various districts of Bengal. Sericulture is carried on more largely in Bengal than in any other part of India, and silk-weaving is still a leading industry in many of the districts; but of late years there has been a serious decline. One branch of this industry, however, seems more flourishing than some others, namely, the cultivation of *tasar* or wild silk, the worm that produces it feeding upon the leaves of the sal and other forest trees. On the other hand, various new manufactures, carried on by machinery, are rising up. The most important of these are the industries connected with jute, cotton, and sugar. These are already affording employment to many thousands, and the natives are said to show great aptitude for factory work. The jute mills alone employ nearly 40,000 hands.

*Commerce.*—The commerce of Bengal, both internal and external, is very large. Multitudes of native boats and other craft navigate the rivers. The imports to Calcutta from the interior have been valued at over £26,000,000, consisting of rice, tea, jute, indigo, linseed, mustard seed, wheat, etc. The foreign trade is large and increasing. Almost the whole of it passes through Calcutta, and the value of it annually is over £55,000,000, over £34,000,000 being exports. The most important exports are opium, jute, indigo, oil seeds, tea, hides and skins, and rice; the chief import is cotton

piece goods. The foreign trade is chiefly with Great Britain, China, the Straits Settlements, France, the United States, and Ceylon.

*Finance.*—The total revenue of the lieutenant-governorship of Bengal in the year ending March 31, 1898, was (calling the rupee 2s.) £20,288,493, and the total expenditure £10,324,105. The surplus goes to meet the expenses of the general government of India. The principal sources of revenue are land (amounting in 1897–1898 to £3,978,219), salt (£2,451,364), opium (£1,824,840), excise (£1,274,775), stamps (£1,775,941), and customs, assessed taxes, etc.

*Education, Social and Domestic Conditions, etc.*—It is one of the consequences of the extreme poverty of the bulk of the population of Bengal, that education should be there at a very low ebb. The proportion of boys of school-going age attending school is only about 28.6 per cent., of girls 2 per cent. The first rudiments of education are often given in small schools called *páthsálas*, in which the fees are extremely low, and in which only reading, writing, and arithmetic are taught. The greater number of these, although private establishments, receive aid from government. In the primary schools the principle of keeping the standard of instruction as low as possible is adhered to; and this is intended to be done till the whole of the poorest classes shall have been brought under some kind of instruction. In the meanwhile, all who have time or means for learning more are encouraged to resort to schools of a better class. With this view a system of intermediate schools was established in 1875 between the primary and what are called the middle schools, and this step has been rewarded with a satisfactory measure of success.

In addition to the schools already mentioned there are various educational institutions of a higher kind connected with government. The highest of these institutions is the Calcutta University, with the four faculties of arts, law, medicine, and engineering. Affiliated to the university are a number of general and professional colleges, in one of which all who have passed the university entrance examination and wish to proceed to a degree must enroll themselves. The majority of educated Bengal youths, according to official information, resort to two professions, the public service and the law, in consequence of which many cannot obtain employment. With a view to open out other lines of employment the government is endeavoring to establish technical and industrial schools of a superior kind in many places. A healthy ambition is said to exist among the natives of Bengal to raise themselves by education. Almost every Bengalee youth who can af-



ford the means aspires to an English education as one of the main objects of his life. One result of the Prince of Wales's visit to Bengal at the end of 1875 was that the wealthier natives raised subscriptions to commemorate the event by founding educational institutions. The secondary schools are generally divided into "English" and vernacular. Those in which English forms part of the regular course of study of all the scholars, or at least of all in the higher classes, are reckoned as English; if English is optional only, they are reckoned as vernacular. In the common languages of the country there were till lately almost no books to be had; but the Bible, or parts of it, has now been printed in the various languages and widely circulated, as well as a number of other works.

The private houses of Bengal are huts, with pentroofs constructed of two sloping sides which meet in a ridge. One hut of this kind serves the poor man for himself, family, and cattle; wealthy men increase the number of houses without altering the plan, and without having any communication between the different apartments. The walls are generally made of mud, and the floor is raised a foot or two above the level of the plain, to prevent its being flooded in the rainy season, which, however, is not always accomplished. The frames of the houses consist of bamboos tied together—wooden posts and beams being used in the construction of the houses of the wealthy only. The huts collectively sufficient for the accommodation of a family are usually surrounded by a common fence. Farmers have in general larger and better houses than people living in towns. A rich farmer will sometimes have as many as 12 or 14 huts within his enclosure. The food of the class just above the rank of common laborers consists chiefly of rice, wheaten flour, fish, vegetables, and butter, with various condiments and seasonings. In the case of the laborer there is neither flour, fish, vegetables, nor butter, the chief food of that class being a coarse description of rice.

*History.*—The English first got a firm footing in Bengal about 1644, when, through the influence of an English medical man named Boughton, a favorite of the Emperor of Delhi, the East India Company obtained permission to locate themselves at Hugli or Hoogly, some 28 miles above Calcutta. In 1686 the company's factors, having had a rupture with the Moslem commander at the place where they were located, removed to Calcutta, then the village of Chuttanutty, where they continued to carry on their trade. In 1700 the Viceroy of Bengal, being in want of money to dispute the succession to the Mogul throne, obtained a large sum from the company for the township on which their factory stood at Calcutta, and some adjacent lands. Seven years after-

ward, namely in 1707, Calcutta was erected into a presidency, and the foundation of British power in India laid—presenting a striking proof of the energy of the British character, there having been settlements in India by the Portuguese, Dutch, French, and Danes, previous to, and contemporary with, the location of the English in that quarter of the world; but the mighty achievement of obtaining the supremacy in that vast empire could, it appears, be accomplished only by the British. For nearly half a century the company pursued a peaceful and profitable commerce; but at the expiration of that period, 1756, Calcutta was attacked and taken by the Soubahdar of Bengal, who threw the Englishmen he found there, 147 in number, into a dungeon, the well-known "black hole" of Calcutta, where 123 of them perished in 11 hours. In the ensuing year Calcutta was retaken by Lord Clive—an event which was followed by a series of victories on the part of the British, that terminated in the entire conquest of India. In consequence of unprecedented drought great scarcity of food prevailed in 1873 and 1874, but the prompt measures of the government were sufficient to prevent any widespread mortality. A bill conferring upon agricultural tenants a transferable interest in their holdings and protecting them against eviction was passed in 1885.

**Bengal, Bay of**, that portion of the Indian Ocean which lies between Hindustan and Farther India, or Burma, Siam, and Malacca, and may be regarded as extending S. to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawadi. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts. On the W. coast there are no good harbors, but the E. coast has a considerable number, among them being Aracan, Cheduba, Negrais, Mataban and Syriam. On account of the extreme heat the rate of evaporation is very high, sometimes amounting to an inch per day. The tide sometimes rises to the height of 70 feet. In summer the N. E. monsoon prevails, and in winter the S. W. monsoon.

**Bengalee Era, The**, one of the chronological eras of the Hindus, supposed to have been derived from the Hegira. The Hindus, however, use the sidereal year, and the Mohammedans the lunar, hence the Mohammedan epoch is at present some nine years in advance of the Bengalee.

**Bengal, or Bengola, Light**, a kind of firework, giving a vivid and sustained blue light. It is used for signals at sea. It is composed of six parts of niter, two of sulphur, and one of antimony tersulphide. These are finely pulverized and incorporated together, and the composition is pressed into earthen bowls or similar shallow vessels.



## Bengel

**Bengel, Johann Albrecht**, a German theologian and philologist, born in 1687. He studied at Stuttgart and Tübingen, and became pastor and head of a school at Denckendorf. He especially applied himself to the critical study of the Greek Testament; of which he published an edition in 1723. Among his other works are "Apparatus Criticus Novi Testamenti," a work of great value for its suggestive condensed comments, which first appeared in 1742, and has been several times reprinted, etc. An attempt has been made to adapt his "Gnomen" to English readers in the "Critical English Testament," by Blackley and Hawes, published in 1866. He died in 1752.

**Benger, Elizabeth Ogilvy**, an English author, born in Wells, in 1778; is known chiefly for her memoirs, "Memoirs of Elizabeth Hamilton" (2 vols., 1818); "Memoirs of John Tobin" (1820); "Memoirs of Anne Boleyn" (2 vols., 1821); "Memoirs of Mary, Queen of Scots" (1823), and "Memoirs of Elizabeth of Bohemia" (2 vols., 1825). She, however, wrote poems, one "On the Slave Trade," of 850 lines, and novels, "Marian" and "The Heart and the Fancy," and, although struggling from first to last with poverty, was the loved friend of many of her literary contemporaries. Miss Aiken wrote a memoir of her most interesting life which has been prefixed to the second edition of "Anne Boleyn" (1827). She died in London, Jan. 9, 1827.

**Bengough, John Wilson**, a Canadian poet, born in Toronto, April 5, 1851; studied in the Whitley District and Grammar School. In 1873 he established the "Grip," a humorous weekly, in Toronto. His political cartoons in this paper were highly artistic. He is also widely known as a lecturer and a poet. His publications include "Ontario, Ontario" (a famous election song); "Grip's Cartoons" (1875); "Popular Readings, Original and Selected" (1882); "Caricature History of Canadian Politics" (1886); "Motley: Verses Grave and Gay" (1895); "The Up to Date Primer: A First Book of Lessons for Little Political Economists" (1896), etc.

**Benguela** (ben-gā'la), a district belonging to the Portuguese on the W. coast of South Africa; bounded N. by Angola, and S. by the Cunene river, which may be said to constitute also the uncertain E. frontier; area, perhaps 150,000 square miles. The country is mountainous in the interior, and thickly intersected by rivers and streams. Its vegetation is luxuriant, including every description of tropical produce, and animal life is equally abundant. Copper, silver, iron, salt, sulphur, petroleum, and other minerals are found. The natives are mostly rude and barbarous. Population estimated at 2,000,000. The capital, also called Benguela, or San Felipe

## Benicia

de Benguela, is situated on the coast, on a bay of the Atlantic, in a charming, but very unhealthy, valley. It was founded by the Portuguese in 1617, and was formerly an important center of the slave trade, but has now only a spasmodic trade in ivory, wax, gum, copal, etc. Pop. about 3,000.

**Ben-Hadad**, or **Benhaddad**, the name of three Kings of Syria. The first was a contemporary of Asa, King of Judah, (929-873 B. C.), I Kings, xv. The second (860-824 B. C.) of the time of Ahab, King of Israel, I Kings, xx. The third at the time of Jehoahaz, King of Israel (856-839 B. C.), II Kings, xiii.

**Benham, Andrew Ellicott Kennedy**, an American naval officer, born in New York, April 10, 1832; entered the navy in 1847; served in the East India and the Home Squadrons in 1847-1852; attended the United States Naval Academy in 1852-1853; was commissioned Lieutenant in 1855; Lieutenant-Commander in 1862; Commander, 1866; Captain, 1875; Commodore, 1885; and Rear-Admiral in 1890, and was retired in 1894. During the Civil War he served in the South Atlantic and West Gulf Blockading Squadrons. In April, 1893, he commanded one of the divisions in the great naval display at New York; in 1894, as commander of a squadron at Rio de Janeiro, Brazil, he forced the commander of the insurgents' squadron to raise the blockade of the city and to discontinue firing on American merchant vessels; and in 1898 was naval prize commissioner in Savannah, Ga. He died Aug. 11, 1905.

**Benham, Henry W.**, an American military engineer, born in Cheshire, Conn., in 1816; was graduated at the United States Military Academy in 1837; and became Colonel of the United States Engineers, and Brevet Major-General, United States army. He commanded the engineer brigade and laid several pontoon bridges under fire during the Chancellorsville battles; constructed and commanded the defenses at City Point; devised the picket shovel; and made many improvements in the construction of pontoon bridges, in which he was a recognized expert. He died in New York, June 1, 1884.

**Beni**, a river of Bolivia, South America; formed by the union of all the streams flowing down the Eastern Cordillera. It unites with the Mamore on the Brazilian frontier to form the Madeira. Its course is N. to N. E.; length, about 850 miles.

**Beni**, one of the nine departments of Bolivia, South America. It is in the N. E. part; area, 100,580 square miles; pop. 26,750; chief town, Trinidad.

**Benicia**, a city in Solano co., Cal.; at the mouth of the Sacramento and San Joaquin rivers, and on the Southern Pacific railroad; 30 miles N. E. of San Francisco. It



## Beni-Hassan

contains a United States arsenal and barracks; St. Augustine College (Roman Catholic); St. Catherine's Convent (Roman Catholic); extensive shipyards, and large agricultural, tanning, cement and meat-packing plants. The city was once the capital of the State, and is now the seat of the Protestant Episcopal Missionary Bishop of Northern California. Pop. (1910) 2,360.

**Beni-Hassan**, a village of Middle Egypt, on the E. bank of the Nile, remarkable for the grottoes or catacombs in the neighborhood, supposed to have formed a necropolis for the chief families of a city, Hermopolis, on the opposite bank, and exhibiting interesting paintings, etc.

**Beni-Israel**, a race in the W. of India (the Konkan sea board, Bombay, etc.) who keep a tradition of Jewish origin, and whose religion is a modified Judaism; supposed to be a remnant of the ten tribes.

**Beni-Khaibir** (sons of Keber), an Arabic tribe supposed to be a remnant of the Ascetic tribe of Rechabites.

**Beni-Mzab**, a race or tribe of Berbers that dwell in the Sahara near its N. border and recognize the supremacy of the French. They number about 60,000, of whom 15,000 are in the town Ghardaya. They are of peaceful habits, and numbers of them are employed in Algiers in various occupations.

**Benin**, a former negro kingdom of West Africa, on the Bight of Benin, extending along the coast on both sides of the Benue river, W. of the lower Niger, and to some distance inland. The chief town is Benin (pop. 15,000), situated on the river Benue, one of the mouths of the Niger. The country, which gradually rises as it recedes from the coast, is well wooded and watered, and rich in vegetable productions. Cotton is indigenous, and woven into cloth by the women, and sugar cane, rice, yams, etc., are grown. The religion is fetichism, and human sacrifices were formerly numerous. There is a considerable trade in palm oil. The name Benin formerly extended over a much larger territory.

In February, 1897, the Benin country was included within the Niger Coast Protectorate, and a British Resident was installed in the chief town. The whole territory was then between 3,000 and 4,000 square miles in extent, contained about 400 towns and villages, and had a population of which no trustworthy estimate could be formed.

**Benin, Bight of**, part of the Gulf of Guinea, West Africa, which extends into the land between the mouth of the river Volta and that of the Nun.

**Benish Days, The**, days on which the modern Egyptians relax their religious duties, and engage in pleasures. These days

## Benjamin

are Mondays, Wednesdays and Saturdays. In these days the people don the *benish*, or ordinary garment, and they are accordingly styled Benish Days.

**Beni Suef**, a town of Egypt; on the left bank of the Nile, about 65 miles S. of Cairo. It has the residence of the governor, and manufactures of stuffs, linen and carpets. The province of Beni Suef, of which it is the capital, has a population of 185,000.

**Benjamin**, the youngest son of Jacob and Rachel (Gen. xxxv: 16-18). Rachel died immediately after he was born, and with her last breath named him Ben-oni, the "son of my sorrow;" but Jacob called him Benjamin, "son of my right hand." He was a great comfort to his father, who saw in him the image of the beloved wife he had buried, and of Joseph, whose loss he also mourned. He could hardly be persuaded to let him go with his brethren to Egypt. The tribe of Benjamin, small at first, was almost exterminated in the days of the Judges, but afterward it greatly increased. On the revolt of the ten tribes, Benjamin adhered to the camp of Judah; and the two tribes ever afterward closely united. King Saul and Saul of Tarsus were both Benjamites.

**Benjamin, Judah Philip**, an American lawyer, born in St. Croix, West Indies, Aug. 11, 1811; was of English parentage and of Jewish faith. He was educated at Yale College; admitted to the bar in New Orleans, in 1832; and elected to the United States Senate in 1852 and 1858. At the beginning of the Civil War, he resigned from the Senate and declared his adhesion to the State of Louisiana. In 1861 he accepted the office of Attorney-General in the Cabinet of Jefferson Davis, and afterward became successively Confederate Secretary of War and Secretary of State. After the war he went to London, England, where he was admitted to the bar in 1866. He gained a successful practice, and in 1872 was formally presented with a silk gown. He wrote a "Treatise on the Law of Sale of Personal Property" (1868). He died in Paris, May 7, 1884.

**Benjamin, Park**, an American journalist, poet, and lecturer, born at Demerara, British Guiana, Aug. 14, 1809. He studied law originally. His poems, of a high order of merit, have never been collected. "The Contemplation of Nature," read on taking his degree at Washington College, Hartford. 1829; the satires "Poetry" (1843); "Infatuation" (1849); "The Nautilus," "To One Beloved," and "The Old Sexton," are among his works. He was associated editorially with Epes Sargent and Rufus W. Griswold. He died in New York, Sept. 12, 1864.

**Benjamin, Park**, an American lawyer, editor, and miscellaneous writer, son of the



## Benjamin

preceding, born in New York, May 11, 1849. A graduate of the United States Naval Academy (1867), he served on Admiral Farragut's flagship, but resigned in 1869. As a lawyer he has been a patent expert. He edited the "Scientific American" (1872-1878). He has written "Shakings: Etchings from the Naval Academy" (1867); "The Age of Electricity" (1886); "The Intellectual Rise in Electricity, a History," "The United States Naval Academy" (1900), etc.

**Benjamin, Samuel Green Wheeler**, an American traveler, artist, and miscellaneous writer, born at Argos, Greece, Feb. 13, 1837. He was United States Minister to Persia (1883-1885). Among his numerous works, both in prose and verse, are "Art in America," "Contemporary Art in Europe" (1877); "Constantinople" (1860); "Persia and the Persians" (1886); "The Choice of Paris" (1870), a romance; "Sea Spray" (1887), a book for yachtsmen; etc.

**Benjamin of Tudela**, one of the earliest travelers of the Middle Ages, who visited the central regions of Asia; he was author of a Hebrew work of travels, which, though interesting and romantic, is remarkable chiefly for its misrepresentations. The last translation into English is by Asher, London, 1841. Benjamin of Tudela was born in Navarre, Spain, and died in 1173.

**Benjowsky** (ben-yov'skē). **Moritz August, Count von**, a noted Hungarian adventurer; born in Verbo in 1741. In 1769, while aiding the Confederate Poles as a general of cavalry, he was taken prisoner by the Russians and exiled to Kamchatka. He conceived a plot to effect the escape of himself and a number of his companions. In 1774 the French cabinet of Versailles entrusted him with the mission of founding a colony at Madagascar, and, for this purpose, gave him a regiment of infantry; which mission he fulfilled with some success. When he returned to France, he found so much bickering on the part of the government, that he determined to serve the Austrians. Later he set out for England and for America, with the thought of collecting a body of partisans who would enter upon the conquest of Madagascar. He went to that island at the head of an expedition, encountered the French troops, and was killed, May 23, 1786.

**Ben Lawers**, a mountain in Perthshire, Scotland, flanking the N. W. shore of Loch Tay. Easy of ascent, it is rich in Alpine plants, and there is a magnificent view from its summit, which is 3,984 feet high, or with the cairn at the top (rebuilt in 1878), 4,004.

**Ben Ledi**, a mountain (2,875 feet) of Perthshire, Scotland, 4½ miles W. by N. of

## Bennett

Callander. A jubilee cairn was erected on it in 1887.

**Ben Lomond**, a mountain of Scotland in Stirlingshire, on the E. shore of Loch Lomond, rising to a height of 3,192 feet and giving a magnificent prospect of the vale of Stirlingshire, the Lothians, the Clyde, Ayrshire, Isle of Man, hills of Antrim, etc.

**Ben Mac-Dhui** (-dē-i), or **Ben Muich-Dhui**, the second highest mountain in Scotland, situated in the S. W. of Aberdeenshire, on the borders of Banffshire, forming one of a cluster of lofty mountains, among which are Brae-riach, Carintoul, and Cairngorm. Height, 4,296 feet.

**Benne Oil**, a valuable oil expressed from the seeds of *sesamum orientale* and *S. indicum*, much cultivated in India, Egypt, etc., and used for similar purposes with olive oil. Also called sesamum oil and gingelly oil.

**Bennett, Charles Wesley**, an American Methodist clergyman and educator, born at East Bethany, N. Y., July 18, 1828; was Principal of Genesee Wesleyan Seminary (1869-1871), Professor of History and Logic at Syracuse University (1871-1885), Professor of Historical Theology at Garrett Biblical Institute, Evanston (1885-1891). He wrote "National Education in Italy, France, Germany, England, and Wales" (1878); and "Christian Art and Archæology of the First Six Centuries" (1888). He died at Evanston, Ill., April 17, 1891.

**Bennett, Edmund Hatch**, an American lawyer, born in Manchester, Vt., April 6, 1824; was graduated at the University of Vermont in 1843, and admitted to the bar in 1847. He practiced for many years in Taunton, Mass., and was Mayor of that city in 1865-1867, and Judge of Probate and Insolvency of Bristol county in 1858-1883. He was Lecturer at Harvard Law School in 1865-1871, and afterward Professor and Dean at the Law School of Boston University. His works include 30 volumes of "English Law and Equity Reports," "Cushing's Massachusetts Reports" (vols. ix, x, xi, and xii); "Massachusetts Digest," "Brigham on Infantry," "Blackwell on Tax Titles," "Leading Criminal Cases" (2 vols.); "Goddard on Easements," "Benjamin on Sales," "Pomeroy's Constitutional Law," "Indermaur's Principles of Common Law," and "Fire Insurance Cases" (5 vols.). He has also made frequent contributions to professional journals, and has been co-editor of the "American Law Register." He died Jan. 2, 1898.

**Bennett, James Gordon**, a Scotch-American journalist; founder and proprietor of the New York "Herald," born in Newmill, Keith, Sept. 1, 1795. Trained for the Roman Catholic priesthood, he emigrated to



the United States in 1819, where he became in turn teacher, proof reader, journalist, and lecturer. He had acted as casual reporter and writer in connection with several journals, and had failed in one or two journalistic ventures, previous to the issue of the first number of the New York "Herald," as an independent newspaper, May 6, 1835, price one cent. He spared no effort and expense in securing news, and laid the foundation of its after enormous success. It was the first newspaper to publish the stock lists and a daily money article. He died in New York, June 1, 1872.

**Bennett, James Gordon**, an American journalist, born in New York city, May 10, 1841; son of James Gordon Bennett, founder of the New York "Herald," of which he became managing editor in 1866, and from that time largely controlling, and becoming proprietor on the death of his father in 1872. In 1870 he sent Henry M. Stanley on the exploring expedition which resulted in the finding of Dr. Livingstone, and, in conjunction with the London "Daily Telegraph," supplied the means for his journey across Africa by way of the Kongo in 1874-1878. He organized a system of storm prognostications of value to shipping masters; fitted out the "Jeannette" Polar expedition; and, in 1883, was associated with John W. Mackay in organizing the new Commercial Cable Company. He founded the "Evening Telegram" in New York, and established daily editions of the "Herald" in Paris and London. He early gave much attention to yachting, in 1866 taking part in an ocean yacht race from Sandy Hook to the Needles, Isle of Wight, which was won by his schooner, "Henrietta," against two competing yachts, in 13 days, 21 hours and 55 minutes. In 1870 he raced in his yacht "Dauntless" from Queenstown to Sandy Hook, but was beaten by the "Cambria" by two hours. He resides mainly in Paris, collecting foreign news, and directing by telegraph the management and policy of his newspapers. The New York "Herald" was incorporated in 1899.

**Bennett, John Hughes**, an English physician, born in London, Aug. 31, 1812; graduated at Edinburgh in 1837; and, after four years' study in Paris and Germany, settled in Edinburgh as an extra-mural lecturer. A work published in 1841, in which he recommended cod liver oil in all consumptive diseases, first brought him into notice, and in 1848 he was made Professor of the Institutes of Medicine in Edinburgh University—a post which he held until 1874. His health gave way in 1871, and most of his last years were spent abroad. He died in Norwich, Sept. 25, 1875.

**Bennett, Joseph H.**, an American philanthropist, born in Juliustown, N. J., Aug.

16, 1816. He engaged in the clothing business in Philadelphia, Pa., when 16 years old. In 1880 he gave 40 acres of ground in what is now Fairmount Park, valued at \$400,000, for a Methodist Orphanage, to the support of which he afterward largely contributed. He also established the Hays Home, and gave valuable properties to the Deaf and Dumb Institute, the University of Pennsylvania, and the Methodist deaconesses. His property was said to be worth \$3,000,000, and it is estimated that he gave \$1,000,000 to charity. He bequeathed \$500,000 to the University of Pennsylvania for its proposed college for women. He died in Philadelphia, Sept. 29, 1898.

**Bennett, Sanford Fillmore**, an American hymnologist, born in Eden, N. Y., in 1836. He settled in Elkhorn, Wis., in 1860, and became editor of the "Independent." Resigning this place, he entered the 40th Wisconsin Volunteers and served with them throughout the war. In 1867 he aided J. P. Webster, the composer, in preparing "The Signet Ring," a Sunday School hymn book, to which he contributed about 100 hymns. "The Sweet Bye and Bye" was one of the first of these. Many of Mr. Bennett's hymns and songs have been published in sheets. He died in Richmond, Ill., June 12, 1898.

**Bennett, William Cox**, an English song writer, born in Greenwich, Oct. 14, 1820. He suggested that the bust of Longfellow be placed in Westminster Abbey, and formed a committee of 500, with the Prince of Wales at the head, to effect it. He was author of "Poems" (1850); "The Trial for Salamis" (1850); "Endowed Parish Schools and High Church Vicars" (1853); "Queen Eleanor's Vengeance, and Other Poems" (1856); "War Songs" (1857); "Songs by a Song Writer" (1858); "Baby May, and Other Poems" (1859); "Our Glory Roll, and Other National Poems" (1867); "Contributions to a Ballad History of England, etc." (1869); "School Book of Poetry" (1870); "Songs for Sailors" (1872); "Narrative Poems and Ballads" (1879); "Songs of a Song Writer" (1876); and "Sea Songs" (1878). He died in Blackheath, March 4, 1895.

**Bennett, Sir William Sterndale**, English composer, born in 1816, at Sheffield, where his father was organist; became pupil of the Royal Academy in 1826, studying under Cipriani Potter, Crotch, and Lucas, and afterward, Moscheles. By the advice of Mendelsshohn, whose friendship he had gained, he studied in Leipsic from 1836 to 1838, and his performances and compositions were held in high esteem by the younger German musicians, and especially by Schumann. After a period spent in teaching, conducting, and composing, he was appointed Professor of Music at Cambridge in



## Ben Nevis

1856, and he was knighted in 1871. He was too entirely dominated by Mendelssohn's influence to do great original work. He is best known by his overtures, the "Naiads" and "Parisina;" his cantatas, the "May Queen" and "Woman of Samaria," and his little musical sketches, "Lake," "Millstream," and "Fountain." He died in 1875.

**Ben Nevis**, the most lofty mountain in Great Britain, in Inverness-shire, immediately E. of Fort William and the opening of the Caledonian canal, at the S. W. extremity of Glenmore. It rises to the height of 4,406 feet, and in clear weather yields a most extensive prospect. An observatory was established on its summit in May, 1881, by the Scottish Meteorological Society.

**Benningesen, or Bennigsen, Levin August, Baron**, a Russian general, born in Hanover in 1745. He entered the service of Catherine II., and distinguished himself by great gallantry, in the war against Poland. He was commander-in-chief at the battle of Eylau. In 1813 he led a Russian army into Saxony, took part in the battle of Leipsic, and beleaguered Hamburg. He died in 1826.

**Bennington**, town and county-seat of Bennington co., Vt.; on the Bennington and Rutland and the Lebanon Springs railroads; 36 miles E. of Troy, N. Y. It contains the villages of Bennington, North Bennington and Bennington Center; and has large woolen and knit goods factories; a Soldiers' Home, a Memorial Battle monument, dedicated on the centennial of the admission of the State into the Union, Aug. 19, 1891, 2 National banks, and graded public schools. There are valuable deposits of brown hematite ore in the town. Bennington is historically famous on account of the battle fought Aug. 16, 1777, when General Stark with his "Green Mountain Boys" defeated a large British detachment sent from General Burgoyne's army to capture the public stores near North Bennington. Pop. (1910) 6,211.

**Bennington, The**, a twin-screw, steel gunboat of the United States navy; 1,710 tons displacement; length, 230 feet; breadth, 36 feet; mean draft, 14 feet; horse-power, 3,436; main battery, six 6-inch, breech-loading rifles; secondary battery, two 6-pounder and two 3-pounder rapid-fire guns, two 37-millimeter Hotchkiss revolving cannons and two Gatlings; speed, 17.5 knots; crew, 16 officers and 181 men; cost, \$555,875.55.

**Ben Nut**, the seed of *moringa pterygo-sperma*, the ben tree of India, yielding the valuable oil of ben.

**Benoit** (be-nwä'), **Pierre Leopold Leonard**, a Flemish musician and composer, born in Harelbeke, Belgium, Aug. 17, 1834; a pupil of Fétis. He had held the position of Director of the Flemish School of Music in

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Antwerp since 1867; and had written a number of oratorios, cantatas, and operas, among the first of which "Lucifer," "The Drama of Christ," and "The War" should be mentioned. He died March 5, 1901.

**Benoit de Sainte-Maure** (be-nwä' de sant-mör), a French trouvère and chronicler of the 12th century, born in Touraine. He wrote in about 42,000 octosyllabic verses a "Chronicle of the Dukes of Normandy" to the year 1135. To him is usually ascribed the "Romance of Troy," founded on the story of the siege of Troy, as written by Dictys Cretensis and Dares; it was translated into the languages of Western Europe. Boccaccio, Chaucer, and Shakespeare would seem to be indebted to Benoit for the story of the loves of Troilus and Briseis (Cryseyde or Cressida being originally called Briseida).

**Bensel, James Berry**, a well known American poet and novelist, born in New York, Aug. 2, 1856; lived the most of his life at Lynn, Mass., and was a contributor to magazines. He wrote "King Kophetua's Wife" (1884), a novel; "In the King's Garden and Other Poems" (1886). He died in New York, Feb. 3, 1886.

**Benson, Edward Frederic**, an English author, born in Wellington College, July 24, 1867; educated at King's College, Cambridge; worked at Athens for the British Archæological School in 1892-1895, and in Egypt, for the Hellenic Society, in 1895; traveled in Algiers, Egypt, Greece, and Italy. His writings include "Dodo" (1893), a novel of London society; "Rubicon" (1894); "Judgment Books" (1895); "Limitations" (1896); "The Babe" (1897); "Vintage" (1898); "The Capsina" (1899), etc.

**Benson, Edward White**, Archbishop of Canterbury, born near Birmingham in 1829; graduated at Cambridge in 1852 as a first-class and senior optime, and was for some time a master at Rugby. He held the head-mastership of Wellington College from its opening in 1858 to 1872, when he was made a Canon and Chancellor of Lincoln Cathedral. In 1875 he was appointed Chaplain in Ordinary to the Queen, and, in December, 1876, was nominated to the newly erected Bishopric of Truro. Here he began the building of a cathedral (1880-1887), most of the first cost, £110,000, having been gathered by his own energy. In 1882 he was translated to Canterbury to succeed Dr. Tait as Primate of all England. A High Churchman, Dr. Benson was frequently select preacher at both universities, and published several volumes of sermons, a small work on "Cathedrals," and a valuable article on "St. Cyprian." A distinguished ecclesiastical lawyer and diplomatist, he gave the important judgment in the Lincoln case on ritual. He died at Hawarden, Oct. 11, 1896.

**Benson, Egbert**, an American jurist and politician, born in New York city, June 21,



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1746; graduated at Columbia College in 1765; was a member of Congress in 1784-1788, 1789-1793, and 1813-1815; Judge of the Supreme Court of New York in 1794-1801; and became a Judge of the United States Circuit Court. He wrote a "Vindication of the Captors of Major André" and "Memoir on Dutch Names of Places." He died in Jamaica, N. Y., Aug. 24, 1833.

**Benson, Eugene**, an American artist and miscellaneous writer, born at Hyde Park, N. Y., in 1840. Residing in Rome, Italy, he contributed to American magazines, and wrote "Gaspara Stampa," a biography, with selections from her sonnets; "Art and Nature in Italy." He died Feb. 28, 1908.

**Benson, Frank Weston**, an American painter, born in Salem, Mass., March 24, 1862; was educated at the Museum of Fine Arts, Boston, and in Paris; became a member of the Society of American Artists in 1888. He won the Hallgarten and the Clarke prizes at the National Academy of Design in 1889 and 1891; has done much in figure work with outdoor effects, but is best known for his portraits.

**Bensserade, Isaac de** (bäns-räd), a French poet (1613-1691), chiefly remembered as author of the ballets, much in vogue then, in which the King and his courtiers took part; also by his dainty lyrics, especially the sonnet on "Job," which, in rivalry with Voiture's sonnet to "Urania," incited a literary feud in 1651.

**Bent, James Theodore**, an English traveler, born in Liverpool, March 30, 1852; graduated at Oxford University in 1875; managed excavations in Greece for the British Museum and the Hellenic Society. His publications include "A Freak of Freedom, or the Republic of San Marino" (1879); "Genoa: How the Republic Rose and Fell" (1880); "Life of Guiseppe Garibaldi" (1881); "The Cyclades, or Life Among the Insular Greeks" (1885). He died in London, May 6, 1897.

**Benteen, Frederick William**, an American military officer, born in Petersburg, Va., Aug. 24, 1834; was educated in his native State; and at the outbreak of the Civil War went to Missouri and organized a company of Union volunteers. He became First Lieutenant of the 10th Missouri Cavalry, Sept. 1, 1861; promoted Captain, Oct. 1, 1861; Major, Dec. 18, 1862; Lieutenant-Colonel, Feb. 27, 1864; and Colonel of the 138th United States Colored Infantry, July 15, 1865; mustered out of volunteer service Jan. 6, 1866. On July 28, 1866, he was commissioned a Captain in the 7th Cavalry; promoted Major of the 9th Cavalry, Dec. 17, 1882; and retired, July 7, 1888. His most brilliant service after the war was in his campaigns against the Indians. He died in Atlanta, Ga., June 22, 1898.

## Bentham

**Bent Grass**, a genus of grasses, distinguished by a loose panicle of small, one flowered, laterally compressed spikelets; the glumes unequal, awnless, and longer than the paleæ, which are also unequal, and of which the inner one is sometimes wanting, and the outer sometimes has and sometimes has not, an awn; the seed free. The species are numerous and are found in almost all countries and climates. All are grasses of a slender and delicate appearance. Some are very useful as pasture grasses and for hay, on account of their adaptation to certain kinds of soil, although none of them is regarded as being very nutritious. The common bent grass (*agrostis vulgaris*) forms a principal part of the pasture in almost all the elevated districts of Great Britain, and is abundant in many parts of the continent of Europe and the United States. It resists droughts better than almost any other grass, but is sown by agriculturists only on soils unsuitable for the more luxuriant grasses. It is also regarded as very suitable for lawns; but in light, dry, cultivated grounds it is often a troublesome weed, known as black squitch, or quitch grass, and frequent harrowing is resorted to for the removal of its creeping perennial roots. It is as frequent on wet as on dry soils, and varies much in size and appearance. The marsh bent grass (*A. alba*), forming a large part of natural pasture in many moist situations, is very similar to the species just described, but generally taller and stouter. A variety, so little different as scarcely to deserve the name, but with somewhat broader leaves and more luxuriant habit of growth, was at one time much celebrated among agriculturists, under the name of fiorin grass, or *agrostis stolonifera*. It is a useful grass in moist grounds, newly reclaimed bogs, or land liable to inundation.

**Bentham, George**, an English botanist, nephew of Jeremy Bentham, born in Portsmouth, Sept. 22, 1800. He was privately educated, early attached himself to botany, and, having resided in Southern France (where his father had an estate) in 1814-1826 he published in French (1826) a work on "The Plants of the Pyrenees and Lower Languedoc." Having returned to England he studied law, and on this subject, as well as logic, he developed original views. Finally, however, he devoted himself almost entirely to botany, was long connected with the Horticultural Society and the Linnæan Society, and, from 1861 onward, was in almost daily attendance at Kew (except for a few weeks occasionally), working at descriptive botany as a labor of love. With Sir J. D. Hooker he produced the great work of descriptive botany, "Genera Plantarum;" another great work of his was the "Flora Australiensis" (in 7 vols.). His "Hand-



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book of the British Flora" is well known. He died in London, Sept. 10, 1884.

**Bentham, Jeremy**, an English jurist, born in London, Feb. 15, 1748; educated at Westminster and Oxford; entered Lincoln's Inn, in 1763. He was called to the bar, but did not practice, and, having private means, devoted himself to the reform of civil and criminal legislation. A criticism on a passage in Blackstone's "Commentaries," published under the title, "A Fragment on Government" (1776), brought him into notice, and it was followed by a long list of works, of which the more important were "The Hard Labor Bill" (1778); "Principles of Morals and Legislation" (1780), "A Defense of Usury" (1787); "Introduction to the Principles of Morals and Legislation" (1789); "Discourses on Civil and Penal Legislation" (1802); "Treatise on Judicial Evidence" (1813); "Paper Relative to Codification and Public Instruction" (1817); and the "Book of Fallacies" (1824). His mind, though at once subtle and comprehen-



JEREMY BENTHAM.

sive, was characterized by something of the Coleridgean defect in respect of method and sense of proportion; and, he is, therefore, seen at his best in works that underwent revision at the hands of his disciples. Of these, M. Dumont, by his excellent French translations and rearrangements, secured for Bentham at an early date a European reputation and influence, and his editions are still the most satisfactory. In England, James Mill, Romilly, John Stuart Mill, Burton, and others of independent genius, have been among his exponents. In ethics he must be regarded as the founder of modern utilitarianism; in polity and criminal law he anticipated or suggested many practical reforms; and his whole influence was stimulating and humanizing. He was a man of primitive and genial manners, leading a quiet and unblemished life, in which, perhaps, the chief troubles were the refusal of his hand by Lord Holland's sister, Miss Caroline Fox, and the refusal of his ready made codes of law by Russia, the United States and Spain. He died in London, June 6, 1832, leaving his body for dissection. His remains are to be seen at University College, London.

## Bentley

**Bentley, Richard**, a celebrated English divine and classical scholar, distinguished as a polemical writer; born near Wakefield, in Yorkshire, Jan. 27, 1662. His father is said to have been a blacksmith. To his mother, who was a woman of strong natural abilities, he was indebted for the first rudiments of his education. At the age of 14 he entered St. John's College, Cambridge. In 1682 he left the university, and became usher of a school at Spalding; and this situation he relinquished in the following year for that of tutor to the son of Dr. Stillingfleet, dean of St. Paul's. He accompanied his pupil to Oxford, where he availed himself of the literary treasures of the Bodleian Library in the prosecution of his studies. In 1684 he took the degree of A. M. at Cambridge, and in 1689 obtained the same honor at the sister university. His first published work was a Latin epistle to Dr. John Mill, on an edition of the "Chronicle of John Malela," which appeared in 1691. It contained observations on the writings of that Greek historian, and displayed so much profound learning and critical acumen as excited the sanguine anticipations of classical scholars from the future labors of the author. Dr. Stillingfleet, having been raised to the bishopric of Worcester, made Bentley his chaplain, and in 1692 collated him to a prebend in his cathedral. The recommendation of his patron, and of Bishop Lloyd, procured him the honor of being chosen the first preacher of the lecture instituted by the celebrated Robert Boyle for the defense of Christianity. The discourses against atheism which he delivered on this occasion were published in 1694; they have since been often reprinted.

In 1693 he was appointed keeper of the royal library at St. James'—a circumstance which incidentally led to his famous controversy with Charles Boyle, afterward Earl of Orrery, relative to the genuineness of the Greek Epistles of Phalaris, an edition of which was published by the latter, then a student at Christ Church, Oxford. In this dispute Bentley was completely victorious, though opposed by the greatest wits and critics of the age, including Pope, Swift, Garth, Atterbury, Aldrich, Dodwell, and Conyers Middleton, who advocated the opinion of Boyle with extraordinary illiberality. In 1699 Bentley published his "Dissertation on the Epistles of Phalaris," in which he satisfactorily proved that they were not the compositions of the tyrant of Agrigentum, more than five centuries before the Christian era, but were by some sophist under the borrowed name of Phalaris, in the declining age of Greek literature.

Soon after this publication, Dr. Bentley was presented by the crown to the mastership of Trinity College, Cambridge, worth



nearly £1,000 a year. He now resigned the prebend of Worcester, and in 1701 was collated to the archdeaconry of Ely. His conduct as head of the college gave rise to accusations charging him, among various offenses, with embezzling college money. The contest gave rise to a lawsuit lasting more than 20 years. It was decided against him, but the sentence depriving him of his mastership was never carried out owing to Bentley's superior skill and mastery of legal forms. In 1711 he published an edition of Horace, and in 1713, his remarks on "Collins' Discourse on Free-thinking," under the form of a "Letter to F. H. (Francis Hare), D. D., by Phileleutherus Lipsiensis." He was appointed regius Professor of Divinity in 1716, and in the same year issued proposals for a new edition of the Greek Testament, an undertaking which Middleton prevented his executing. In 1726 he published an edition of Terence and Phædrus; and his notes on the comedies of the former involved him in a dispute with Bishop Hare. The last work of Dr. Bentley was an edition of Milton's "Paradise Lost," with conjectural emendations, which appeared in 1732. He died at the master's lodge at Trinity, July 14, 1742, and was interred in the college chapel. As a scholar and a critic Bentley holds the highest position. The best informed of his opponents respected his talents while loading him with classical abuse. Now that prejudices have subsided, his preëminence in that species of literature which he cultivated is widely acknowledged.

**Benton, Thomas Hart**, an American statesman, born near Hillsboro, N. C., March 14, 1782; settled in Tennessee, where he studied law, and was elected to the Legislature. In 1812 he raised a regiment of volunteers, and also served on General Jackson's staff. After the war, he started a newspaper in St. Louis, by which he became involved in several duels. On the admission of Missouri as a State, he was chosen United States Senator in 1820, and, in this post, during 30 years' continuous service, took a leading part in public affairs. A determined opponent of Calhoun's nullification scheme, he afterward supported Jackson in his war on the United States bank, and earned the sobriquet of "Old Bullion" by his opposition



THOMAS H. BENTON.

to the paper currency. He published "A Thirty Years' View, or a History of the Working of the American Government from 1820 to 1850" (2 vols., 1854-1856) and "An Abridgment of the Debates of Congress from 1789 to 1856" (15 vols., 1857). He died in Washington, April 10, 1858.

**Bentzel-Sternau, Count Karl Christian Ernst von**, a German novelist, born in Mentz, April 9, 1767. He is esteemed as a humorist after the manner of Jean Paul; and his satirical romances, "The Golden Calf" (1802-1803); "The Stone Guest" (1808); "Old Adam" (1819-1820); "The Master of the Chair," together form a series. He died at Mariahalden, Switzerland, Aug. 13, 1843.

**Bentzon, Therese.** See BLANC.

**Benué**, or **Binué** (ben-wā'), a river of Africa, the greatest tributary of the Niger, which it enters from the E. about 250 miles above its mouth. Dr. Barth came upon the river in 1851, and its course was partly traced by Dr. W. Balfour Baikie, but its source was only reached (by Flegel) in 1883.

**Benzene**, an aromatic hydrocarbon, also called benzol, or phenyl hydride, discovered in 1825 by Faraday in the liquid condensed during the compression of oil gas; it was called by him bicarburet of hydrogen. In 1849, it was found in coal tar by C. B. Mansfield, who lost his life while experimenting with it on Feb. 25, 1855. Aniline is produced from it, which again is the source of the celebrated modern dyes, mauve, magenta, etc. It is obtained from the more volatile portion of coal tar oil. It is also formed by distilling benzoic acid with lime. Benzene is a thin, colorless, strongly refracting liquid: it boils at 82°. It dissolves fats, resins, iodine, sulphur, and phosphorus; sp. gr., 0.885. Benzene is formed when acetylene is passed through a tube heated to dull redness. Many substitutional products of benzene have been formed. Benzene unites with chlorine, or bromine, in direct sunlight, forming additive compounds,  $C_6H_6Cl_6$ .

**Benzoic Acid**, ( $C_7H_6O_2$ ), exists ready formed in certain balsams, as of Peru and Tolu, in gum benzoin, and in the urine of man and herbivorous animals, and it is, besides, the product of a number of chemical reactions. Its taste is quite pungent and bitter. It is easily obtained from gum benzoin, by heating it for some hours in a pot covered with a paper cap. The acid sublimes, and the cap on removal is found encrusted with light brilliant white prisms, which are almost pure, except a trace of volatile oil, which gives the acid its ordinary odor. The acid can also be extracted in the wet way. When pure it forms crystals, sparingly soluble in cold water, more soluble in hot, and very volatile in aqueous vapor. It sublimes readily; when



heated in the air it burns with a bright smoky flame. It forms the salts called benzoates.

**Benzoin**, a solid, fragile, vegetable substance, of a reddish-brown color. In commerce several varieties are distinguished, of which the yellow, the Siam, and the amygdaloidal—the latter containing whitish tears of an almond shape diffused through its substance—and Sumatra firsts are the finest. It is imported from Siam, Singapore, Bombay, and occasionally also from Calcutta, and is found also in South America. Benzoin is obtained from the tree called *Styrax benzoin*, and perhaps from some others. On making incisions into the bark, it flows out in the form of a balsamic juice, having a pungent taste and an agreeable odor. The pure balsam consists of two principal substances, viz., a resin and a peculiar acid termed benzoic, which is procured from the mass by sublimation. Benzoin is not soluble in water, but is readily dissolved in alcohol, by the aid of a gentle heat. The tincture thus made is used in pharmacy. A small quantity of this tincture dropped into water, forms a white, milky fluid, which is used in France as a cosmetic, under the name of *lait virginal*. The gum is a principal ingredient of the common court plaster. The acid, as well as the gum, is employed in medicine: they are stimulating, and act more particularly on the pulmonary system; hence they are used in asthma and chronic catarrh. It is largely used in the ceremonies of the Greek and Roman Catholic churches.

**Benzoni, Girolamo**, an Italian traveler; born in Milan, in 1519; went to Spanish America in 1542, visited the principal places then known, and frequently joined the Spaniards in raids on Indian settlements; and after returning to Italy (1556) published a narrative of his adventures, "History of the New World" (Venice, 1565). He died after 1566.

**Beothukan** (red man, or Indian), a linguistic stock of North American Indians, habitats of the region of the Exploits river in Northern Newfoundland, and believed to have been limited to a single tribe, the last known survivor of which died in 1829. The Beothuks painted their bodies and their property with red ochre, and from this circumstance their stock and tribal name was derived. They were also known as the Good-Night Indians, from the incorrect translation of a Micmac word that sounded like Beothuk. It is not known whether the Beothuks became extinct by reason of wars and famine or by absorption among other tribes.

**Beowulf** (bā'ō-wölf), an Anglo-Saxon epic, the only manuscript of which belongs to the 8th or 9th century, and is in the Cottonian

Library (British Museum). From internal evidence it is concluded that the poem in its essentials existed prior to the Anglo-Saxon colonization of Britain, and that it must be regarded either as brought to Britain by the Teutonic invaders, or as an early Anglo-Saxon translation of a Danish legend. From the allusions in it to Christianity, however, it must have received considerable modifications from its original form. It recounts the adventures of the hero Beowulf, especially his delivery of the Danish kingdom from the monster Grendel and his equally formidable mother, and, lastly, the slaughter by Beowulf of a fiery dragon, and his death from wounds received in the conflict. The character of the hero is attractive through its noble simplicity and disregard of self. The poem, which is the longest and most important in Anglo-Saxon literature, is in many points obscure, and the manuscript is somewhat imperfect.

**Béranger, Pierre Jean de**, the national poet of France; born in Paris, Aug. 19, 1780. His father was a restless and scheming man, and young Béranger, left in a great measure to himself, ran a great chance of spending his life as a gamin and vagabond in the streets of Paris. A few days after the destruction of the Bastille he was conveyed to Peronne and placed under the charge of an aunt who kept a tavern, and to whom for a time he acted as waiter. At the age of 14 he was apprenticed to a M. Laisnez, a printer in Peronne, but after remaining in that employment for some time was suddenly summoned to Paris by his father, who wished his coadjutorship in the monetary traffic by which he gained his subsistence. A miserable scrambling existence was now that of the young man, who loathed both the business in which he found himself engaged and the chicanery and intrigue with which it was conducted. The improvidence and prodigality of his father were constantly involving them in difficulties, and Béranger, with as yet no settled vocation in life, was enduring all the hardships and privation which men of genius in a similar position to himself have frequently had to encounter before the recognition of their talents by the world.

At one time he thought of accompanying the French army to Egypt, but was dissuaded from doing so by a friend, and continued to occupy his garret in Paris, where, as he informs us, he often lived without a fire, and had his bed wet with rain and snow through holes in the roof. He had now, besides making an unsuccessful attempt in the drama, produced a number of poems, including his "Roger Bon-temps," "Le Grenier," "Les Gueux," and "Le Vieil Habit." Some of these were sent by him in 1804 to Lucien Bonaparte, in the hope thereby of obtaining



some patronage or assistance. In this, probably the only application he ever made for aid in the course of a long life, Béranger was not disappointed. Lucien sent for him, encouraged him to proceed in his poetical career, and as a means of support made over to him his own income to which he was entitled as member of the French Institute. He was afterward employed in editing the "Annales du Musée," and in 1809 received an appointment as clerk in the office of the secretary to the university. Many of his songs had now become extremely popular, and in 1815 the first collection of them was published. A second collection was published in 1821, but Béranger had made himself extremely obnoxious to the Bourbon government by his satires on the established order of things; and in addition to being dismissed from his office in the university, he was prosecuted and sentenced to three months' imprisonment and a fine of 500 francs. A third collection appeared in 1825, and a fourth in 1828, which last publication subjected him to a second State prosecution, an imprisonment of nine months, and a fine of 10,000 francs. Nothing, however, could daunt the poet's indomitable spirit, and in prison he still continued to busy himself in the composition of his songs and lyrical satires upon government. In 1833 he published his fifth and last collection, which contains some of the most powerful effusions of his genius. Shortly after the revolution of February, 1848, he was elected representative of the department of the Seine in the Constituent Assembly, but sent in his resignation in the month of May of same year. The concluding years of his life were spent in a dignified retirement and the enjoyment of the society of a few literary and cherished friends. He died in Paris, July 16, 1857, and received the honor of a public funeral, at which the most eminent men in France, both of the world of literature and politics, attended.

The great attraction of Béranger's songs is the unequalled grace and sprightliness which they display, combined with great descriptive powers, much comic humor, and occasional bursts of indignation and invective when some social or political grievance is denounced. They are sometimes also, it must be admitted, marked by a tendency to levity and looseness of morals, but in this respect they partake eminently of the French character. No one, indeed, was more thoroughly French than Béranger, and the glory of his beloved *patrie*, as paramount to all other considerations, appears constantly as the inspiring genius of his poetry. The intense nationality of his songs constitutes one of their principal charms, and in this respect he bears some resemblance to Thomas Moore. He has sometimes been called the Burns of France, but though like him essen-

tially a poet of the people, he falls far beneath the pathos and depth of feeling displayed by the Ayrshire bard in depicting the passion of love. In private life Béranger was the most amiable and benevolent of men, beloved by his friends alike for his social qualities and kindness of heart, while his charities were so numerous and extensive as often to exceed the bounds of prudence.

**Berar**, otherwise known as the Haidarabad Assigned Districts, a province of India, in the Deccan, under the British Resident at Haidarabad; area, 17,718 square miles, consisting chiefly of an elevated valley at the head of a chain of ghauts. It is watered by several affluents of the Godavari, and by the Tapti, and has a fertile soil, producing some of the best cotton, millet, and wheat crops in India. The two principal towns of Berar are Amráoti (pop. 23,550), and Khamgaon (pop. 12,390). Coal and iron ore are both found in the province, the pop. of which was (1901) 2,754,016. Exports, £3,456,348; imports, £2,100,903. Berar was assigned by the Nizam to the British Government in 1853, as security for arrears due.

**Berat**, a town of Albania, in European Turkey; on the Ergent river, here bridged; 30 miles N. E. of Aulona. It is the seat of a Greek archbishop, and has a cathedral, a number of mosques, and several Greek churches. A majority of the population, estimated at 12,000, are Greeks.

**Béraud, Jean** (bé-rō), a painter of great power, born in St. Petersburg, of French parentage, in 1845. His subjects are usually chosen from Parisian life. His latest works have been modernized scenes from the New Testament. "La Madeleine" represents a Parisian harlot at the feet of Christ in a Paris restaurant; the scene of the "Descent from the Cross," is Montmartre overlooking Paris, with a group of working men and women.

**Berber**, a town of Nubia, on the right bank of the Nile, below the confluence of the Atbara. It is a station on the route from Khartum to Cairo, and a point to which caravans go from Suakin on the Red Sea. In the course of General Graham's operations against Osman Digna in 1885, a railway was projected from Suakin to Berber, and the work was actually begun, but was ultimately abandoned when military protection was taken away. The pop. is about 8,000.

**Berbera**, a seaport of British Somaliland, Eastern Africa, with a good harbor, on a bay of the Gulf of Aden. It was conquered by Egypt in 1875, but in July, 1884, the British Government took possession of it, and a small Indian force is now stationed here. It is the scene of a large annual fair, which brings over 30,000 people together



from all quarters in the East. Coffee, grains, ghee, gold dust, ivory, gums, cattle, ostrich feathers, etc., are brought hither from the interior, and exchanged for cotton, rice, iron, Indian piece goods, etc.

**Berberidaceæ, Berberideæ, or Berberids**, an order of plants, the typical one of the alliance *berberales*. The sepals are three, four, or six in a double row, and surrounded by petaloid scales. The petals are equal in number to the sepals, or there are twice as many. The stamens are equal in number to the petals, and opposite to them; the anther valves are recurved. There is a solitary, free, one celled carpel, with sutural placentæ. Seeds, many or two. Fruit, berried or capsular. Leaves, alternate. Compound shrubs or perennial herbs found in the United States, Europe, and India. The species known in 1846 numbered 110. Their prevailing quality is astringency or slight acidity. The order is divided into two sections, *berberideæ*, and *nandineæ*.

**Berberine** ( $C_{21}H_{19}NO_5$ ), a feeble base, slightly soluble in water, extracted from the root of *berberis vulgaris*. It crystallizes in yellow needles. It is a bitter powder, and has been used in India in the treatment of fevers, as a substitute for quinine. It is, however, inferior to quinine in its effects.

**Berberis**, a genus of plants, the typical one of the order *berberidaceæ* (berberids). The sepals, petals, and stamina are each six in number, and the berry is two and three seeded. *B. vulgaris* is the common barberry. *B. aristata*, *ilicifolia*, *emarginata*, and *fascicularis* are cultivated species more or less ornamental in their aspect. An extract of the root, stem, and branches of the Indian, or ophthalmic barberry, *B. lycium*, of Royle, Greek *lukion indicum* of Dioscorides, is of use in ophthalmia. The fruits of *B. Asiatica* are dried in the sun like raisins.

**Berbers**, a people spread over nearly the whole of Northern Africa, from whom the name Barbary is derived. The chief branches into which the Berbers are divided are, first, the Amazirgh, or Amazigh, of Northern Morocco, numbering from 2,000,000 to 2,500,000. They are for the most part quite independent of the Sultan of Morocco, and live partly under chieftains and hereditary princes and partly in small republican communities. Second, the Shuluh, Shillooh, or Shellakah, who number about 1,450,000, and inhabit Southern Morocco. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number 960,000; and fourth, the Berbers of the Sahara, who inhabit the oases. Among the Sahara Berbers the most remarkable are the Beni-Mzâb and the Tuaregs. To these might be added the Guanches of the Canary Islands, now ex-

ting, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion is brown, and sometimes almost black, with brown and glossy hair. They are sparely built, but robust and graceful; the features approach the European type. Their language has affinities to the Semitic group, but Arabic is spoken along the coast. They are believed to represent the ancient Mauritians, Numidians, Gætulians, etc. The Berbers live in huts or houses, and practice various industries. Thus they smelt iron, copper, and lead: manufacture gun barrels, implements of husbandry, etc., knives, swords, gunpowder, and a species of black soap. Some of the tribes breed mules, asses, and stock in considerable numbers, but many of the Berbers live by plunder.

**Berbice**, a district of British Guiana, extending along the coast and up the Berbice river; principal town, New Amsterdam.

**Berbice**, a river of British Guiana; flows generally N. E. into the Atlantic. It is navigable for small vessels for 165 miles from its mouth, but beyond that the rapids are numerous and dangerous.

**Berchem, or Berghem, Nicholas**, a Dutch painter, born at Haarlem, in 1620. Having studied under his father and Van Goyen, Weenix the elder, and other masters, he spent several years in Italy, where he soon acquired an extraordinary facility of execution. His industry was naturally great, and his innumerable landscapes now decorate the best collections of Europe. The leading features of Berchem's works, besides the general happiness of the compositions, are warmth and coloring, a skilful handling of lights, and a mastery of perspective. His etchings are also highly esteemed. He died in 1683.

**Berchta** (berch'ta), in the folk lore of Southern Germany, a sort of female hobgoblin, of whom naughty children are much afraid. Her name is connected with the word bright, and originally she was regarded as a goddess of benign influence.

**Berditchef**, a town of Russia, 108 miles W. S. W. of Kiev by rail, famous for its five annual fairs. At these, cattle, corn, wine, honey, leather, etc., are disposed of. The average annual value of the sales is £600,000. Pop. (1897) 53,728.

**Bere**, the name given in Scotland to *hordeum hexastichum*, a cereal with six rows of seeds on its spike, hence called six-rowed barley. It is cultivated in the N. of Scotland and Ireland, being valued for its hardy properties, and is used in malting, and for the manufacture of spirits. Bere is a coarser and less nutritious grain than barley, but thrives in the poorest soil. It is also called bigg.



## Berea

**Berea**, a village in Cuyahoga co., O.; on several railroads; 13 miles S. W. of Cleveland, with which, and Elyria and Oberlin, it is connected by trolley lines. It was founded in 1829; is lighted by natural gas and electricity; has extensive quarries of sandstone; and is the seat of Baldwin University, German Wallace College (both Methodist Episcopal), and a German orphan asylum. Pop. (1900) 2,510; (1910) 2,609.

**Berea College**, a co-educational (non-sectarian) institution, in Berea, Ky.; organized in 1855; has grounds and buildings valued at over \$490,000; endowment, \$450,000; scientific apparatus, \$85,000; volumes in the library, about 24,000; income, about \$130,000; professors and instructors, 70; students, over 1,200; preparatory, collegiate, normal, musical, and industrial departments.

**Berea Grit**, a variety of sandstone, great deposits of which are found at Berea, Ohio. It is widely famous for its purity of texture, evenness of color, and exemption from the impurities that would deteriorate its marketable value.

**Berean**, a Scottish religious sect founded by the Rev. J. Barclay in 1773, on which account they were called also Barclayans. Their aim was to become entitled to the commendation bestowed by St. Luke on the inhabitants of Berea (Acts xvii: 11, 12). The Bereans do not figure now, by that name at least, in the Registrar-General's list of Scottish or English sects.

**Berengar I.**, a King of Italy, who succeeded at his father's death to the dukedom of Friuli. After the deposition of Charles the Fat in 887, he was crowned King of Italy, but he soon irritated the nobles by condescending to hold his territory in fief from Arnulf, King of Germany; and Guido, Duke of Spoleto, was persuaded to contest the throne. With the help of Arnulf, however, Berengar ultimately prevailed. After Guido's death in 894, his son, Lambert, compelled the King to share with him the sovereignty of North Italy until 898, when Lambert was assassinated. Berengar's influence quickly sank, since he could not check the plundering incursions of the Magyars and Arabs, and many years were spent in struggles to maintain his position. In 915 he was crowned Emperor by Pope John X.; but the nobles again revolted, and, under Rudolf of Burgundy, completely overthrew him in 923. In his extremity, Berengar called in the Hungarians to his aid, which unpatriotic act alienated the minds of all Italians from him, and cost him his life, for he was assassinated in 924.

**Berengar II.**, grandson of the preceding, succeeded his father as Count of Ivrea in 925, and married Willa, niece of Hugo, King of Italy, in 934. For a conspiracy against

## Berenice

Hugo, he was compelled to flee to Germany, where he was kindly received by the Emperor, Otto I. In 945 he recrossed the Alps at the head of an army, and placed the weak Lothaire, the son of Hugo, on the throne. On the death of this prince, who was probably poisoned by Willa, Berengar allowed himself to be crowned along with his son, Adalbert, in 950. His tyranny induced his subjects to call in the aid of the Emperor, who marched into Italy in 961, and took possession of the country. After three years' refuge in a mountain fortress, Berengar surrendered, and was sent as a prisoner to Bamberg, in Bavaria, where he died in 966.

**Berengarius of Tours**, a theologian of the 11th century. He was born at Tours in 998, long held an ecclesiastical office there, and was afterward archdeacon of Angers. He was thoroughly versed in the philosophy of his age, and did not hesitate to apply reason to the interpretation of the Bible. He denied the dogma of transubstantiation, and no less than seven councils were held respecting him, at three of which he was condemned, and at four he was prevailed on to make retractions more or less complete. Though failing thus in courage in the presence of his persecutors, he, nevertheless, continued to teach what he believed. He died in 1088.

**Berenger**, or **Berengario**, **Jacopo**, an Italian anatomist and physician of the 16th century, born in Carpi. He made several important anatomical discoveries, and is said to have been the first who used mercury in syphilitic diseases. He died in Ferrara, in 1550.

**Berenice**, an ancient city of Egypt, on a deep bay of the Red Sea, 20 miles S. W. of Ras-Bernass. The world is indebted to Belzoni for the resuscitation of this long lost city, from which have been exhumed many interesting antiquities.

**Berenice**, the common name of the female branch of the Egyptian Ptolemies; but from the practice, common with the Persians and Egyptians, of family intermarriages, and the union of brother and sister, the lives of most of the princesses who bear this name are a record of vice and immorality. The most celebrated of these women was Berenice, the daughter of the renowned Ptolemy Philadelphus, the founder of the Alexandrian Library, and she married her reigning brother, Evergetes, for whose sake, while absent on an expedition, as a mark of sorrow and humiliation, she cut off all her hair, and offered it up as a propitiatory sacrifice to the gods. The hair was stolen, or else the priests flung it away, and then Conon of Samos allayed the annoyance of the king at its disappearance, and made religious capital for the



temple, by proclaiming that it had been taken up to the sky and placed among the seven stars in the tail of Leo. Berenice's hair is now the English rendering of the words *Coma Berenices*, one of the nine constellations introduced by Hevelius. It is in the northern hemisphere, and consists of indistinct stars between Bootes and the tail of Leo. She was ultimately put to death by her own father, about 220 years B. C.

**Berenice**, a daughter of Herod Agrippa I., who was the son of Aristobulus, who was the son of Herod the Great (Acts xii; Matthew ii). She was the sister of Herodes Agrippa II., before whom Paul preached A. D. 63 (Acts xxv: 13), and the wife of Herodes of Chalcis, who seems to have been her uncle, and left her a young widow. Titus,



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the son of Vespasian, fell in love with Berenice, who had taken an active part at the time when Syria declared in favor of Vespasian against Vitellius. Berenice was then a young and very handsome woman. After the capture of Jerusalem she went to Rome (A. D. 75), and Titus is said to have been so much attached to her that he promised

to marry her; but on the death of his father he sent Berenice from Rome, much against his will and hers, when he found that the proposed match was disagreeable to the people. Juvenal appears to allude to this Berenice and her brother Agrippa. Racine has written a tragedy on the subject of Titus and Berenice.

**Beresford, Lord Charles de la Poer**, an English naval officer, born in Ireland, Feb. 10, 1846; became a Cadet in 1857; Lieutenant, 1868; Captain, 1882; and Rear-Admiral, 1897. In 1882 he commanded the "Condor" in the bombardment of Alexandria, and was especially mentioned and honored for his gallantry. After the bombardment he instituted an efficient police system in the city. In 1884-1885 he served on Lord Wolseley's staff in the Nile Expedition; and subsequently commanded the naval brigade in the battles of Abu Klea, Abu Kru, and Metemmeh. He commanded the expedition which rescued Sir Charles Wilson's party in "Safia," and was commended for his gallantry in both Houses of Parliament. He received the thanks of the French Government for assisting the grounded "Seignalay." In 1893-1896, he was in command of the naval reserve at Chatham, and in December, 1899, was appointed the second in command of the British squadron mobilized in the Mediterranean Sea. Lord Beresford accompanied the

Prince of Wales on his visit to India in 1875-1876, as naval aide-de-camp, and held the same relation to the Queen in 1896-1897. He has served several terms in Parliament. Besides the numerous honors for gallantry as an officer he has received three medals for saving life at sea under trying circumstances. In 1898 he visited China at the request of the Associated Chambers of Commerce of Great Britain to make a study of the complicated commercial conditions existing there; and on his return, in 1899, he passed through the United States, and was received with distinguished honors by official and commercial bodies. He has done much to promote the "open door" policy as a condition of international commerce in China. His publications include "Life of Nelson and His Times;" "The Break-Up of China" (1899), and many essays and special articles.

**Beresford, William Carr, Viscount**, a British military officer; a natural son of the first Marquis of Waterford; born in 1768. He entered the army, lost an eye at Nova Scotia, served at Toulon, and in Corsica, the West Indies, and Egypt. In 1806, as Brigadier-General, he commanded the land force in the expedition of Buenos Ayres; and, in 1808, remodeled the Portuguese army, receiving in return the titles of Marshal of Portugal, Duke of Elvas, and Marquis of Santo Campo. He was subsequently engaged at Badajoz, Salamanca, Vittoria, and Bayonne, and for his bravery at the battle of Toulouse was raised to the peerage with the title of Baron (Viscount, 1823) Beresford. He died in 1854.

**Beresina**, or **Berezina**, a river of Russia in Europe; rises in the District of Dissna, Government of Minsk, which it traverses from N. to S.; after receiving various affluents, and being joined by a canal with the Don, it falls into the Dnieper, near Ritchitza, after a course of 200 miles. This river has been rendered famous on account of its disastrous passage by the French army during the retreat of Napoleon I. from Russia, in 1812.

**Berezovsk**, a village in the Russian province of Perm, near Ekaterinburg, gives name to a famous gold field, wrought since 1744. The mines are on the eastern slopes of the middle Ural chain, and the field is above 5 miles long. The washings on the Berezovka river are also very productive.

**Berg**, a former duchy of Germany, on the right bank of the Rhine, now incorporated with the Prussian dominions, between Düsseldorf and Cologne. It is a densely populated manufacturing country. After various vicissitudes, the duchy was merged in the Electorate of Bavaria, and in 1806 Bavaria ceded it to France. Napoleon erected it into a grand duchy, constituting his brother-in-



law, Murat, its sovereign; and two years afterward Napoleon's nephew, then Crown Prince of Holland, was made Grand Duke. The peace of 1815 gave Berg to Prussia.

**Berg, Frederick William Rambert**, a Russian general, chiefly notorious for the severity with which he treated the unfortunate population of Poland during the insurrection of 1863, and which excited the horror and indignation of the civilized world.

**Bergamo**, a town of North Italy, capital of the Province of Bergamo (1,028 square miles, pop. [1901] 457,983), consists of two parts, the old town, situated on hills and having quite an ancient appearance, and the new town, almost detached and on the plain. It has a cathedral, an interesting church of the 12th century, a school of art, picture gallery, etc. It trades largely in silk, silk goods, corn, etc., has the largest annual fair in North Italy, and extensive manufactures. The comic characters in the Italian masked comedy are Bergamese, or affect the Bergamese dialect. Pop. (1901) 45,785.

**Bergamot**, a fruit tree, a variety or species of the genus *citrus*, variously classed with the orange, *citrus aurantium*, the lime, *atrus limetta*, or made a distinct species as *citrus bergamia*. It is probably of Eastern origin, though now grown in Southern Europe, and bears a pale yellow, pear shaped fruit with a fragrant and slightly acid pulp. Its essential oil is in high esteem as a perfume. Bergamot is also a name given to a number of different pears.

**Bergen**, a seaport on the W. coast of Norway, the second town of the kingdom, about 25 miles from the open sea, on a bay of the Byfjord, which forms a safe harbor, shut in by hills which encircle the town on the land side, and promote perpetual rains. The town is well built, but has many narrow streets, and houses mostly of wood; with cathedral, museum, etc. The trade is large, timber, tar, train oil, cod liver oil, hides, and particularly dried fish (stock fish) being exported in return for corn, wine, brandy, coffee, cotton, woolens, and sugar. In 1445 a factory was established here by the Hanseatic cities of Germany. Pop. (1900) 72,251.

**Bergerac** (berzh-rac'), a town in the French Department of Dordogne, on the Dordogne, 60 miles E. of Bordeaux by rail. Most of its inhabitants are employed in the surrounding iron works and paper mills. The wines of the district, both white and red, are esteemed. During the wars with the English, Bergerac was a fortress and an entrepôt of trade; but after siding with the Calvinists, and, consequently, suffering greatly in the religious wars, the place was dismantled by Louis XIII. in 1621, while the revocation of the Edict of Nantes drove

many of its citizens into exile. Pop. (1896) 15,642.

**Bergerac, Savinien Cyrano de**, a French author, born in Paris in 1619, distinguished for his courage in the field, and for the number of his duels, more than a thousand, most of them fought on account of his monstrously large nose. He died in 1655. His writings, which are often crude, but full of invention, vigor, and wit, include a tragedy, "Agrippina," and a comedy, "The Pedant Tricked," from which Corneille and Molière have freely borrowed ideas; and his "Comical History of the States and Empires of the Sun and the Moon" probably suggested "Micromégas" to Voltaire, and "Gulliver" to Swift. His works have been frequently republished. He was made the hero of a drama bearing his name, written by Edmond Rostand, the French playwright, which had a phenomenal success in the United States in 1899-1900, and was the occasion of a suit for plagiarism. See ROSTAND, EDMOND.

**Bergerat, Auguste Emile** (berzh-rä'), a French journalist, playwright and novelist, born in Paris, April 29, 1845, son-in-law of Théophile Gautier, and since 1884 particularly known as the amusing chronicler of the "Figaro" under the pseudonym of "Caliban." His *feuilletons* for that paper were published collectively as "Life and Adventures of Sieur Caliban" (1886); "The Book of Caliban" (1887); "Caliban's Laughter" (1890), etc. He also wrote two novels, "Faublas in Spite of Himself" (1884); "The Rape" (1886); besides two volumes to the memory of his father-in-law, "Théophile Gautier, Painter" (1877), and "Th. Gautier, Conversations, Souvenirs, and Correspondence" (1879).

**Bergh, Henry**, an American philanthropist, born in New York in 1823; was founder and President of the American Society for the Prevention of Cruelty to Animals (1866), founder of the American Society for the Prevention of Cruelty to Children (1881), Secretary of Legation and acting Vice-Consul at St. Petersburg (1862-1864). He wrote "Love's Alternatives" (1881), a play; "Married Off" (1859), a poem; "The Streets of New York," "The Ocean Paragon," etc. He died in New York city, March 12, 1888.

**Bergh, Pieter Theodoor Helvetius van den**, a Dutch dramatist and poet, born in 1799; attracted attention with his comedy "The Nephew" (1837), considered one of the best in modern Dutch literature, but did not justify expectations by his subsequent dramatic efforts. He also published a collection, "Prose and Poetry" (3d ed., 1863). He died in 1873.

**Berghaus, Heinrich**, a German geographer, born in Cleves, Prussia, May 3, 1797.



## Bergk

He served in 1815 in the German army in France, and was from 1816 to 1821 employed in trigonometrical survey of Prussia under the War Department. From 1824 to 1855 he was Professor of Applied Mathematics in the Berlin Academy of Architecture. Besides his various maps and his "Great Physical Atlas," he published "Lands and Peoples," "Peoples of the Earth" and other similar works. He died in Stettin, Feb. 17, 1884.

**Bergk, Theodor**, a German classical philologist, born in Leipsic, May 22, 1812. He became an indisputable authority on Hellenic poetry, producing two works of surpassing importance in that department of scholarship: "Greek Lyric Poets" (4th ed. 1878-1882), and "History of Greek Literature" (1872); the latter not quite completed at his death, but brought to perfection with the aid of his posthumous papers. He contributed much of value, likewise, to our knowledge of special departments of classical learning. He died at Ragaz, Switzerland, July 20, 1881.

**Bergman, Ernest von**, a German surgeon, born in Riga, Dec. 16, 1836; educated at Vienna, Dorpat and Berlin. He served in the Prussian army during 1866-1870; was Professor of Surgery in the University of Würzburg in 1878-1882; and was appointed Director of the Surgical Clinic at the University of Berlin in 1882. He wrote "The Putrid Poison," "The Embolism of Fatty Tissues," "The Poison," "Instruction Concerning the Putrid Intoxication," etc.

**Bergman, Torbern Olof**, a Swedish physicist and chemist, born in Catherineberg, March 20, 1735; studied under Linnæus at Upsala; in 1758 became Doctor of Philosophy and Professor of Physics there; and, in 1767, became Professor of Chemistry. He succeeded in the preparation of artificial mineral waters, discovered the sulphuretted hydrogen gas of mineral springs, and published a classification of minerals on the basis of their chemical character and crystalline forms. His theory of chemical affinities greatly influenced the subsequent development of chemistry. He died July 8, 1784.

**Bergmann, Carl**, a German musician, born in Ebersbach, Saxony, April 11, 1821. Being implicated in the Revolution of 1848, he left Germany for the United States in 1849. At first leader of the Germania Society, in New York, he also conducted there the Philharmonic, the Arion, from 1855, several choral unions, and the operas produced at the Academy of Music in 1865. An enthusiastic Wagnerite, he was himself the composer of an opera, a symphony and many concert pieces. He died in New York city, in August, 1876.

## Beriberi

**Bergmehl** (berg-mäl'), a whitish earth, consisting almost entirely of the flinty shields of microscopic plant growths. It occurs in bog and ancient lake deposits in many parts of Northern Europe, and, during times of great scarcity, it has been, when mixed with flour, eaten as food. Some writers assert that hundreds of carloads are consumed every year by the inhabitants of Northern Sweden. From analysis, it does not appear to contain any positive nutriment.

**Bergsoe, Jorgen Vilhelm** (berg'sè), a Danish novelist, poet and naturalist, born in Copenhagen, Feb. 8, 1835. While suffering partial blindness, caused by excessive use of the microscope in his memorable biological researches at Messina, he turned to literary composition; and soon appeared the first of a cycle of novels, "From the Piazza del Popolo" (1866), which had an extraordinary success. The following year he published his first volume of poems, "Now and Then." Of his many novels, the one which excels for fineness of touch is "Who Was He?" All his stories are characterized by rich imagination, fine observation, and great originality; his poetry is inferior in these respects to his prose.

**Bergues** (ber-gä'), a town in the Department of Nord, France, on the Colme river; 5 miles S. E. of Dunquerque. It is a handsome, well built town; is strongly fortified; and contains an imposing clock tower. Vauban, the illustrious military engineer, superintended the construction of the defenses of the place. The architecture here is noteworthy for its Gothic features.

**Bergylt**, the name given a fish (the *sebastes norvegicus* of Cuvier, the *perea marina* of Linnæus), belonging to the order *acanthopterygii* and the family "With hard cheeks." It is called also the Norway haddock, but has no real affinity to the haddock proper. It is an Arctic fish, but is found occasionally on the coasts of Scotland.

**Berhampur**, the name of two Indian towns: (1) A town and military station in the N. E. portion of Madras Presidency, the headquarters of Ganjâm district, with a trade in sugar and manufactures of silks. Pop. 23,599. (2) A municipal town and the administrative headquarters of Murshidâbâd district, Bengal, formerly a military station, and having still large barracks. It was the scene of the first overt act of mutiny in 1857. Pop. 23,605.

**Beriberi, Beriberia, Berriberri, or Barbiers**, an acute disease characterized by oppression of breathing, by general œdema, by paralytic weakness, and by numbness of the lower extremities. It is generally fatal. It occurs frequently in Ceylon among the colored troops, and on some portions of the Indian coast. Earlier authorities consider



beriberi and barbiers distinct, but more recent medical observers regard them as identical.

**Bering, or Behring, Vitus**, a Danish explorer, born in Jutland, in 1680. After making several voyages to the East and West Indies, he entered the service of Russia while still young; became a captain-commander in 1722; and was sent by the Empress Catharine in charge of an expedition (planned by Peter the Great before his death), whose object was to determine whether Asia and America were united.

Aleutian group, and here himself and many of his crew perished, in December, 1741.

**Bering Island**, the larger of the two Kommandor Islands; 115 miles from the E. coast of Kamchatka, crossed by  $55^{\circ} 10' N.$ ; contains the tomb of Bering, who died here after being shipwrecked in December, 1741. It is an important resort of seal hunters.

**Bering Sea**, that part of the North Pacific Ocean between the Aleutian Islands, in  $55^{\circ}$ , and Bering Strait, in  $66^{\circ} N.$ , by which latter it communicates with the Arctic Ocean. It has on its W. side Kamchatka and

the Chukchi country, with the Gulf of Anadyr, and on its E. the territory of Alaska, with Norton Sound and Bristol Bay; contains several islands, and receives the Yukon river from North America and the Anadyr river from Asia. Fogs are almost perpetual in this sea. Ice is formed and melted in the sea every year, the northern part becoming closed to navigation about the beginning of November. Pack ice gradually extends southward to a little below the latitude of St. Matthews Island ( $60\frac{1}{2}^{\circ}$ ), beyond which ice is found in flocs. The S. limit of the ice usually extends from Bristol Bay, Alaska, to about 35 miles S. of Pribilof Island, though in exceptionally severe winters it reaches as far S. as Unimak Pass. It usually leaves Pribilof Island about May 1st, and vessels following in its wake may reach Bering Strait between about the 15th and 25th of June. A strong and comparatively warm current sets northward at about two to three knots an hour, through Bering



BERGUES CLOCK TOWER.

Crossing Siberia he sailed from the river of Kamchatka in July, 1728; and reached lat.  $67^{\circ} 18' N.$ , having passed through the strait since called after him, without knowing it. Discovering that the land trended greatly to the W. he concluded that the continents were not united, and returned; without, however, seeing America. In another voyage, in 1741, he touched upon the American coast, in lat.  $58^{\circ} 21' N.$ ; and gave name to Mount St. Elias. In returning, his ship was cast upon an island, since named after him, an outlier of the

Strait, and after following the Siberian shore turns N. toward Herald Island. A cold current also passes out through the strait. The United States having claimed the exclusive right of seal fishing in the Bering Sea in virtue of the purchase of Alaska from Russia, and this right having been disputed by the British, it was decided in August, 1893, by an arbitration tribunal, to which the question was referred, that no such right existed, but at the same time regulations for the protection of the fur seal were drawn up and agreed to



## Bering Strait

between the two powers, the chief being the prohibition of seal fishery within the zone of 60 miles round the Pribilof Islands, inclusive of the territorial waters, and the establishment of a close season for the fur seal from May 1 to July 31 inclusive, applying to the part of the Pacific and Bering Sea N. of 35° N. and E. of the 180th meridian from Greenwich.

In 1894 laws were enacted by both the United States and Great Britain to carry into effect the award of the Bering Sea arbitration of 1893, fixing penalties for illegal sealing, and authorizing, with certain limitations, the search and seizure of sealers of one of the nations by the naval and revenue forces of the other nation. There still awaited adjudication the compensation due to sealers whose vessels had been illegally seized by United States cutters prior to the establishment of a close season in 1890.

On Jan. 14, 1898, President McKinley submitted to Congress the awards and report of the commission appointed under the terms of a treaty to adjust the claims referred to. In his letter of transmittal the President said that he cordially coincided with the recommendation of the Secretary of State, and that the treaty obligations demanded prompt and favorable action by Congress, which he urgently hoped might be taken to the end that the long pending questions might be finally and satisfactorily settled. The principal of the claims allowed to the owners of the vessels amounted to \$264,188.91, with accrued interest of \$149,790.36, a total of \$413,979.27. The difference between this and \$415,157.26 was for personal claims. The bill for the payment was introduced in Congress on April 19, and was passed by the House on June 13, and by the Senate on June 14. It was promptly approved by the President, and the money was paid to Sir Julian Pauncefote, British Ambassador to the United States, on June 16.

**Bering Strait**, the channel which separates Asia and America at their nearest approach to each other, and connects the Arctic with the Pacific Ocean (Bering Sea). Between East Cape (Asia), and Cape Prince of Wales (America), it is 36 miles wide, and generally of slight depth. The shores rocky, bare, and greatly indented. It was discovered by Bering in 1728, and first explored by Cook in 1788.

**Beriot, Charles Auguste de** (ber-yō'), a Belgian violinist, born in Louvain, Feb. 20, 1802; studied with Robbrecht and Tiby, and, in Paris, with Baillot; and became a professor in the Conservatory in Brussels in 1842. He published a "Violin Method" (1858.) He died in Louvain, April 20, 1870.

**Berkeley**, a town in Alameda co., Cal.; on the Southern Pacific railroad; 8 miles N. E. of San Francisco. It is the seat of the

## Berkeley

State University of California; the State Agricultural College; the State Institution for the Deaf, Dumb, and Blind; and six college preparatory schools. The town is well equipped with electric light and street railroads; and has soap works, iron foundries and machine shops, furniture factory, and other industries. Pop. (1910) 40,434.

**Berkeley Sound**, next to Stanley Sound the most frequented inlet of the East Falkland Island, near its N. E. extremity. Though it is difficult to enter, it contains several excellent harbors.

**Berkeley Springs**, town and county-seat of Morgan co., W. Va.; 2 miles S. of the Potomac and 77 miles N. W. of Washington; on a branch of the Baltimore and Ohio railroad. It is in an agricultural region, and has been widely known and popular for more than a century because of its mineral springs. The site of the town was a part of the vast estate of Lord Fairfax, and Washington owned considerable property here. It is the oldest pleasure resort in the South, and as far back as the colonial days the gentry of Virginia came here in warm weather and lived in log huts in order to enjoy or be benefited by the baths and swimming pools.

**Berkeley, George**, Bishop of Cloyne; born in Kilcrin, Ireland, in 1684; became fellow of Trinity College, Dublin, in 1707; traveled in Italy as far as Leghorn in 1713 and 1714; and at a later period accompanied Mr. Ashe, son of the Bishop of Clogher, on a tour through Italy, Sicily, and France. In 1721 he was appointed chaplain to the Lord-Lieutenant of Ireland, the Duke of Grafton. He appeared with much applause as an author before he was 20 years old. His works on philosophy and mathematics (among which his "Theory of Vision," published in 1709, is the most brilliant proof of the author's acuteness) procured him a widespread fame. By a legacy of Miss Vanhomrigh, the celebrated Vanessa, who has become so generally known through her love to Swift, his fortune was considerably increased. In 1724 he was promoted to the deanery of Derry and resigned his fellowship. He now published his "Proposals for the Conversion of the American Savages to Christianity by the Establishment of a College in the Bermuda Islands."

The project was very favorably received, and persons of the first rank raised considerable sums by subscription to aid it; and Berkeley having resigned his preferment set sail for Rhode Island, with several other persons of similar views, to make arrangements for carrying on his college. The assistance of Parliament, which had been promised, not being afforded, his undertaking miscarried after he had spent seven years and a considerable part of his fortune in his efforts to accomplish it. He after-



## Berkeley

ward wrote numerous philosophical, religious, and politico-economical works. Toward his 60th year he was attacked by a nervous colic, which he attempted to cure by the use of tar-water, whereby he was induced to publish two treatises on the utility of this water. He died suddenly in Oxford in 1753. Berkeley is said to have been acquainted with almost all branches of human knowledge. His character commanded the respect and love of all who knew him. His most celebrated philosophical works are: "Treatise on the Principles of Human Knowledge" (London, 1710); "Three Dialogues between Hylas and Philonous" (London, 1713); "Alciphron, or the Minute Philosopher" (London, 1732). His works appeared in London, 1784, two vols. 4to preceded by a biography written by Arbuthnot. A new edition of his works, in three vols. 8vo., by Professor Fraser of Edinburgh, was published in 1871, together with his "Life and Letters" in one volume. As a philosopher he maintains that the belief in the existence of an exterior material world is false and inconsistent with itself; that those things which are called sensible material objects are not external but exist in the mind, and are merely impressions made on our minds by the immediate act of God, according to certain rules termed laws of nature, from which He never deviates; and that the steady adherence of the Supreme Spirit to these rules is what constitutes the reality of things to His creatures; and so effectually distinguishes the ideas perceived by sense from such as are the work of the mind itself or of dreams, that there is no more danger of confounding them together on this hypothesis than on that of the existence of matter.

**Berkeley, Sir John**, one of the proprietors of New Jersey, born in 1607. He was a prominent Royalist during the contest of Charles I. with Parliament. Charles II. granted him, with Sir George Carteret, a proprietary interest in New Jersey and Carolina. He died Aug. 28, 1678.

**Berkeley, Sir William**, an English colonial Governor, born near London, about 1610. In 1632 he was a Commissioner of Canada, and in 1641 became Governor of Virginia. He opposed the party of Cromwell and was forced to resign; but at the Restoration was reappointed Governor. In 1676 he resigned and returned to England. He was author of "The Lost Lady, a Tragic-Comedy" (1638). He died in England, July 13, 1677. See BACON'S REBELLION.

**Berkley, Sir George**, an English engineer, born in London, April 26, 1821. In 1835 he began experimenting with methods for operating atmospheric railways. In 1841 he associated himself with Robert Stephenson and continued his experiments.

## Berlin

On Stephenson's death he became engineer of the Great Indian Peninsular Railway. In 1892 he was made President of the Institute of Civil Engineers. He wrote papers on atmospheric railways and on the strength of iron and steel; and was knighted in 1893. He died in London, Dec. 20, 1893.

**Berkshires, The, or Berkshire Hills**, a range of mountains in the N. W. of Massachusetts; in Berkshire county; stretching 16 miles N. and S., on the E. of the valley of the Upper Hoosic river. They are a favorite summer and autumn resort.

**Berlichingen, Gœtz von**, surnamed the "Iron Hand," a brave and turbulent German noble; born in Jaxthausen, Würtemberg, in 1480. He was almost constantly at war, was put under the ban of the empire by Maximilian, and was killed during the siege of a fortress in which he had taken refuge, in 1562. His story was dramatized by Goethe.

**Berlin** (anciently BERLE — uncultivated land), the capital of the Prussian dominions and of the German empire, the residence of the Emperor of Germany and foreign ambassadors; in the province of Brandenburg; lat. (new observatory) 52° 30' 16" N.; lon. 13° 23' 53" E.; the largest city in Germany, and, for the beauty and size of its buildings, the regularity of its streets, the importance of its institutions of science and art, and its activity, industry, and trade, one of the first in Europe. It is situated on a dreary sandy plain, about 126 feet above the level of the sea, on both sides of the Spree, a sluggish stream, here about 200 feet broad, which winds through the city from S. E. to N. W., and divides into several branches and canals. The main stream and its branches are spanned by a large number of bridges. The city has water communication to the North Sea by the Spree, which flows into the Havel, one of the principal tributaries of the Elbe, and to the Baltic by canals connecting with the Oder. The oldest portion of the city lies on an island in the Spree and on the right bank of the river, and is in part irregularly built, with narrow crooked streets and indifferent houses. A newer portion, on the other or left bank, rose up as if by magic at the orders of Frederick the Great; the site, according to his plan, being covered with straight and spacious streets, running at right angles to each other, and being lined by handsome houses of uniform appearance. These portions, however, form a comparatively small part of the present city, which has extended itself on every side, its growth since about 1860 having been very rapid.

The houses are mostly of white freestone, or of brick covered with a coating of plaster or cement. The drainage of the



city, owing to the flatness of the ground on which it stands and to the sluggishness of the Spree, is defective, though much improvement has been made on it in recent years. The streets are well paved and lighted. The houses generally are heated with stoves. Of the numerous bridges, the finest is the Castle Bridge, connecting the great street Unter den Linden with the Spree island, about 104 feet wide, and having its eight piers surmounted by colossal groups of sculpture in marble. Another fine bridge is that of Kaiser Wilhelm, from the island to the other side of the Spree. The principal and most frequented street, the Unter den Linden ("under the lime trees"), is in some respects unsurpassed. It is situated on the left side of the river and runs in a direction nearly from E. to W. It is about two-thirds of a mile in length, and of remarkable width (160 feet), the center being occupied by a double avenue of lime trees, which give it its name and form a fine shady promenade; while on either side of the trees is a carriage-way, and beyond each carriage-way, in front of the houses, a spacious foot pavement. At or near the E. end of this street, and also round the Lustgarten, a square with which it is connected by the Castle Bridge, are clustered a number of the principal public buildings of the city; such as the royal and imperial palace (Schloss), the palace of the Emperor William I., the palace of the Emperor Frederick III., the arsenal, the university, the museums, the cathedral, royal academy, opera house, etc., while at the W. end it terminates magnificently with the Brandenburg Gate, a noble structure, modeled on a grand scale after the Propylæum of Athens, and regarded as one of the finest portals in existence. The gateway is surmounted by a colossal Victory in bronze, mounted in a car drawn by four horses. Immediately beyond this portal is the Thiergarten ("zoölogical garden"), an extensive and well-wooded park, interspersed with ponds, shrubberies, and trees, and containing the palace of Bellevue, as well as elegant villas and places of public amusement. There are also several other public parks. Running partly along the E. side of the Thiergarten and taking a bend to the S. E. is the new street or boulevard called the Königgrätzerstrasse, longer than the Unter den Linden but not so wide; and running transversely to the Unter den Linden are several good streets, including the Wilhelmstrasse, a long straight street on either side of which are various public buildings, palaces, etc. In or in the close vicinity of the Unter den Linden are to be found clustered together perhaps a larger number of fine buildings than any other city can show in the same area.

Among the principal public buildings deserving more particular notice the first is

the royal and imperial palace or Schloss, a vast rectangular pile, extended and altered at various times, more remarkable for a certain air of grandeur than architectural beauty. To it belongs a large and richly decorated chapel, whose lofty dome forms the most striking external feature of the building. On the opposite side of the square or garden (Lustgarten) from the Schloss is the museum, a fine building in pure Grecian taste, with an extensive collection of sculpture and painting; and behind it the new museum, containing extensive collections of Egyptian and other antiquities, and also the celebrated mural paintings by Kaulbach. Of the numerous churches (the great majority of which are Protestant) only four belong to the Middle Ages. Many of those recently erected are fine structures, the most important being the Cathedral (not yet completed), an elaborate domed structure in the Italian Renaissance style situated on the E. side of the Lustgarten; estimated cost, £500,000. The royal theater is a fine Grecian edifice, one of the most important works of the eminent architect Schinkel. The arsenal (Zeughaus) is an excellent building in the Renaissance style (1695-1706), containing a vast collection of objects illustrating the history and operations of warfare, many of them of great antiquity. The university, the exchange, the opera house, the principal Jewish synagogue, the town hall (cost £500,000), and the architectural academy, are all beautiful structures. There are various public monuments, such as the one in memory of the soldiers who fell in the wars of 1864, 1866, and 1870-1871, and several others; but the most remarkable is that erected in 1851 to Frederick the Great in the Unter den Linden — the *chef d'œuvre* of Rauch and his pupils. The colossal statue of the king on horseback is placed on a lofty pedestal, around which are grouped bronze figures representing his principal generals, ministers, and eminent men of his time — in all 31 portrait statues the size of life, those at the four corners being on horseback. In front of the arsenal are statues in bronze of Blücher, and of Generals York and Gneisen — the former by Rauch and the two latter by Freibel. There are marble statues by Rauch of Bülow and Scharnhorst, an equestrian statue in bronze of the great elector, Frederick William, and another (colossal) of the Emperor William I. There are also monuments to Luther, Schiller, Goethe, Chamisso, Lessing, Alexander and William von Humboldt, etc.

The literary institutions of the city are numerous and excellent. They include the university, the academy of sciences; the technical high school, the mining academy, the high school of agriculture, the academy of arts, the school of music, the seminary for Oriental languages, the military academy



and school of engineering, many gymnasia and real-schools; an institution for instructing the deaf and dumb, etc. The chief libraries are the royal library, founded in 1659, and now containing 900,000 volumes and 25,000 manuscripts; and the university library, with about 300,000 volumes. The public museums and picture galleries are on a scale adequate to the importance of the city.

Berlin is the literary and scientific metropolis of Germany, and in the various walks of literature, philosophy, science, and art, can show a galaxy of names such as few cities can equal. Since the time of Frederick the Great it has been the policy of the Prussian kings to attract to their capital, either through professorships in the university or otherwise, learned men in every department of knowledge. Consequently, though but a city almost of yesterday, the number of eminent men who have labored, or who still labor, within the walls of Berlin is very great. Of those who are world-renowned may be named Leibnitz, who founded the Academy of Sciences, and became its first president; the philosophers Fichte, Schleiermacher and Hegel; the theologians Neander, De Wette, and Hengstenberg; the historians Ranke, Von Raumer, and Mommsen; the philologists Bopp and the brothers Grimm. In the natural sciences Alexander von Humboldt, and after him many brilliant names, down to those of Virchow and Koch. It may suffice, further, to name the poets Tieck and Rückert, the famous sculptors Rauch and Schadow, and the composers Felix Mendelssohn and Meyerbeer. Berlin being the capital of Germany, government officials, people of wealth and education, etc., form an important element of the population. Music is extensively and successfully cultivated by the Berliners. The performance of sacred vocal music, in particular, has attained extraordinary perfection. The opera and theaters are on the most flourishing footing and are liberally encouraged, the taste for such entertainments pervading all classes.

The manufactures of Berlin are various and extensive. The most important branch of manufacturing industry is that of steam engines and other machinery (employing over 15,000 hands). Brass-founding, the making of lamps and other articles of metal, are also largely carried on; while next in order come such industries as printing and the kindred arts, spinning and weaving, the making of sewing machines, paper, tobacco and cigars, pottery and porcelain, pianos and harmoniums, artificial flowers, brewing, etc. A considerable quantity of the manufactures are exported. In the royal iron-foundry busts, statues, bas-reliefs, etc., are cast, together with a great variety of ornaments of unrivaled delicacy of workmanship.

Berlin is well supplied with city and other railways. It has tramways on which the motive power is partly horses, partly steam, and partly electricity. There are elevated and other city lines, including an elevated electric line, and a circular line. Berlin is an important railway center, not only for Germany but for a great part of Europe, being on the main routes from Paris and London to St. Petersburg and Moscow, and on those from Northern Europe to Vienna, Constantinople, and Italy.

*History.*—The oldest parts of the city are Kölln and Berlin proper, which were originally poor villages inhabited by fishermen, and first rose to some importance under Margrave Albert (1206–1220), the grandson of Albert the Bear. The Elector Frederick II. with the Iron Teeth built a castle at Kölln on the banks of the Spree in 1442; and from the time of John Cicero the town became the permanent residence of the electors. About two centuries ago Berlin was still a place of little importance. It was confined to the immediate bank of the Spree and the island which divides its channel, and consisted of a series of villages which gradually merged into each other and gave their names to different quarters. The first important improvement was made by the great Elector Frederick William, who planted the Unter den Linden, and otherwise enlarged and beautified the town; so that in his time it already numbered 20,000 inhabitants. He may be considered the second founder of the city. His successor, King Frederick I., seconded his efforts; but Berlin never assumed the appearance of a capital till the time of Frederick the Great, who, determined to make it worthy of his extended dominions, inclosed a large space within the walls and proceeded to build upon it, to supply the wants, not so much of actual, as of an anticipated population. He was twice interrupted in the work, and almost driven from his purpose, when in 1757 the city fell into the hands of the Austrians, and in 1760 into those of the Austrians and Russians. But he soon repaired the damage; and his successors having followed in his steps, Berlin has rapidly risen to be the first city in Germany in respect of population, architecture, and political influence. Pop. (1900) 1,888,326; (1910) 2,180,000.

**Berlin**, town and county-seat of Waterloo co., Ont., Canada; on the Grand river, and the Grand Trunk railway, 62 miles W. of Toronto. It has manufactories of furniture, leather, boots and shoes, pianos and organs, buttons, gloves, etc.; excellent sewerage system, water works, street railway, and gas and electric light plants; a Roman Catholic college, 15 churches, and several daily, weekly, and monthly periodicals. Pop. (1901) 9,747.



## Berlin

**Berlin, Treaty of**, a treaty signed July 13, 1878, at the close of the Berlin Congress, which was constituted by the representatives of the six Great Powers and Turkey. The treaty of San Stefano, previously concluded between Turkey and Russia, was modified by the Berlin Treaty, which resulted in the division of Bulgaria into two parts, Bulgaria proper and Eastern Rumelia, the cession of parts of Armenia to Russia and Persia, the independence of Rumania, Servia, and Montenegro, the transference of Bosnia and Herzegovina to Austrian administration, and the retrocession of Bessarabia to Russia. Greece was also to have an accession of territory. The British representatives were Lords Beaconsfield, Salisbury, and Odo Russell. By a separate arrangement previously made between Great Britain and Turkey, the former got Cyprus to administer.

**Berlin, University of**, a celebrated institution of learning in Berlin, Germany. It is, with the exception of Bonn, the youngest of the German universities, but is probably the most famous of them all. It was founded in 1810, when the Napoleonic victories had left Prussia apparently crushed and had even transferred her great University of Halle to the newly formed kingdom of Westphalia. Wilhelm von Humboldt was Minister of Education at the time, and Prussia's debt to him for organizing her national school system with the University of Berlin at its head, during that period of national defeat and disaster, is certainly very great. It should be borne in mind, too, that Humboldt was ably seconded by Fichte and Schleiermacher. The first rector of the university was Schmalz; the first deans of its faculties were Schleiermacher, Biener, Hufeland, and Fichte; and before it was 10 years old it had for professors such men as Niebuhr, Wolff, Böckh, Bekker, and Hegel. In more recent years, Ranke, Mommsen, Helmholtz, Virchow, and other famous scholars have upheld the reputation which the university won for itself at the very start. There are four faculties, theology, medicine, jurisprudence, and philosophy, with a total of 494 professors and teachers. At the satisfactory completion of the course, the doctor's degree is conferred. The number of students in 1910 was 9,242, besides a large number of non-matriculated ones.

**Berlioz, Hector** (ber-lē-ōs'), a French composer, born in La Cote St. Andre, Dec. 11, 1803. He forsook medicine to study music at the Paris Conservatoire, where he gained the first prize in 1830 with his cantata, "Sardanapale." For about two years he studied in Italy, and, when on his return he began to produce his larger works, he found himself compelled to take up the pen both in defense of his principles and for his own better maintenance. As critic of the "Journal des Debats," and *feuilletonist*, he

## Bermuda Hundred

displayed scarcely less originality than in his music, his chief literary works being the "Traité d'Instrumentation" (1844); "Voyage Musical" (1845); "Les Soirées d'Orchestre" (1853); and "A travers Chant" (1862). His musical works belong to the Romantic school, and are especially noteworthy for

the resource they display in orchestral coloring. The more important are "Harold en Italie," "Episode de la Vie d'un Artiste," and "Le Retour à la Vie;" "Romeo and Juliette" (1834); "Damnation de Faust" (1846); the operas

Benvenuto Cellini," "Beatrice et Benedict," and "Les Troyens," "L'Enfance du Christ," and the "Requiem." He married an English actress, Miss Smithson, but latterly lived apart from her. He died in Paris, March 9, 1869. After his death appeared "Mémoires," written by himself.

**Berm**, or **Berme**, in fortification, a narrow, level space at the foot of the exterior slope of a parapet, to keep the crumbling materials of the parapet from falling into the ditch.

In engineering, a ledge or bench on the side or at the foot of a bank, parapet, or cutting, to catch earth that may roll down the slope or to strengthen the bank. In canals, it is a ledge on the opposite side to the tow-path, at the foot of a talus or slope, to keep earth which may roll down the bank from falling into the water. Slopes in successive benches have a berme at each notch, or, when a change of slope occurs, on reaching a different soil.

**Bermuda Cedar**, a species of cedar which covers the Bermuda Islands. The timber is made into ships, boats and pencils. The wood of *juniperus barbadensis*, the Barbadoes cedar, is sometimes imported with it under the same name.

**Bermuda Grass**, a species of grass, called in Bermuda, devil grass. It grows in the American Southern States and in Southern Europe. It is much esteemed for pasture.

**Bermuda Hundred**, a locality in Chesterfield county, Va.; the scene of a battle in the Civil War between the Federal troops under General Butler, and the Confederates under General Beauregard. The battle was fought May 16, 1864, and resulted in a defeat for Butler.



HECTOR BERLIOZ.



## Bermudas

**Bermudas, The, or Somers Islands**, a group of small islands, about 300 in number, in the North Atlantic Ocean, belonging to Great Britain, stretching N. E. by E. and S. W. by W. about 20 miles, the lighthouse on Gibb's Hill being situated in lat.  $32^{\circ} 14' 54''$  N., long.  $64^{\circ} 53'$  W., 580 miles S. E. of Cape Hatteras; area, about 30 square miles. When viewed from the sea, the elevation of these islands is trifling, the highest land scarcely attaining to a height of 200 feet. Their general aspect is similar to the West India Islands, and they are almost everywhere surrounded by extensive coral reefs, the channels through which are extremely intricate, and can only be safely navigated by native pilots. The principal islands are those of Bermuda, St. George, Ireland, and Somerset. The protection afforded to shipping by their numerous bays, and their position in the track of the homeward bound West India vessels, have led to the conversion of the Bermudas into a maritime rendezvous, and likewise, into a British naval station for West Indian fleets. The harbor of St. George's Island has been greatly improved, is fortified, protected by a breakwater, and has water and space enough to float the largest fleet. The principal productions are fruits, vegetables, maize, and tobacco. Pineapples are very abundant and largely exported. The climate is mild and salubrious; almost realizing the idea of a perpetual spring. Fish abounds, and forms a profitable source of industry to the inhabitants. Breadstuffs, etc., are imported from the United States, and manufactured goods from England. Hamilton, on Bermuda Island, is the seat of the colonial government. Pop. (1901) 17,535. These islands were discovered by Bermudez, a Spaniard, in 1522, and settled by the English in 1607, and are supposed to be the "still vexed Bermoothes," mentioned in Shakespeare's "Tempest." Pulmonary invalids are occasionally sent to Bermuda from the United States. It affords a good winter retreat, provided due care be taken in selecting a locality sheltered from the strong winter winds. Hamilton has been recommended with this view.

**Bermudez** (ber-mū'dāth), a State in the N. E. of Venezuela, between the Orinoco and the Caribbean Sea, formed in 1881 from the former States and present sections of Barcelona, Cumana, and Maturin. Area, 32,243 square miles; pop. (1905) 364,158.

**Bermudez, Remigio Morales**, a Peruvian statesman, born in Tarapaca Province, Sept. 30, 1836; began business in the nitrate trade in his native province. In 1854, as a lieutenant, he joined the revolutionary army, which finally overthrew General Echinique's government. In 1864 he joined the revolution against President Castilla. In the war with Chile, he led the force that marched to Arica. When Caceres was

## Bern

elected President, in 1886, Bermudez was chosen Vice-President, and was elected President in 1890. He died in Lima, March 31, 1894.

**Bern, or Berne**, a Swiss canton, bounded on the N. by France. It is the most populous, and next to the Grisons, the most extensive canton of Switzerland; its area being nearly 2,650 square miles, and its pop. (1908) 624,641, more than one-sixth of the Swiss people. The fertile valleys of the Aar and the Emmen divide the mountainous Alpine region in the S. from the Jura Mountains in the N. The Bernese Oberland, or Highlands, comprises the peaks of the Jungfrau, Mönch, Eiger, Schreckhorn, Finsteraarhorn, etc., and the valleys of Hasli, Lauterbrunnen, etc. The Lakes of Thun, Brienz, Neuchâtel, and Bierné are in the canton, which is watered by the Aar and its several tributaries. The climate is generally healthy. The plains of the Aar and the Emmen are the most fruitful, producing corn and fruits of various kinds, and affording excellent pasturage for cattle, which, with dairy produce, form the chief agricultural wealth of Bern. The vine grows in some districts. The horses of the Emmenthal are much prized. The lakes abound with salmon and trout. Iron mines are worked, and a little gold is found, and quarries of sandstone, granite, and marble are abundant. Its manufactures, which are not extensive, consist chiefly of linen, coarse woollens, leather, iron, and copper wares, articles of wood, and watches. Bern entered the Swiss Confederation, in which it now holds the second rank, in 1352. In the 15th and 16th centuries, it added to its possessions Aargau and Vaud, which it lost during the wars of the first Napoleon; but it received in return Bienne and its territory, and the greater part of the bishopric of Basel. The present constitution of the canton, proclaimed in 1874, but based on the laws of 1848, is one of representative democracy.

**Bern**, the chief city of the above canton, was, by the decision of the Council of the Confederation, in 1848, declared to be the political capital of the Commonwealth. It is a fine, clean, well built town, on the Aar, 23 miles S. of Basel, and possesses many fine public edifices, more notably, the Cathedral, erected 1421-1502. The most remarkable feature in the town are the arcades, running in front of the houses down both sides of the two chief streets. The inhabitants are serious and reserved, and proud of the ancient glory of their city. The aristocracy, or patricians, as the old families were called, lived secluded from the other classes. The town has bears for its arms; and some of these animals are maintained in a place called Bärengraben ("bear's ditch"), on funds appropriated to that special purpose. The principal manufactures are watches,



## Bernadotte

wooden clocks, and toys, linen, woolen, and silk fabrics. Pop. (1909) 78,500. Bern was founded by Duke Berthold V., of Zähringen, in 1191, and was made a free and imperial city by a charter from the Emperor Frederick II., dated May, 1218.

**Bernadotte, Jean Baptiste Jules** (ber-na-dot'), a French general, afterward raised to the Swedish throne, was the son of an advocate of Pau, born Jan. 26, 1764. He enlisted at 17, became sergeant-major in 1789, and subaltern in 1790. In 1794 he was appointed a General of Division, and distinguished himself greatly in the campaign in Germany, and on the Rhine. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. The following year he became for a short time Minister of War, and on the establishment of the Empire was raised to the dignity of Marshal of France, and the title of Prince of Ponte-Corvo. On the death of the Prince of Holstein-Augustenburg, the heir apparent to the Swedish crown was offered to the Prince



BERNADOTTE.

of Ponte-Corvo, who accepted with the consent of the Emperor, went to Sweden, abjured Catholicism, and took the title of Prince Charles John. In the maintenance of the interests of Sweden, a serious rupture occurred between him and Bonaparte, followed by his accession, in 1812, to the coalition of sovereigns against Napoleon. At the battle of Leipsic, he contributed effectually to the victory of the allies. At the close of the war strenuous attempts were made by the Emperor of Austria and other sovereigns to restore the family of Gustavus IV. to the crown; but Bernadotte, retaining his position as Crown Prince, became King of Sweden on the death of Charles XIII. in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important pub-

lic works were completed. He died March 8, 1844, and was succeeded by his son Oscar.

**Bernard, Charles de** (ber-när') [properly BERNARD DU GRAIL DE LA VILLETTE], a French novelist, born in Besançon, Feb. 25, 1804. He was a disciple of Balzac, whom he resembles in his power of realistic description and psychological analysis; but he possesses a purer and more nervous style, and above all is content with a less minute elaboration of story and characters. His first piece, "The Gorfalcon," made a hit with its clever description of the literary cliques. Everywhere he evinces clear insight into the foibles of society. Of his novels, the following may be named as only second in rank to his masterpiece, "The Gorfalcon," "A Magistrate's Adventure," "The Gordian Knot," "Wings of Icarus," "The Lion's Skin," "The Country Gentleman." He died in Neuilly, March 6, 1850.

**Bernard, Claude**, a French physiologist, born in 1813; studied at Paris; held, in succession, the chairs of physiology in the Faculty of Sciences, the College of France, and the Museum. Among his many works are "Researches on the Functions of the Pancreas" (1849); "Sympathetic Systems" (1852); "Experimental Physiology in Its Relation to Medicine" (1855-1856); "On the Physiological Properties and Pathological Alterations of the Various Liquids of the Organism" (1859), and "Nutrition and Development" (1860). He died in Paris in 1878.

**Bernard, Sir Francis**, an English administrator, born in Nettleham, in 1714; was Governor of New Jersey in 1758-1760, and of Massachusetts Bay in 1730-1769. He did a great deal toward precipitating the Revolution by his aggressive attempts to strengthen the royal authority. He was finally recalled on account of the unpopularity resultant on his bringing troops into Boston. He died in Aylesbury, England, June 16, 1779.

**Bernard, Mountague**, an English lawyer, born in Gloucestershire, Jan. 28, 1820; was Professor of International Law at Oxford in 1859-1874. In 1871 he was one of the High Commissioners who signed the Treaty of Washington, and on his return home was made a Privy Councillor. In 1872 he assisted Sir Roundell Palmer in preparing the British case for the Geneva Arbitration Tribunal. He died at Overcross, Sept. 2, 1882.

**Bernard, Pierre Joseph, or Gentil Bernard**, as he is commonly called after Voltaire, a French poet, born in Grenoble in 1710. He showed, at an early age, a great taste for poetry, and was at first only an attorney's clerk, but, afterward, became secretary to Marshal de Coigny, who had command of the army of Italy. After the



Marshal's death, he obtained a lucrative appointment, and was then able to indulge his poetic faculties. He wrote an opera, "Castor and Pollux," which met with great success; the "Art of Loving," and a number of odes, songs, etc. His works were collected and reprinted in 1803. He died in 1775.

**Bernard, Great St.,** a celebrated pass of the Pennine Alps in Switzerland in the canton Valais, on the mountain road leading from Martigny to Aosta in Piedmont. On the E. side of the pass is Mount Velan, and on the W. the Pointe de Dronaz; there is no mountain known by the name of St. Bernard. Almost on the very crest of the pass is the famous Hospice, among the highest permanently inhabited spots in Europe, 8,200 feet above the level of the sea. There is a massive stone building, capable of accommodating 70 or 80 travelers with beds and sheltering 300. As many as 500 or 600 have received assistance in one day. It is situated on the highest point of the pass, exposed to tremendous storms from the N. E. and S. W., and is tenanted by 10 or 12 brethren of the Order of St. Augustine, who have devoted themselves by vow to aid travelers crossing the mountains. The climate of this high region is necessarily rigorous. There is a lake on the summit, a short distance from the Hospice, on which ice has frequently remained throughout the whole year. The severest cold recorded is 29° below zero, F., but it has often been 18° and 20° below zero; the greatest summer heat recorded is 68° F. From the difficulty of respiration in so elevated a locality, and the severity of the climate, few of the monks survive the time of their vow, 15 years from the age of 18, when they are devoted to this service.

The dogs kept at St. Bernard to assist the brethren in their humane labors are well known. In the midst of tempests and snowstorms the monks, accompanied by some of these dogs, set out for the purpose of tracking those who have lost their way. If they find the body of a traveler who has perished they carry it into the vault of the dead, where it is wrapped in linen, and remains lying on a table till another victim occupies the place. It is then set up against the wall among the other bodies, which, on account of the cold, decay so slowly that they are often recognized by their friends after the lapse of years. Adjoining this vault is a kind of burying ground, where the bones are deposited when they accumulate too much in the vault. It is impossible to bury them, because there is nothing around the Hospice but naked rocks. The institution is supported partly by its own revenues, partly by subscriptions and donations. The Pass of St. Bernard appears to

have been known at a very early period; and a Roman road led down the Piedmontese side of the mountains. The remains of a massive pavement are still visible and the cabinet of the Hospice contains votive tablets, bronze figures, and other antiquities found in the vicinity. The Hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of those who performed pilgrimages to Rome. In May, 1800, Napoleon led an army of 30,000 men, with its artillery and cavalry, into Italy by this pass.

**Bernard, Little St.,** a mountain of Italy, belonging to what are called the Graian Alps, about 10 miles S. of Mont Blanc. It stands between Savoy and Piedmont, having the valley of the Isère, in the former, on the W., and that of the Doire, in the latter, on the E. The pass across it is one of the easiest in the Alps, and is supposed by many to be that which Hannibal used. The Hospice at the summit of the pass has an elevation of 7,192 feet.

**Bernard, St.,** Abbot of Clairvaux, was born of a noble family in Burgundy, in 1091. He was educated at the University of Paris. At the age of 23 he entered the recently founded monastery of Cîteaux, accompanied by his brothers and 20 of his companions. He observed the strictest rules of the Order, and so distinguished himself by his ability and acquirements that he was chosen to lead the colony to Clairvaux, and was made abbot of the new house; an office which he filled till his death. His fame attracted a great number of novices, many of whom became eminent men. Among them was Pope Eugenius III., six cardinals, and many bishops. In 1128 he prepared the statutes for the Order of Knights Templar. Popes and princes desired his support and submitted their differences to his arbitration. By his influence Innocent II. was recognized as lawful Pope; he had a public debate with Abelard on some doctrines of his philosophy, and procured his condemnation; courageously opposed the doctrine of the Immaculate Conception of the Virgin and the festival instituted in its honor; was founder of 160 monasteries; and was the chief promoter of the second crusade. At the Council of Vézelay, in 1146, he spoke as if inspired, before the King and the nobles of France, and with his own hand gave them their crosses. He then preached the crusade in Germany, persuaded the Emperor Conrad to join it, and refused the command which was offered him. His prediction of success was falsified. St. Bernard was the vehement adversary of Arnold of Brescia, and procured his banishment from Rome and from Zürich. He successfully attacked the doctrines of several so called heretics. He



steadily refused the offers of several archbishoprics and other dignities, preferring to remain abbot only. His character and his writings have earned him the title of "Last of the Fathers." The power, tenderness, and simplicity of his sermons and other works have secured the admiration of Protestants and Catholics alike. Dante introduces him in the last cantos of the "Paradise" with profound reverence and admiring love; and Luther studied his writings with the same feelings. St. Bernard died at Clairvaux in 1153, and was canonized in 1174.

**Bernard, Simon**, a French engineer, born in Dole, April 28, 1779. He served under Napoleon as his aide-de-camp; was wounded at the battle of Leipsic; superintended the defense of Torgau, and was present at Waterloo. In 1816 he came to the United States; was commissioned a Brigadier-General of Engineers; and planned an elaborate system of seacoast defenses, the most important of the works built by him being Fort Monroe. In 1831 he returned to France; was made aide-de-camp to Louis Philippe, and designed the fortifications of Paris. In 1834 he was appointed Minister of War. He died in Paris, Nov. 5, 1839.

**Bernard, William Bayle**, an Anglo-American dramatist, born in Boston, Mass., Nov. 27, 1807. His first work was a nautical drama called the "Pilot." This proved successful and encouraged him to pursue a literary career. He wrote in all 114 plays, of which the best known are "Rip Van Winkle," "The Man About Town," "Marie Ducange" and "The Boarding School." He died in Brighton, England, Aug. 5, 1875.

**Bernard de Ventadour** (ber-när' de ven-tä-dör') a French troubadour poet, born, presumably, in Ventadour about 1125; died in the monastery at Dalon about 1197. Love songs "To Eleonore," and various amatory lays to courtly dames, form the riches of his delicate verse.

**Bernard Dog, Great St.**, a race or species of dog which gets its name from the Hospice of St. Bernard, where it has long been kept by the monks to aid them in rescuing perishing travelers. This dog is very valuable in assisting the monks to keep to the line of the road and in finding their way back. They are seldom burdened. Dogs of other races are used for the same purpose in other parts of the Alps. The St. Bernard dog is of two varieties: the first, which has long white hair with black or tawny spots being few in number.

This famous dog, according to the traditions of the monastery, is the result of a cross between a Danish bull-bitch and a mastiff, a native hill dog, though at what time effected it is impossible to say. After the

breed was once established it was kept pure till 1812. About 1860 these dogs first attracted the attention of English travelers, who imported them to Great Britain, where they were exhibited and at once excited much notice on account of their size and beauty. Others were introduced, and the St. Bernard was soon established as the most popular big dog, a popularity which has gone on increasing. The St. Bernard, as bred to modern English ideas, is an immense red or orange colored dog, marked with white on muzzle, neck, chest, feet, and tip of tail. The head should be massive and imposing, with a strong square muzzle, a point of great importance. Legs should be straight, with large feet, and double or, at least, single dew claws. Hind feet should turn out, though not sufficiently to hinder the dog's movements. The coat of the rough variety is of medium length; it should not be too curly. In the smooth variety the coat should be short and wiry. Many of the finest St. Bernards measure over 30 inches high at the shoulder and weigh over 150 pounds. On account of his great size and weight the St. Bernard often moves in an awkward manner, a defect which should be avoided. St. Bernards, though occupying a great deal of space, are so handsome that they are kept as companions in great numbers; as a rule they are good tempered, though many are not to be trusted.

**Bernard of Chartres**, surnamed SYLVESTRIS, a writer of the 12th century, has been lauded as the ablest Platonic of his time, and wrote two works, now lost, in one of which he endeavored to reconcile Plato and Aristotle, and in the other he maintained the doctrine of a Providence, and proved that all material beings, possessing a nature subject to change, must necessarily perish. Another work under the name of Bernard Sylvestris still exists, and is composed of two parts, distinguished by the names of "Megacosmus" and "Microcosmus," or the "Great World" and the "Little World." He reduces all things to two elements—matter and ideas. Matter is in itself devoid of form, but susceptible of receiving it; ideas reside in the divine intellect and are the models of life, and from their union with matter all things result.

**Bernard of Treviso**, an Italian alchemist, born in Padua in 1406. His most important work was "Treatise on the Most Secret Chemical Labor of the Philosophers." He died in 1490.

**Bernardine**, the name given to the Cistercian monks, a branch of the old Benedictines, from St. Bernard, who, entering the order, gave it such an impulse that he was considered its second founder. His Order was revived in 1664 by Armand Jean Bouthelier de Rance, and long flourished



under the name of the Reformed Bernardines of La Trappe.

**Bernardakis, Demetrios** (ber-när'dä-kis'), a Greek poet, dramatist, and scholar, born at Santa Marina, Lesbos, Dec. 2, 1834. After a course of study at Athens and in German universities, he was (with one considerable intermission) Professor of History and Philology in the University of Athens from 1861 to 1882, when he went back of Lesbos. He is author of a spirited Pindaric ode for a jubilee occasion, of several dramas, and of a satire, "The Battle of Cranes and Mice;" he has also written a "Universal History," a "Church History," and a spirited tractate, "Confutation of a False Atticism," directed against the would-be Attic purists.

**Bernardes, Diogo** (ber-när'des), a Portuguese poet, born in Ponte de Lima, about 1530. He was called, in his day, "the Sweet Singer of the Lima," a streamlet immortalized in his verse. He left his native valley in 1550 and attached himself to the master singer, Sá de Miranda, who lived retired on his estate, Quinta da Tapada, a devotee of the Muses. Here Bernardes composed verses of all kinds, elegies, sonnets, odes, songs, full of tender sympathies and perfect melody. Here he wrote "The Lima," "Various Rimes — Flowers from Lima's Banks," "Various Rimes to the Good Jesu." He died in 1605.

**Bernardino, St.**, of Siena, born in 1380 at Massa-Carrara, of a distinguished family, made himself famous by his rigid restoration of their primitive rule among the degenerate order of the Franciscans, of which he became a member in 1404. In 1438 he was appointed Vicar-General of his Order for Italy. Bernardino was unweariedly devoted in his activity during the great Italian plague of 1400, both as an impressive preacher and an attendant upon the sick and dying. He founded the Fratres de Observantia, a branch of the Franciscan Order, which numbered more than 300 monasteries in Italy during his day. He died in 1444, and was canonized in 1450.

**Bernardo del Carpio**, a half legendary Spanish hero of the 9th century, son of Ximena, sister of Alphonso the Chaste, by Don Sancho of Saldagua. Alphonso put out the eyes of Don Sancho and imprisoned him, but spared Bernardo, who distinguished himself in the Moorish wars, and finally succeeded in obtaining from Alphonso the Great the promise that his father should be given up to him. At the appointed time his father's corpse was sent him, and Bernardo in disgust quitted Spain for France, where he spent the remainder of his life as a knight errant.

**Bernauer, Agnes** (ber'nour), the daughter of a poor surgeon of Augsburg, secretly

married, in 1432, to Duke Albrecht of Bavaria, only son of the reigning Duke Ernst. Their happiness was undisturbed till Albrecht's father, becoming aware of his son's attachment, had the knightly lists shut against him, as one who was living with a woman in licentiousness. Albrecht then caused Agnes to be recognized as Duchess of Bavaria; but, in her husband's absence, Duke Ernst had Agnes tried for sorcery, condemned for having bewitched Albrecht, and drowned in the Danube in the presence of the whole people, Oct. 12, 1435. Albrecht took up arms against his father; but after a year of war he was prevailed on to return to his father's court, and ultimately consented to marry Anna of Brunswick.

**Berner.** See BERN.

**Berners, John Bouchier, Lord**, an English baron, a descendant of the Duke of Gloucester, youngest son of Edward III.; born in 1474; member of Parliament 1495-1529; aided in suppressing Cornish insurrection, 1497; Chancellor of Exchequer, 1515; ambassador to Spain, 1518; for many years governor of Calais; died 1532. He translated "Froissart's Chronicles" (1523-1525), and other works, his translation of the former being a sort of English classic.

**Berners, Lady Juliana**, an English author; daughter of Sir James Berners, who was beheaded in the reign of Richard II. She is said to have been born in Essex and to have flourished in the 15th century. She was celebrated for her beauty, spirit, and passion for field sports. Little is known of her life excepting that she was prioress of the nunnery of Sopewell, near St. Alban's, and was the author of what was probably the earliest sporting book issued from the English press, which was entitled "The Treatyses pertynyng to Hawkyng, Huntynge, and Fysshynge with an Angle." It was reprinted in 1486 under the title of the "Boke of St. Alban's," and was several times reprinted in the 16th century, becoming a popular manual of sporting life.

**Bernhard**, Duke of Saxe-Weimar, a German military officer; born in 1604. He entered the army, and early distinguished himself. After being engaged in several affairs of minor importance, he joined the army of Gustavus Adolphus in 1631, in the war against the house of Austria. He took part in the siege of Würzburg, assisted at the passage of Oppenheim, took Mannheim, and drove the enemy from the Palatinate. He began the conquest of Bavaria, completed the victory of Lützen after the fall of Gustavus, and drove the Austrians from Saxony. He afterward had a command subordinate to Marshal Horn, and was harassed by intrigues. He took Ratisbon, which was soon lost, and, with Horn, was defeated at Nordlingen, in September,



## Bernhard

1634. Soon after he accepted a subsidy from the King of France, and concerted operations with Richelieu. In 1638 he won the battle of Rheinfeld, and took Alt-Breisach. He died in 1639.

**Bernhard, Karl** (bärn'här), pseudonym of NICOLAI DE SAINT AUBAIN, a celebrated Danish novelist, born in Copenhagen, Nov. 18, 1798. His induction into the republic of letters was under the auspices of his noted kinswoman, Madame Gyllembourg. The poet Heiberg was his uncle; the nephew has almost overshadowed the older writer through the brilliance of "The Favorite of Fortune," "Two Friends," "For and Against," and many other novels, all founded either on historical occurrences or the author's observations of contemporary life. He died in Copenhagen, Nov. 25, 1865.

**Bernhardi, Theodor von** (bern-här'dē), a German historian and diplomat, born in Berlin, Nov. 6, 1802. His diplomatic career was important, and afforded him special facilities for compiling a "History of Russia and of European Politics During the Years 1814-1831" (1863-1877); "Frederick the Great as a Military Commander" (1881), and similar works, all of value. He died at Kunersdorf, Silesia, Feb. 12, 1887.

**Bernhardt, Rosine Sarah**, a French actress, born in Paris, Oct. 22, 1844. At an early age her Jewish parents placed her in a convent at Versailles. When 14 years old she left the convent, and entered the Paris Conservatoire, and there studied tragedy and comedy. In 1862 she made her



SARAH BERNHARDT.

debut at the Theatre Français, in Racine's "Iphigène" and Scribe's "Valerie," but, not achieving a success, she retired for a time from the stage. Her first great success was as Marie de Neuberg, in Victor Hugo's "Ruy Blas," in January, 1867. Becoming very popular by her representations, notably in "Andromaque" and "La Sphinx," she was recalled to the Français, and was soon recognized as the foremost actress in French tragedy. In 1879 she visited London with the company of the Comedie Française and was warmly received; in 1880, 1887, 1891, 1896, 1900, and 1910 made successful tours in the United States, and be-

## Bernini

tween and after these dates visited Switzerland, Holland, South America, Italy, Algeria, Australia, etc. In 1899 she appeared in a new rendering of "Hamlet" in Paris, and scored a most flattering triumph. She has also done considerable work in painting, sculpture, and literature.

**Bernhardy, Gottfried**, a German classical philologist, born in Landsberg-on-the-Warthe, March 20, 1800. He lectured very brilliantly at the leading universities, his principal works being "Greek Syntax Scientifically Considered" (1829), a historical study of the subject; "Outlines of Roman Literature" (5th ed., 1872); "Outlines of Greek Literature" (part i, 5th ed., 1892; part ii, 2d-3d ed., 1876-1880; part iii wanting), and a supplement to the first named treatise, entitled "Paralipomena [Omission] in [the Work on] Greek Syntax" (1854-1862); although he has written many other important books. He died in Halle, May 14, 1875.

**Berni, Francesco**, an Italian poet, born in Tuscany in 1490. He remodeled Boiardo's "Orlando Innamorato," and was the author of "Rime Burlesche." The gracefulness and purity of his diction have been seldom equaled; his humor, though broad, is not low; and though his themes or allusions are often licentious, his works display many traits of moral feeling, which would do no discredit to a better age. He died in 1536.

**Bernicia**, a Latinized form of the English word Bryneich, used to indicate the N. part of what became the kingdom of Northumbria, the part N. of the Tees. The Anglian kingdom of Bernicia is said to have been founded by Ida, who made his capital at Bamborough about 550 A. D.

**Bernier, Francois** (bern-yā'), a French physician and traveler, born in Angers about 1625; set out on his travels in 1654, and visited Egypt, Palestine, and India, where he remained for 12 years as physician to the Great Mogul Emperor Aurungzebe. After his return to France he published his "Travels," an abridgment of the philosophy of Gassendi, a "Treatise on Freedom and Will," and other works. He died in Paris in 1688.

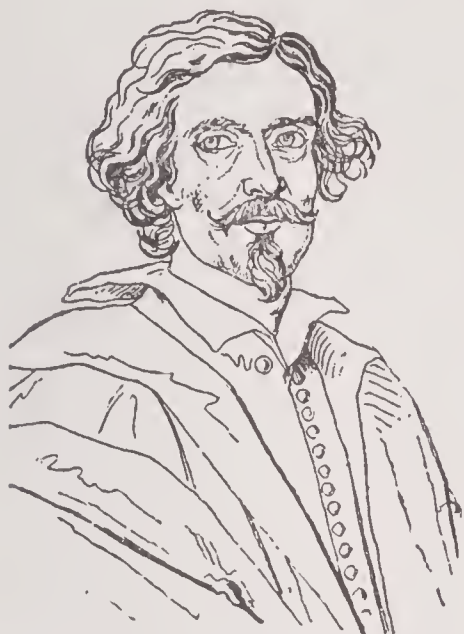
**Bernina**, a mountain of the Rhætian Alps, 13,290 feet high, in the Swiss canton of Grisons, with remarkable and extensive glaciers. Its summit was first attained in 1850. The Bernina Pass, which attains an elevation of 7,642 feet, and over which a carriage road was completed in 1864, leads from Pontresina to Poschiavo.

**Bernini, Giovanni Lorenzo** (known also as IL CAVALIERE BERNINI), an Italian painter, born in Naples in 1598, and obtained, among his contemporaries, the reputation of being the modern Michael Angelo, on account of



## Bernis

his success as painter, statuary, and architect. At the age of 18, he produced the "Apollo and Daphne," in marble, a masterpiece of grace and execution. Being ap-



GIOVANNI LORENZO BERNINI.

pointed architect of Urban VIII., he executed many works in St. Peter's; built the palace Barberini and the Campanile of St. Peter's; visited Paris in 1665, his journey being a triumphal procession; at 70 executed the monument of Alexander VII., and 10 years later sculptured

the figure of Christ in bas relief for Queen Christina, continuing in the indefatigable pursuit of his art, as sculptor and architect, till his death, in 1680.

**Bernis, François Joachim de Pierres de** (ber-né'), a French cardinal and minister of Louis XV., born in 1715. Madame de Pompadour presented him to Louis XV., who assigned him an apartment in the Tuileries, with a pension of 1,500 livres. After winning credit in an embassy to Venice he rose rapidly to the position of Minister of Foreign Affairs, and is possibly to be credited with the formation of the alliance between France and Austria which terminated the Seven Years' War. The misfortunes of France being ascribed to him he was soon afterward banished from court, but was made Archbishop of Alby in 1764, and in 1769 Ambassador to Rome, where he remained till his death. When the aunts of Louis XVI. left France in 1791 they fled to him for refuge, and lived in his house. The Revolution reduced him to a state of poverty, from which he was relieved by a pension from the Spanish court. His verse procured him a place in the French Academy. The correspondence of Bernis with Voltaire contains matter of interest. He died in 1794.

**Bernouilli, or Bernoulli** (ber-nö-yē), a family which produced eight distinguished men of science. The family fled from Antwerp during the Alva administration, going first to Frankfort, and afterward to Basel. 1. JAMES, born in Basel in 1654, became professor of mathematics there 1687, and died 1705. He applied the differential calculus to difficult questions of geometry and mechanics; calculated the loxodromic and catenary curve, the logarithmic spirals, the

## Bernouilli

evolutes of several curved lines, and discovered the so-called numbers of Bernouilli. 2. JOHN, born in Basel, in 1667, wrote with his brother, James, a treatise on the differential calculus; developed the integral calculus, and discovered, independently of Leibnitz, the exponential calculus. In 1694 he became Doctor of Medicine in Basel, and in 1695 went, as Professor of Mathematics, to Groningen. After the death of his brother he received the professorship of mathematics in Basel, which he held until his death in 1748. 3. NICHOLAS, nephew of the former, born in Basel in 1687; in 1705 went to Groningen to John Bernouilli, and, returning with him to Basel, be-



JOHN BERNOUILLI.

came there professor of mathematics. On the recommendation of Leibnitz he went as professor of mathematics to Padua in 1716, but returned to Basel in 1722 as professor of logic, and in 1731 became professor of Roman and feudal law. He died in 1759. The three following were sons of the above mentioned John Bernouilli: 4. NICHOLAS, born in Basel, in 1695, became professor of law there in 1723, and died in St. Petersburg in 1726. 5. DANIEL, born at Groningen in 1700; studied medicine. At the age of 21 he went to St. Petersburg, returning in 1733 to Basel, where he became professor of anatomy and botany, and in 1750 professor of natural philosophy. He retired in 1777, and died in 1782. 6. JOHN, born in Basel in 1710, went to St. Petersburg in 1732, became professor of rhetoric in Basel in 1743, and in 1748 professor of mathematics. He died in 1790. The two following were his sons: 7. JOHN, licentiate of law and royal astronomer in Berlin, born in Basel in 1744. He lived after 1779 in Berlin as Director of the Mathematical Department of the Academy. He died in 1807. 8. JAMES, born at Basel in 1759; went to St. Petersburg, where he be-



## Bernstein

came professor of mathematics; married a grand-daughter of Euler, and died in 1789 while bathing in the Neva.

**Bernstein, Aaron**, a German publicist and novelist, born in Dantzie, in 1812. He was in politics a Radical, and in religion a Reformer, and his life was a continued battle against obscurantism and conservatism. Yet he wrote some charming stories of life among the Jews, among them "Mendel Gibbor" (1860). He wrote also some notable historical sketches, as "The People's Years" and "The Years of Reaction." He died in 1884.

**Bernstorff, Johann Hartwig Ernst, Count**, a celebrated statesman in the service of the King of Denmark, born in Hanover, in 1712. He was employed in divers embassies, and afterward held the office of foreign minister to Frederick V. for about 20 years, resigning in 1770. He died in 1772.

**BERNSTORFF, ANDREAS PETER, COUNT**, nephew of the above, born in 1735; also in the service of the King of Denmark. He was appointed Prime Minister in 1769, when he ceded to Russia the Gottorp part of Holstein in exchange for Oldenburg and Delmenhorst. He introduced a new system of finance, and prepared the abolition of villanage in Schleswig and Holstein. He died in 1797.

**Beroë** (ber-ō'ē), a daughter of Oceanus; also the name of several women connected with Thrace, Illyria, etc.; also a genus of animals, the typical one of the family *beroidæ*. The beroes are oval or globular ribbed animals, transparent and gelatinous, with cirri from pole to pole, and two long tentacles fringed with cirri, which aid them in breathing and in locomotion. They have a mouth, a stomach, and an anal aperture. They are free swimming organisms inhabiting the sea, sometimes rotating, and at night phosphorescent.

**Berosus**, a priest of the Temple of Belus at Babylon early in the 3d century B. C., who wrote in Greek a history of the Babylonian Chaldeans founded on the ancient archives of the Temple of Belus. It is known only by the quotations from it in Apollodorus, Eusebius, Josephus, etc.

**Berosus**, a genus of beetles belonging to the family *hydrophilidæ*. They have prominent eyes, a narrow thorax, a dusky yellow hue, with dark, metallic bronze markings. They swim in ponds, often in an inverted position.

**Berquin, Louis de** (ber-kan'), the first Protestant martyr in France, born in 1490. He was a gentleman of Artois, a friend of Badius, the savant. When, in 1523, the police began to seize Luther's works, with a view to suppressing Protestantism, they found among Berquin's books some manu-

## Berrien

scripts of his own writing that were pronounced heretical. As he refused to retract, he was thrown into prison. Francis I., whose counsellor he was, obtained for him his freedom; and Erasmus, always his friend, tried in vain to prevent him from exposing his life in a useless struggle. His fixed opinions and intrepid nature, however, having thrown him into prison three times, caused him to be condemned to death. He was burned alive in Paris, April 17, 1529.

**Berri, or Berry, Charles Ferdinand Duc de**, second son of the Comte d'Artois (afterward Charles X.), born at Versailles, Jan. 24, 1778. In 1792 he fled with his father to Turin and served under him and Condé on the Rhine. In 1801 he went to Great Britain, where he lived alternately in London and Scotland, occupied with plans for the restoration of the Bourbons. In 1814 he landed at Cherbourg, and passed on to Paris, gaining many adherents to the royal cause; but they melted away when Napoleon landed from Elba, and the Count was compelled to retire with the household troops to Ghent and Alost. After the battle of Waterloo he returned to Paris, and, in 1816, married. He was assassinated by Louvel, a political fanatic, Feb. 14, 1820. The Duke had by his wife, Carolina Ferdinanda Louisa, eldest daughter of Francis, afterward King of the Two Sicilies, a daughter, Louise Marie Thérèse, afterward Duchess of Parma, and a posthumous son, subsequently known as Comte de Chambord.

**Berri, or Berry, Caroline Ferdinande Louise, Duchesse de**, widow of the second son of Charles X. of France; daughter of Francis I. of the Two Sicilies; born Nov. 5, 1798. Her futile attempt at insurrection in 1832, to place her son on the French throne, caused her imprisonment and subsequent withdrawal to Sicily. She died April 17, 1870.

**Berrian, William**, an American Episcopal clergyman and writer, born in New York in 1787; was rector of Trinity Church, New York (1830-1862). Besides various religious works, he wrote "Travels in France and Italy" and a "Historical Sketch of Trinity Church." He died in New York City, Nov. 7, 1862.

**Berrien, John McPherson**, an American statesman, born in New Jersey, Aug. 23, 1781; graduated at Princeton College in 1796, and was admitted to the bar in Georgia when 18 years old. He became Solicitor of the Eastern District of Georgia in 1809, and was Judge of that district in 1810-1821. He represented Georgia in the United States Senate in 1825-1829 and 1840-1852; was Attorney-General of the United States in 1829-1831, and a delegate



to the Baltimore Convention in 1844. In 1829 he delivered a speech so clear and impressive against certain measures before Congress that the title of "American Cicero" was given him. He died in Savannah, Ga., Jan. 1, 1856.

**Berro, Bernardo Prudencio**, an Uruguayan statesman, born in Montevideo about 1800. In 1852 he was Vice-President and President of the Senate. Under Giro he was Minister of Government till the Revolution of 1853; again President of the Senate in 1858, and President of the republic in 1860-1864. The revolution of Flores was successful soon after the expiration of his term. In 1868 he stirred up a revolt against Flores, was imprisoned, and soon afterward shot through a window in his cell, in April, 1868.

**Berry**, a succulent fruit, in which the seeds are immersed in a pulpy mass inclosed by a thin skin. The name is usually given to fruits in which the calyx is adherent to the ovary and the placentas are parietal, the seeds finally separating from the placenta and lying loose in the pulp. The term, however, is frequently used to include fruits in which the ovary is free and the placentas central, as the grape. Popularly it is applied to fruits like the strawberry, bearing external seeds on a pulpy receptacle, but not strictly berries.

**Berry, Mary**, an English author, daughter of a Yorkshire clerk, born in Kirkbridge, Yorkshire, March 16, 1763; was an intimate friend of Horace Walpole. In 1798 she edited the "Works of Horace Walpole." Her most ambitious work was her "Social Life in England and France," collectively edited in 1844. She died in London, Nov. 20, 1852.

**Berry, Canal de**, one of the most important canals in France as regards the amount of its traffic; begins at Monthuçon on the Cher, the chief trading center of the coal fields of the Allier; descends the Cher valley to St. Amand, then proceeds E., and soon after branches, one branch going N. E. and joining the lateral canal of the Loire about 9 miles N. W. of Nevers, the other branch proceeding N. and rejoining the valley of the Cher, and ultimately entering the Cher itself near St. Aignan, below which point the canalized Cher continues the line of navigation to Tours. Length of navigation 200 miles, of which 36½ miles belong to the canalized Cher. Constructed 1807-1841.

**Berryer, Antoine Pierre** (ber-yā'), a French advocate and statesman, born in Paris in 1790. In 1814 he proclaimed at Rennes the deposition of Napoleon, and remained till his death an avowed Legitimist. He assisted his father in the defense of Ney, secured the acquittal of General Cam-

bronne, and defended Lamennais from a charge of atheism. His eloquence was compared with that of Mirabeau, and, after the dethronement of Charles X. (1830), he remained in the Chamber as the sole Legitimist orator. His political services won for him a public subscription of 400,000 francs in 1836 to meet his pecuniary difficulties. In 1840 he was one of the counsel for the defense of Louis Napoleon after the Boulogne fiasco. In 1843 he did homage to the Comte de Chambord in London, adhering to him through the Revolution of 1848, and voting for the deposition of the Prince-President the morning after the *coup d'état*. He gained additional reputation in 1858 by his defense of Montalembert, and was counsel for the Patterson-Bonapartes in the suit for the recognition of the Baltimore marriage. In 1863 he was re-elected to the Chamber with Thiers, and in 1864 received a flattering reception in England. He died in 1868.

**Bersaglieri** (ber-sal-yā'rē), a corps of riflemen or sharpshooters, introduced into the Sardinian army by Gen. Della Marmora, about 1849. They took part in the Russian War and also assisted at the battle of the Tchernaya, Aug. 16, 1855. They were likewise employed in the Italian Wars of 1859 and 1866.

**Berserker**, a redoubtable hero, the grandson of the eight-handed Starkader and the beautiful Alfhilde. He despised mail and helmet, and, contrary to the custom of his time, went always into battle unharnessed, his fury serving him instead of defensive armor. By the daughter of King Swafur-lam, whom he had slain in battle, he had 12 sons, who inherited the name of Berserker along with his warlike spirit.

**Bersezio, Vittorio** (ber-sets'yō), an Italian novelist and playwright, born at Peveragno, Piedmont, in 1830. Both as a writer of tales and of comedies he is conspicuous for vivid and faithful delineation of Piedmontese life; especially in his dialect comedies, among which "The Misfortunes of Monssù Travett" is considered to be his masterpiece. He also wrote an excellent historical work, "The Reign of Victor Emmanuel II." (1878-1893).

**Bert, Paul**, a French statesman and physiologist, born in Auxerre, Oct. 17, 1833. He studied both law and medicine, became assistant to Claude Bernard at the College of France, and successively occupied the chairs of Physiology at Bordeaux and Paris. Entering political life in 1870, on the proclamation of the republic, he was four times re-elected to the Chamber. He brought forward laws removing primary instruction from the control of the religious orders, and making it compulsory. During the premiership of Gambetta he held the



## Berthelot

post of Minister of Public Instruction and Worship. While engaged in public life, M. Bert still pursued with ardor his scientific investigations, attracting world-wide attention by his experiments in vivisection. Appointed by the French Ministry to the governorship of Tonquin and Annam, he went out there in 1886, but died Nov. 11, of the same year. The anti-religious views of M. Bert excited much controversy. He was also the author of several works on anatomy and physiology, and of numerous educational and political writings. He rendered a service to natural science by the clear and simple style of his text-books. M. Bert was a member of the French Academy of Sciences, and of many other distinguished bodies at home and abroad.

**Berthelot, Pierre Eugene Marcellin** (ber-tel-ō'), a French chemist, born in Paris, Oct. 25, 1827; early studied chemistry, and in 1859 was appointed Professor of Organic Chemistry in the Superior School of Pharmacy. In 1865 a new chair of organic chemistry was organized for him in the College of France. In 1870 he was elected president of the scientific committee of defense, and during the siege of Paris was entrusted with the manufacture of ammunition and guns, and especially dynamite and nitroglycerine. In 1878 he became president of the committee on explosives, which introduced smokeless powder. His labors also led to the discovery of dyes extracted from coal tar. He received the decoration of the Legion of Honor in 1861; was made Commander in 1879, and Grand Officer in 1886. In 1889 he was elected Permanent Secretary of the Academy of Sciences. He has contributed to the knowledge of synthetical processes and to the relations between the phenomena of heat and of chemistry. His works include: "*Chimie organique fondée sur la synthèse*" (1860); "*Leçons sur les principes sucrés*" (1862); "*Leçons sur l'isomerie*" (1865); "*Traité élémentaire de chimie organique*" and "*Sur la force de la poudre et des matières explosives*" (1872 and 1889); "*Vérification de l'aréomètre de Baume*" (1873); "*Les Origines de l'alchimie*" (1885); "*Collection des anciens alchimistes grecs*" (1888); etc. He died March 18, 1907.

**Berthier, Alexander**, Prince of Neufchatel and Wagram, Marshal, Vice-Constable of France, etc.; born in Versailles, Nov. 20, 1753; son of a distinguished officer; was, while yet young, employed in the general staff, served in America, and fought with Lafayette for the liberty of the United States. In the first years of the French Revolution he was appointed Major-General in the National Guard of Versailles, and conducted himself in this post with uniform

## Berthier

moderation. On Dec. 28, 1791, he was appointed chief of the general staff in the army of Marshal Luckner; marched against La Vendée in 1793; joined the army of Italy in 1795; and as general of division and chief of the general staff contributed much to the success of the campaign. In October, 1797, General Bonaparte sent him to Paris to deliver to the Directory the treaty of Campo Formio. In January, 1798, he received the chief command of the army of Italy, and was ordered by the Directory to march against the dominions of the Pope. In the beginning of February he made his entrance into Rome, abolished the papal government, and established a consular one. Being much attached to General Bonaparte, he followed him to Egypt as chief of the general staff.

After the 18th of Brumaire, Bonaparte appointed him minister of war. He afterward became general-in-chief of the army of reserve; accompanied Bonaparte to Italy in 1800; and contributed to the passage of St. Bernard and the victory at Marengo. He signed the armistice of Alessandria, formed the provisional government of Piedmont, and went on an extraordinary mission to Spain. He then received again the department of war, which, in the meantime, had been in the hands of Carnot. He accompanied Napoleon to Milan, June, 1805, to be present at his coronation, and in October was appointed chief of the general staff of the grand army in Germany. On Oct. 19 he signed the capitulation of Ulm with Mack, and Dec. 6 the armistice of Austerlitz. Having in 1806 accompanied the emperor in his campaign against Prussia, he signed the armistice of Tilsit, June, 1807. He afterward resigned his post as minister of war, and having been appointed vice-constable of France, married, in 1808, Maria Elizabeth Amelia, daughter of Duke William of Bavaria-Birkenfeld, and continued to be the companion of Napoleon in all his expeditions.

In the campaign against Austria in 1809, he distinguished himself at Wagram, and received the title of Prince of Wagram. In 1810, as proxy of Napoleon, he received the hand of Maria Louisa, daughter of the Emperor Francis I., and accompanied her to France. Somewhat later Napoleon made him colonel-general of the Swiss troops. In 1812 he was with the army in Russia as chief of the general staff, which post he also held in 1813. After Napoleon's abdication he lost his principality of Neufchatel, but retained his other honors, and possessed the favor and confidence of Louis XVIII., whom, after Napoleon's return, he accompanied to the Netherlands, whence he repaired to his family at Bamberg, where he arrived May 30. After his arrival at this place, he was observed to be sunk in a profound melancholy; and when, on the afternoon of June



1, the music of the Russian troops on their march to the French borders was heard at the gates of the city, he put an end to his life by throwing himself from a window of the third story of his palace. He left a son, Alexander (born in 1810), one of the most zealous adherents of Napoleon III., and two daughters.

**Berthold, Franz** (ber-töld'), pseudonym of ADELHEID REINBOLD, born in 1802; was a German novelist, warmly appreciated and furthered by Ludwig Tieck. Her story "Fred of the Will-o'-the-Wisp" (1830), met with great favor; after her death appeared "King Sebastian" (1839), a historical romance, and "Collected Tales" (1842). She died in 1839.

**Berthold of Ratisbon**, a celebrated German preacher and Franciscan monk; ranked as the most powerful preacher of his time in the German world. It is said that as many as 60,000 people flocked to hear him in the open fields. His sermons have been preserved. He died in 1272.

**Berthollet** (ber-töl-ā'), **Claude Louis, Comte**, a French chemist, was born in Savoy, Dec. 9, 1748, and studied medicine at Turin. He afterward settled in Paris, where he became intimate with Lavoisier, was admitted a member of the Academy of Sciences, and made a professor at the Normal School. He accompanied Napoleon to Egypt; and, during the empire, was made a Senator and an officer of the Legion of Honor; but he was one of the first to desert his patron when his fortunes were on the decline; and he received the title of Comte from Louis XVIII. His principal work is "Essai de statique chimique" (1803), but he wrote many other valuable essays, and also had a large share in the reformation of chemical nomenclature. He died Nov. 6, 1822.

**Bertholletia**, named after Comte Berthollet, a genus of plants belonging to the order *lecythidaceæ*. The only species is a large tree, growing 100 feet high, with a diameter of two feet, found in the forests which fringe the Orinoco. It has yellowish white flowers, with six unequal petals, and a fleshy ring consisting of many white stamina. The fruit is the size of a man's head, with four cells and six or eight nuts. These are called Brazil, or, from the place where they are shipped, Para nuts, are an article of commerce, being eatable, besides furnishing a bland oil used by watchmakers and artists. At Para the fibrous bark of the tree is used in place of oakum for calking ships.

**Bertie, Willoughby**, fourth Earl of Abingdon, born Jan. 16, 1740; was a vigorous opponent in the House of Lords of the policy of England toward the American colonies that culminated in the Revolution;

wrote a famous and very popular tract called "Thoughts on Mr. Burke's Letter on the Affairs of America," was active in promoting favorable legislation for Ireland, and sympathized with the French Revolution. He died Sept. 26, 1799.

**Bertillon, Alphonse** (ber-tē-yôn'), a French anthropologist, born in Paris in 1853; is widely noted as the founder of a system of identification of criminals. In 1880, while Chief of the Bureau of Identification in the Prefecture of Police, he established his system of measurements which has given results marvelous for their precision. The system has since been adopted by the police authorities of the large cities of Europe and the United States. He was one of the expert witnesses in handwriting in the trial of Capt. Dreyfus in 1899, and soon after its close was removed from his office. He was author of numerous works bearing upon his system, including "Identification anthropometrique" (1893).

**Bertillon System**, a system of identification of criminals, introduced into France by Alphonse Bertillon. The system depends upon accurate measurements of various portions of the human body, especially the bones, which in adults never change. The parts measured are the head, ear, foot, middle finger, the extended forearm, height, breadth, and the trunk. These measurements are placed upon a card, and, together with photographs of the bodily features, take the place of the old portraits in the rogues' gallery.

**Bertin, Antoine** (ber-tan), a French poet, born in 1752; much admired by his contemporaries, who, somewhat extravagantly, styled him the French Propertius. He was a friend of Parny, and like him excelled in elegiac and epistolary verse. His principal works are "Voyage in Burgundy" (1777) and "The Loves" (1780). He died in 1790.

**Bertin, Louis François** (called BERTIN L'AINE), a French journalist, born in Paris, Dec. 14, 1766. The Revolution made him a journalist, and in 1799 he started the famous "Journal des Débats." His royalist principles offended Napoleon, and cost him imprisonment and banishment to Elba; thence, however, he escaped to Rome, where he formed a friendship with Châteaubriand. In 1805 he returned to Paris, and resumed the editorship of the "Débats," but was much hampered by Napoleon. The second restoration of the Bourbons restored once more to Bertin the free control of his journal, and henceforward he gave almost constant support to the ministerial party. He supported the July monarchy, and edited the "Débats" till his death, Sept. 13, 1841. ARMAND LOUIS MARIE BERTIN, his son, was born in Paris, Aug. 22, 1801, and became, after the Restoration, secretary to Château-



## Bertin

briand, during his embassy in England. In 1820 he joined the editorial staff of the "Journal des Débats," and at his father's death assumed the chief direction. He died at Paris, Jan. 11, 1854.

**Bertin, Louise Angelique**, a French musician and composer, born near Bievres, Jan. 15, 1805; composed "Faust," "Esmeralda," and other operas. She died in Paris, April 26, 1877.

**Bertrand, Eugène**, a French operatic manager, born in 1835. He made his debut as an actor in 1857; but subsequently became a manager, and introduced Adelina Patti to the French, as well as many other noted singers. In 1892 he was named director of the Paris Opera House, producing "La Belle Helene" (for the first time), "Salammbô," and "Samson and Delilah." He died in Paris, Jan. 21, 1900.

**Bertrand** (ber-trän'), **Henri Gratien, Comte**, a French military officer, born in Châteauroux in 1773, and early entered the armies of the Revolution as engineer. He accompanied the expedition to Egypt, and directed the fortification of Alexandria. He distinguished himself at Austerlitz and became Napoleon's adjutant; and, after the battle of Aspern, in 1809, for his share in saving the French army by bridges, he was created count and governor of Illyria. After serving with credit in the subsequent campaigns, he retired with the Emperor to Elba, was his confidant in carrying out his return to France, and finally shared his banishment to St. Helena. On Napoleon's death, Bertrand returned to France, where, though sentence of death had been pronounced upon him—a sentence which Louis XVIII. had wisely recalled—he was restored to all his dignities, and, in 1830, appointed Commandant of the Polytechnic School. In 1840, he formed part of the expedition which brought back the remains of Napoleon to France. He died in Châteauroux, Jan. 31, 1844.

**Bervic, Charles Clément**, a French engraver, born in Paris in 1756; made himself famous by a full length engraving of Louis XVI., from the picture by Callet, one of the finest works of the kind ever produced, in 1790. He died March 23, 1822.

**Berwick**, or more fully, **Berwick-on-Tweed**, a seaport town of England, formerly a Parliamentary borough and (with small adjoining district) a county by itself, but now incorporated with Northumberland, and giving name to a Parliamentary division of the county. It stands on the N. or Scottish side of the Tweed, within half a mile of its mouth. It is surrounded by walls of earth faced with stone, along which is an agreeable promenade; the streets are mostly narrow, straggling, and irregular. The Tweed is crossed by an old bridge of

## Berzelius

15 arches and by a fine railway viaduct. The chief industries are iron founding, the manufacture of engines and boilers, agricultural implements, feeding cake, manures, ropes, twine, etc.; there is a small shipping trade. In the beginning of the 12th century, during the reign of Alexander I., Berwick was part of Scotland, and the capital of the district called Lothian. In 1216 the town and castle were stormed and taken by King John; Bruce retook them in 1318; but, after undergoing various sieges and vicissitudes, both were surrendered to Edward IV. in 1482, and have ever since remained in possession of England. Pop. 13,995.

**Berwick, James Fitzjames, Duke of**, born in 1670; was a natural son of James II., King of England, and Arabella Churchill, sister of the Duke of Marlborough. His first military service was under Charles, Duke of Lorraine, in Hungary, and he was present at the siege of Buda, and the battle of Mohacz. He was created Duke of Berwick in 1687; accompanied James II. to France, at the Revolution, served under him in Ireland, and was at the battle of the Boyne. He became Lieutenant-General in the French army, was naturalized in France, afterward commanded in Spain, and by the victory of Almanza secured the throne to Philip V. He especially distinguished himself by the defense of Provence and Dauphiny, in 1709, against the superior forces of the Duke of Savoy, which has always been regarded as a triumph of strategic skill. He was killed at the siege of Philipsburg, in 1734.

**Beryl**, a colorless, yellowish, bluish or less brilliant green variety of emerald, the prevailing hue being green of various shades, but always pale, the want of color being due to absence of chromium, which gives to the emerald its deep, rich green. Its crystals, which are six sided, are usually longer and larger than those of the precious emerald, and its structure more distinctly foliated. The best beryls are found in Brazil, in Siberia, and Ceylon, and in Dauria, on the frontiers of China. Beryls are also found in many parts of the United States. Some of the finer and transparent varieties of it are often called aquamarine.

**Beryllium**, a rare white malleable metal, the same as glucinum. It does not decompose water. Its melting point is below that of silver. It is dissolved by caustic potash and dilute acids with the solution of hydrogen. It occurs as a silicate in phenacite, also in the mineral beryl along with aluminum silicate.

**Berzelius, Johann Jakob, Baron**, a Swedish chemist, born in Ostgothland, Aug. 29, 1779. After graduating at Upsala, in 1804, he went to Stockholm, where he became an assistant to Sparrmann, who had



accompanied Captain Cook in one of his voyages around the world; and at his death, in 1806, he succeeded him in the chair of chemistry, which he held for 42 years. His patient labors and ingenious investigations have done more to lay the foundations of organic chemistry than those of any other chemist. To him pre-eminently belongs the honor of applying the great principles which had been established by Dalton, Davy, Gay-Lussac, and himself, in inorganic chemistry, to the study of the laws which regulate the combinations forming the structures of the animal and vegetable kingdoms; and of thus opening the way for the discoveries of Mulder, Liebig, Dumas, and others. To him, chemistry is indebted for the discovery of several new elementary bodies, more especially selenium, thorium, and cerium; and to his skill as a manipulator may be traced many of the analytical processes at present in use. All the scientific societies of the world contended for the honor of enrolling his name among their members. He died in Stockholm, Aug. 7, 1848.

**Bes**, an Egyptian god, represented clad in a lion's skin, with the head and skull of the animal concealing his features, and with a dwarfish and altogether grotesque appearance.

**Besançon** (bes-än-sôn'), a city in the N. E. of France, the capital of the Department of Doubs, on the river Doubs. It commands a strong strategic position at the convergence of the roads from Switzerland and the valley between the Vosges and Jura Mountains. It was the fortified town of Vesontio in 58 B. c., when Cæsar expelled the Sequani. In the 5th century it was part of Burgundy, and in 1032 a free city of Franche-Comté. By the peace of Westphalia, in 1648, it was ceded to Spain, but was retaken by Louis XIV., united to France in 1678, and fortified by Vauban. It withstood the Austrians in 1814, and was the seat of operations of the French army under Bourbaki in 1870-1871. It contains Roman remains, including an amphitheater, aqueduct and triumphal arch of Mars, as well as a cathedral of diversified architectural style, and the Renaissance palace of Cardinal Granvelle, who was born in Besançon. Victor Hugo was also a native of Besançon. Watch-making is the principal industry. Pop. (1906) 56,168.

**Besant, Annie** (bes'ant), an English theosophist and author, born in London, Oct. 1, 1847; was married in 1867 to the Rev. Frank Besant, brother of Sir Walter Besant, but was legally separated from him in 1873. She manifested an earnest interest in social and political topics, and, in 1874, became connected with the National Secular Society. Owing to the publication of "Fruits of Philosophy," Mrs. Besant was

prosecuted, in connection with Charles Bradlaugh (June, 1877), but the prosecution failed. Mrs. Besant has since stated her disagreement with the sentiments expressed in this book. In 1883 she announced her adherence to Socialism. For three years she was a member of the School Board of London. She has been prominently connected with various socialistic movements, and a frequent speaker at meetings for workingmen, and in 1889 joined the Theosophical Society, and has since been active in theosophical propaganda in Great Britain and the United States. She visited the United States in 1891 and 1892-1893 and lectured on Madame Blavatsky and reincarnation, and on theosophy and occultism. Among her numerous publications are "Reincarnation" (1892); "Seven Principles of Man" (1892); "Autobiography" (1893); "Death and After" (1893); "Building of the Kosmos" (1894); "In the Outer Court" (1895); "Karma" (1895); "The Self and Its Sheaths" (1895); "Path of Discipleship" (1896); "Man and His Bodies" (1896); "Four Great Religions" (1897); "The Ancient Wisdom" (1897); "Three Paths to Union with God" (1897), etc.

**Besant, Sir Walter**, an English novelist; born in Portsmouth, England, Aug. 14, 1836; was educated in London and at Christ's College, Cambridge, where he graduated with mathematical honors. He was for a time professor in the Royal College, Mauritius. His first work, "Studies in Early French Poetry," appeared in 1868, and to the field of French literature also belong his "French Humorists" (1873), and his "Rabelais" (1877 for the "Foreign Classics" series). He was for years secretary to the Palestine Exploration Fund, and published a "History of Jerusalem" (1871) in conjunction with Professor Palmer, a life of whom he also wrote. The "Survey of Western Palestine" was edited by him. He is best known by his novels, a number of which were written in partnership with the late James Rice, including "Ready-Money Mortiboy" (1872); "This Son of Vulcan"; "The Case of Mr. Luccraft"; "The Golden Butterfly" (1876); "The Monks of Thelema"; etc. After Mr. Rice's death (1882) Sir Walter wrote: "All Sorts and Conditions of Men" (1882), which led to the establishment of the People's Palace in London; "All in a Garden Fair" (1883); "Dorothy Foster" (1884); "The World Went very Well Then" (1887); "The Ivory Gate" (1892); "The Rebel Queen" (1893); "Beyond the Dreams of Avarice" (1895); "The Orange Girl" (1899); "The Alabaster Box" (1900); "The Story of King Alfred" (1901), etc. Among his other works are "The Eulogy of Richard Jeffries" (1888). He labored for many years to promote the interests of all



members of the literary profession, more especially in his capacity as editor of the monthly paper, "The Author." On May 24, 1895, he was knighted. He died in London, June 9, 1901.

**Besika Bay**, a bay on the N. W. coast of Asia Minor, opposite Tenedos, to the S. of the entrance of the Dardanelles. The English fleet was stationed here during crises in the Eastern question in 1853-1854 and 1877-1878.

**Bessarabia**, a Russian Province stretching in a N. W. direction from the Black Sea, between the Pruth and Danube and the Dniester. It was conquered by the Turks in 1474, taken by the Russians 1770, ceded to them by the Peace of Bucharest, 1812; the S. E. extremity was given to Turkey in 1856, but restored to Russia by treaty of Berlin, 1878, in exchange for the Dobrudsha. In the N. the country is hilly, but in the S. flat and low. It is fertile in grain, but is largely used for pasturage. Capital, Kishenef. Pop., chiefly Wallachians, Gipsies and Tartars (1908) 2,344,800.

**Bessarion, John**, a Greek scholar, born in Trebizond in 1395, one of the most eminent restorers of learning in the 15th century, and founder of the library of St. Mark at Venice; was a monk of the Order of St. Basil. He was drawn from his monastery in the Peloponnesus, where he had passed 20 years, to accompany the Emperor John Palæologus to the great council of Florence, where he effected, 1439, a union of short duration between the Greek and Roman Churches. He was made a Cardinal by Pope Eugenius, and had afterward the title of Patriarch of Constantinople given him by Pius II. He spent the last 30 years of his life at Rome, devoting himself to the promotion of literature, and discharging several important embassies. An admirer of Plato, he wrote a work in defense of the Platonic philosophy in answer to George of Trebizond. He died in Ravenna, Nov. 19, 1472.

**Bessel, Friedrich Wilhelm**, astronomer, born in Minden, Prussia, July 22, 1784. He attracted the attention of Olbers by his computation of the orbit of the comet of 1607 from observations which had just been discovered, and was offered the position of assistant in Schröter's observatory; appointed director of the new observatory at Königsberg, where the rest of his active life was passed. His systematic and thorough methods of reducing observations, freeing them from instrumental errors, and correcting them for precession, aberration and nutation, as developed in his reduction of Bradley's observations in the "Fundamenta Astronomiæ" and completed later in the "Tabulæ Regiomontanæ," are still the models on which all such work is done. He first developed the theory of

correcting for instrumental sources of error in all kinds of observations, and almost all the improvements in astronomical accuracy since his time have been only the further carrying out of his ideas. His investigations into the length of the seconds pendulum and that of standards of length were of the highest importance. His triangulation of the Pleiades, his cometary investigations, and many others too numerous to mention here were all of the highest order of accuracy. The later years of his life were largely taken up with this subject of the general connection of all the European triangulations into one consistent system, and from these and from the work of the English in India, he deduced a value for the figure and dimensions of the earth which is probably nearly as accurate as any that we have to-day from all the investigations since. He died in Königsberg, March 17, 1846.

**Bessels, Emil**, a German naturalist, born in Heidelberg, June 2, 1847; was educated in the University of Heidelberg, and while an assistant at the Royal Museum in Stuttgart became interested in the subject of Arctic research. In 1869 he was a member of Petermann's expedition that sailed into the sea between Spitzbergen and Nova Zembla. In 1871 he came to the United States and was appointed both naturalist and surgeon to the expedition under Capt. Charles F. Hall, United States Navy. Most of the scientific results of this expedition were gathered by his personal efforts, and published under the title of "Report on the Scientific Results of the Polaris Expedition" (1876). In 1879 he published a German narrative of the expedition, illustrated with his own sketches. Later he returned to Germany, where he devoted himself to literary pursuits, art and geographical instruction. He died in Stuttgart, March 30, 1888.

**Bessemer**, a town in Jefferson co., Ala.; on several trunk railroads; 11 miles S. W. of Birmingham, the county-seat. It was founded in 1887 as a manufacturing place because of the valuable iron and coal mines in its immediate vicinity. It contains iron foundries, coke ovens, a number of blast furnaces, machine shops, planing mills, iron pipe works, fire brick works and other works connected with the iron and steel industry. It is the seat of Montezuma University and Medical College, and has a savings bank, several daily and weekly newspapers and a property valuation of \$2,500,000. Pop. (1900) 6,358; (1910) 10,864.

**Bessemer**, city and county-seat of Gogebic co., Mich., on the Chicago and Northwestern and several other railroads; 40 miles E. of Ashland, Wis. It is in an important iron mining and lumbering region; was founded in 1884, and has become important



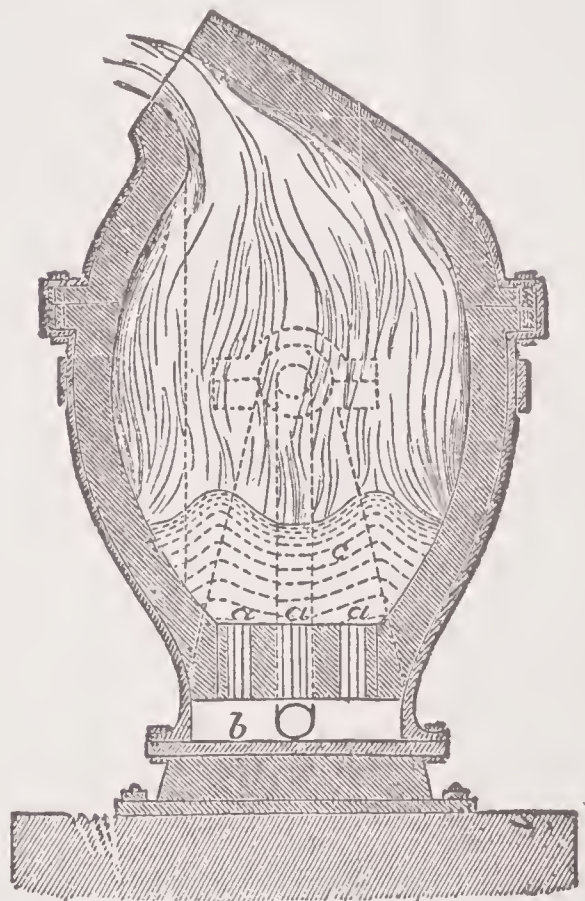
by reason of its mining and manufacturing and its trade relations with the surrounding territory. It has a notably fine high school building, stone court-house, a National bank, and weekly newspapers. Pop. (1900) 3,911.

**Bessemer, Sir Henry**, an English inventor, born in Charlton, Hertfordshire, Jan. 19, 1813; began modeling and designing patterns when 18 years old; chose engineering as a profession, and, after long and costly experiments, announced, in 1856, his discovery of a means of rapidly and cheaply converting pig iron into steel, by blowing a blast of air through the iron when in a state of fusion (see BESSEMER STEEL). For this discovery the Institution of Civil Engineers awarded him the Gold Telford Medal, and several foreign governments honored him with valuable tokens. In the United States appreciation of his great discovery took the form of creating industrial cities and towns under his name. He was elected President of the Iron and Steel Institute of Great Britain in 1871; knighted by the Queen in 1879, and received the freedom of the city of London in 1880. He died in London, March 15, 1898.

**Bessemer Steel**, steel made from pig iron, from which practically all the carbon, etc., has been removed by exposing the molten mass to a current of air. The Bessemer process, that of Sir Henry Bessemer, patented 1856, is the boldest and most noted attempt as yet made to improve on the older methods of making both malleable iron and steel. Bessemer's first idea was to blow air through molten pig iron till practically the whole of the carbon was oxidized when malleable iron was required, and to stop the blowing when a sufficient degree of decarburization was effected in order to produce steel. By this process, steel has been produced ranging from 1.00 per cent. carbon to .08 per cent. carbon, the former being a steel suitable for springs, and the latter a soft material replacing wrought iron, rail steel usually containing .4 to .5 per cent. carbon. But serviceable steel can not be made by the plan first specified by Bessemer except from the best charcoal iron, such as the Swedish. In England, where charcoal iron is not used for this purpose, the process can be successfully conducted only by first oxidizing the whole of the carbon and silicon, and then restoring the proper amount of carbon by the addition of a small quantity of a peculiar manganiferous iron, of known composition, called spiegeleisen. Moreover, until recently, hematite pig was the only kind of English pig iron which could be employed, as that made from clay ironstone contained too much phosphorus and sulphur; but by the Thomas Gilchrist modifi-

cation of the Bessemer process impure ores can now be employed.

*Process of Manufacture.*—The various steps in the Bessemer process, as at present conducted, are as follows: Pig iron is melted either in a cupola or taken direct from blast furnace, and run in the liquid state into a converting vessel. The converter, as it is called, is a steel shell, lined with a silicious material called "ganister," and is suspended on trunnions, so as to admit of its being turned from an upright to a horizontal position by means of hydraulic cylinder. The capacity of a converter varies from 3 to 17 tons. In the bottom there are 10 to 16 tuyers, each with 7 to 10 holes of about one-half inch in diameter, through which air is blown with a pressure of from



BESSEMER CONVERTER.

a a a, tuyers; b, air-space; c, melted metal.

18 to 25 pounds per square inch by a blowing engine. The molten iron in the converter is therefore resting, from the first, on a bed of air, the strength of the blast being sufficient to keep it from falling through the tuyers into the blastway. During the blowing off of the carbon at this stage a striking and magnificent effect is produced by the roar of the blast, and the volcanic-like shower of sparks and red hot fragments from the mouth of the converter, as well as by the dazzling splendor of the flame. In 10 or 20 minutes practically the whole of the carbon is removed.

*After the Blow.*—When the blow is finished, the converter is lowered to a horizontal position, and a definite amount of molten spiegeleisen is run in, till it amounts to from 5 to 10 per cent. of the whole charge.



As already stated, the spiegeleisen restores the proper amount of carbon to produce steel suitable for rails. When it is desired to manufacture a soft steel similar in properties to wrought iron, instead of molten spiegeleisen, a small amount of ferro-manganese is added ( $\frac{1}{2}$  per cent.) while pouring the steel into the ladle. There is a circular pit in front of every two converters, with a hydraulic piston in its center, and on its counterpoised arm a large ladle is hung, so that it can sweep the whole circumference. Round this the ingot molds are arranged, and the hydraulic machinery is so conveniently planned that, simply by moving levers, a man standing on a small platform can empty the contents of the huge converters into the ladle, raise or lower the ladle itself, and turn it round from point to point so as to fill the molds by means of a plug in its bottom. The molds are taken from the ingots, which are then sent to heating furnaces, where they are brought to an even and suitable heat, after which they are rolled down in a blooming mill to smaller rectangular sections, which are known to the trade as blooms, billets and slabs. These in turn are again heated and rolled into rails, beams, rods, plates, etc.

*Production in the United States.*—The total production of Bessemer steel ingots in 1908 was 6,116,755 long tons, against 11,667,549 in 1907, and 12,275,830 in 1906, the latter surpassing all previous records in this industry. The decrease in 1908 was attributed to the general business depression and the restriction of railroad operations. Of the ingots produced in 1906, Pennsylvania furnished 4,827,725 tons; Ohio, 3,769,913; Illinois, 1,684,772; and all other States, 1,993,420. The production of all kinds of Bessemer steel rails direct from ingots by the producers of Bessemer steel ingots in 1902 was 2,876,293 gross tons, against a similar production of 2,361,921 tons in 1900, and 1,955,427 tons in 1898. The maximum production of Bessemer steel rails by the producers of Bessemer steel ingots was reached in 1902. The year of next largest production was 1901, when 2,836,273 tons were made. Of the total production of Bessemer rails in 1902, Pennsylvania made 1,148,425 tons, and other States made 1,727,868 tons. A. MONELL.

**Bessey, Charles Edwin**, an American botanist, born in Wilton, O., May 21, 1845; educated at Harvard University; Professor of Botany in the Iowa Agricultural College in 1870–1884; Professor of Botany in the University of Nebraska since 1884. He was also President of the Society for the Promotion of Agricultural Science in 1883–1885; President of the Nebraska Academy of Sciences in 1891; acting Chancellor of the University of Nebraska in 1888–1891; Fellow of the American Association for the Advancement of Science. His publications in-

clude "Reports on Insects" (1873–1874); "Geography of Iowa" (1876); "The Erysiphei of North America" (1877); "Botany for High Schools and Colleges" (1880); "Essentials of Botany" (1884); "Reports of the State Botanist of Nebraska" (1887 to 1892), etc. He was editor in charge of the Department of Botany of "Johnson's Universal Cyclopædia," in 1892–1895.

**Bessièrès, Jean Baptiste** (bes-yâr'), Duke of Istria, a marshal of the French Empire, born of poor parents at Preissac, Aug. 6, 1768. Entering the army in 1792 as a private soldier, in less than two years he had attained the rank of captain. After making the Spanish campaign, he passed into the army of Italy, and soon attracted the notice of Napoleon, who took him to Egypt in 1798, where his conduct at St. Jean d'Acre and Aboukir covered him with glory. At the accession of Napoleon (1804) to the throne, he became Marshal of France. He showed his usual conspicuous courage at Austerlitz, Jena, Eylau, and Friedland, and, raised to the rank of Duke of Istria, commanded in Spain in 1808–1809. In the Russian campaign he led the cavalry of the Guard, and did much by his sleepless courage and presence of mind to save the wreck of the army in the disastrous retreat from Moscow. On the morning of the battle of Lützen (May 1, 1813), he fell mortally wounded by a cannon ball.

**Best, William Thomas**, an English musician, born in Carlisle, Aug. 13, 1826; received his musical training from Mr. Young, the organist of the Carlisle Cathedral. In 1848 he was appointed organist of the Philharmonic Society in Liverpool; in 1852 he went to London and became organist of the Panopticon of Science and Art, and also of the Church of St. Martin-in-the-Fields; in 1854 was organist of Lincoln's Inn Chapel; in 1855, returned to Liverpool, and became organist of St. George's Hall; in 1868 was organist of the Liverpool Musical Society; and in 1872 was again engaged by the Philharmonic Society. He was the author of "The Modern School for the Organ" (1853); "The Art of Organ Playing" (1870); "Arrangements from the Scores of the Great Masters" (1873); "The Organ Student," "Organ Concertos," "Opera and Oratorio Songs," etc. He died in Liverpool, May 10, 1897.

**Bestiary**, the name given to a class of written books of great popularity in the Middle Ages, describing all the animals of creation, real or fabled, composed partly in prose, partly in verse, and generally illustrated by drawings. But they were valuable for the moral allegories they contained, no less than as handbooks of zoological facts. The symbolism which was then so much in vogue fastened spiritual meanings upon the several animals, until every quality of good



or evil in the soul of man had its type in the beast world. It is in this way to the bestiaries that we must look for explanation of the strange, grotesque creatures which are found sculptured on the churches and other buildings of the Middle Ages. The oldest Latin bestiaries had an early Greek original, the well known "Physiologus," under which name about 50 such allegories were grouped. The Greek text of this famous work is found only in manuscript. There are old Syriac, Armenian, Ethiopic, Arabic, Icelandic, and numerous Latin versions. Editions of the Latin have been issued — Mai, Heider, and Cahier. An Old High German version was made earlier than the 11th century; in the 12th century, versions in French were made by Philippe de Thaun and Guillaume, a priest of Normandy. The "Bestiary of Love" of Richard de Fournival was rather a parody upon the earlier form of such books. The following is a characteristic extract from the "Divine Bestiary: " "The unicorn has but one horn in the middle of its forehead. It is the only animal that ventures to attack the elephant; and so sharp is the nail of its foot, that with one blow it rips up the belly of that most terrible of all beasts. The hunters can catch the unicorn only by placing a young virgin in the forest which it haunts. No sooner does this marvellous animal descry the damsel, than it runs toward her, lies down at her feet, and so suffers itself to be taken by the hunters. The unicorn represents our Lord Jesus Christ, who, taking our humanity upon him in the Virgin's womb, was betrayed by the wicked Jews, and delivered into the hands of Pilate. Its one horn signifies the Gospel truth, that Christ is one with the Father," etc.

**Bestusheff, Alexander Alexandrovich** (bes-tō'shef), a Russian novelist and soldier, born in St. Petersburg, Nov. 3, 1797. Of his numerous novels, the most celebrated are "Amalat-Beg," "The Nadeshda Frigate," "The Terrible Prophecy." His "Private Correspondence" is highly prized. He was killed in battle in the Caucasus, July 19, 1837.

**Bestusheff, Michael Alexis Petrovitch**, a Russian statesman and soldier, born in Moscow, in June, 1693; enjoyed the favor of Peter the Great, Anna, and Elizabeth; was appointed imperial chancellor by Elizabeth (1744); degraded and exiled on a charge of treason (1758); was recalled and made a field marshal by Catherine II. He died April 21, 1766.

**Betauzos, Juan Jose de** (be-tō'thos), a Spanish historian and adventurer of the 16th century; was author of an account of the conquest of Peru by Pizarro.

**Betel, or Betle**, the English name of the piper betle, a shrubby plant with evergreen

leaves, belonging to the typical genus of the order *piperaceæ* (pepperworts). It is extensively cultivated in the East Indies. Its leaf is used as a wrapper to inclose a few slices of the areca palm nut with a little shell lime. The Southern Asiatics are perpetually chewing it to sweeten the breath, to strengthen the stomach, and, if hunger be present, to deaden its cravings. It is called *pan*, or *pan soo-parce*. It is offered by natives of the East to their European visitors, and is often all that is laid before one accepting an invitation to their houses.



BETEL NUT.

a, bud; b, fruit; c, nut.

**Betelgeuse** (bet-el-ge's), or **Betelgeux**, the star Alpha Orionis, the bright, reddish star in one of the shoulders of Orion. It varies somewhat in brightness, but in no regular period.

**Betham-Edwards, Matilda**, an English author, born in Suffolk, in 1836; was educated privately; has published numerous works in poetry, fiction, and on French rural life. She was made an officer of public instruction in France in 1891. Among her works are "The White House by the Sea," "Kitty," "The Dream Charlotte," "France of To-Day," "A Romance of Dijon," "The Lord of the Harvest," a volume of poems, and an edition of Arthur Young's "Travels in France."

**Bethania, or Bethany**, a town in Syria, about 2 miles S. E. of Jerusalem, on the way to Jericho. It is now a small place, inhabited by a few Turkish families, by whom it is called Lazari, in memory of Lazarus, who dwelt here, and who was here raised from the dead. The inhabitants show the pretended sites of the houses of Lazarus, of Martha, of Simon the leper, and of Mary Magdalene. The alleged tomb of Lazarus, a large excavation in the rock, is also shown to the credulous. The situation of Bethania is extremely picturesque.

**Bethany College**, a co-educational institution in Linsborg, Kan.; organized in 1881; under the auspices of the Lutheran Church; has grounds and buildings valued at over \$225,000; scientific apparatus, \$15,000; en-



## Bethany College

dowment, about \$60,000; income from all sources, average \$78,000; volumes in the library, over 12,000; professors and instructors, 45; students, about 900.

**Bethany College**, a co-educational institution in Bethany, W. Va.; organized in 1841; under the auspices of the Church of the Disciples; has grounds and buildings valued at over \$200,000; scientific apparatus, \$25,000; endowment, \$150,000; volumes in the library, over 11,000; income, about \$25,000; professors and instructors, 20; students, about 345.

**Bethel**, a town of Palestine, about 10 miles from Jerusalem, now called Beitin, or Beiteen. The patriarch Jacob here had a vision of angels, in commemoration of which he built an altar. Interesting ruins abound in the vicinity.

**Bethel College**, an educational institution in Russellville, Ky.; organized in 1854; under the auspices of the Baptist Church; has grounds and buildings valued at over \$100,000; productive funds, \$100,000; scientific apparatus, about \$5,000; ordinary income, over \$6,000; volumes in the library, over 6,000; professors and instructors, about 6; students, 70.

**Bethencourt, Jean de**, a Norman baron; chamberlain to Charles VI., King of France. Being ruined in the war with England, he sought to repair his fortunes in foreign countries, and made a descent from Spain on the Canary Isles, in 1402. Not having sufficient force, however, he returned, and obtained reinforcements from Henry III. of Castile, with which he was successful, and was crowned King in 1404, under the title of Louis. He converted the greater portion of the Canaries to Christianity, and, in 1405, received from the Pope the appointment of Bishop to the islands. The following year he went to Normandy, where he passed the remainder of his days, dying in 1425.

**Bethesda**, a pool in Jerusalem, near St. Stephen's Gate, and the Temple of Omar. It is 460 feet long, 130 broad, and 75 deep, and is now known as Birket Israel (see John v: 2-9).

**Bethlehem**, a borough in Northampton co., Pa.; on the Lehigh river and canal, and the Lehigh Valley, the Central of New Jersey, and other railroads; 57 miles N. of Philadelphia. It was founded in 1741 by Moravians, under Count Zinzendorf, and is the chief center of that sect in the United States. It contains a Moravian Theological Seminary, a Moravian Seminary for young ladies, more than a dozen churches, and two National banks. On the opposite side of the river, here spanned by two bridges, is SOUTH BETHLEHEM, the seat of LEHIGH UNIVERSITY (q. v.), the main offices of the Lehigh Valley Railroad Company, and a number of important manufacturing establishments, including silk mills, rolling mills,

## Bethlehemites

foundries and machine shops, brass works, zinc oxide and spelter works, etc. Monocacy creek separates Bethlehem from West Bethlehem, consolidation of which with Bethlehem was authorized in 1904. Pop. (1900) Bethlehem, 7,293; West Bethlehem, 3,465; (1910) Bethlehem, 12,837; South Bethlehem, 19,973.

**Bethlehem** ("house of bread;" modern Beitlahm), the birthplace of Jesus Christ and of King David, and the Ephratah of the history of Jacob; is now a small, unwall'd village of white stone houses, in the midst of a most interesting country, 6 miles S. of Jerusalem. The population, about 3,000, is wholly Christian—Latin, Greek, and Armenian. The Convent of the Nativity, a large, square building, resembling a fortress, was built by the Empress Helena, in 327 A. D., but destroyed by the Moslems in 1236, and, it is supposed, restored by the crusaders. Within it is the Church of the Nativity, which is subdivided among the Latins, Greeks, and Armenians, for devotional purposes. The church is built in the form of a cross; the nave, which is by far the finest part of the building, belongs to the Armenians, and is supported by 48 beautiful Corinthian columns of solid granite, each between two and three feet in thickness, and about 17 in height. The other portions of the church, forming the arms of the cross, are walled up. At the farther end of that section, which forms the head of the cross, and on the threshold, is a sculptured marble star, which the Bethlehemites say covers the central point of the earth. Here a long intricate passage descends to the crypt below, where the blessed Virgin is said to have been delivered. The walls of the chamber are hung with draperies of the gayest colors; and a silver star, with the words, "*Hic de Virgine Maria Jesus Christus natus est*" (here Jesus Christ was born of the Virgin Mary), marks the spot of the Nativity. The manger stands in a low recess cut in the rock. The site appears to have been venerated since the 2d century A. D., and St. Jerome, a monk of this convent, toward the end of the 4th century, found the grotto in possession of pagans, who celebrated here the birth of Adonis. To the N. W. stands a square domed building, marking the reputed site of Rachel's tomb. The Bethlehemites chiefly gain their subsistence by the manufacture and sale of crucifixes, beads, boxes, shells, etc., of mother-of-pearl and olive wood.

**Bethlehemites**, a name applied (1) to the followers of Jerome Huss, from Bethlehem Church, where he preached; (2) to an order of monks, established, according to Matthew Paris, in 1257, with a monastery at Cambridge; (3) to an order founded in Guatemala about 1655 by Fray Pedro, a Franciscan tertiary, a native of Teneriffe. It spread to Mexico, Peru, and the Canary



## Bethlem=Gabor

Islands. An order of nuns founded in 1667 bore the same name.

**Bethlem=Gabor**, a Bohemian military officer, born of a Protestant Magyar family in 1580; fought under Gabriel Bathori, and then joined the Turks, by whose aid he made himself Prince of Transylvania in 1613. In 1619 he assisted the Bohemians against Austria, and, marching into Hungary, was elected King by the nobles (1620). This title he surrendered in return for the cession to him by the Emperor Frederick II. of seven Hungarian counties and two Silesian principalities. After a brilliant reign, he died in 1629.

**Bethsaida** (beth-sī'da), a village on the W. shore of the Lake of Galilee, the birthplace of Peter and Andrew and Philip. Its site has been identified with a heap of grass-grown ruins. At the N. E. extremity of the lake was another Bethsaida, a village, near which the 5,000 were fed. Philip the Tetrarch raised it to the dignity of a town, and renamed it Julias, in honor of the Emperor Augustus' daughter.

**Bethune, Charles James Stewart**, a Canadian educator, born in West Flamboro, Ont., Aug. 11, 1838; graduated at Trinity College, Toronto, in 1859; ordained deacon in 1861, and priest in 1862. He became incumbent of the Credit Mission in 1866, and in 1870 was appointed to the head mastership of Trinity College School, in Port Hope. He is well known as a writer on scientific subjects. He was the first editor of "The Canadian Entomologist," a monthly magazine. Resigning this place, he edited for a considerable time the entomological department of the "Canadian Farmer" and the "Weekly Globe." In 1886 he again became editor of the "Canadian Entomologist." In 1892 he was elected a Fellow of the Royal Society of Canada.

**Bethune, George Washington**, an American Dutch Reformed clergyman and poet, born in New York, March 18, 1805; was a most lovable man, noted as an orator and a wit. He had charges at Rhinebeck and Utica, N. Y., Philadelphia, Brooklyn, and New York city. Besides religious works, he wrote "British Female Poets," "Lays of Love and Faith" (1847), several of the hymns in which are widely used. He also published an edition of Izaak Walton's "Complete Angler" (1846), etc. He died in Florence, Italy, April 27, 1862.

**Betony**, a genus of plants belonging to the order *lamiaceæ* (labiates). The calyx is ten ribbed, with five awned teeth, and the lower lip of the corolla is trifid. *Betonica officinalis*, or wood betony, grows in shady places. It is called by Bentham and others *stachys betonica*. When fresh it has an intoxicating effect; the dried leaves excite sneezing. The roots are bitter and very nau-

## Betts

seous, and the plant is used to dye wool a fine, dark yellow.

**Betterton, Thomas**, English actor, born in 1635; excelled in Shakespeare's characters of Hamlet, Othello, Brutus, and Hotspur, and was the means of introducing shifting scenes instead of tapestry upon the English stage. He wrote the "Woman Made a Justice," a comedy; "The Amorous Widow, or the Wanton Wife," "Diocletian," a dramatic opera, etc.



THOMAS BETTERTON.

Mrs. Sanderson, whom he married in 1670, was also an actress of repute. He died in 1710, and was buried in Westminster Abbey.

**Betteloni, Vittorio** (bet-el-ō'nē), an Italian poet, born in Verona in 1840. He was educated in Pisa, and became Professor of Italian Literature and History in the Female College in Verona. His verse proves him an adherent of that Italian classical school which dates from 1869, and includes "In the Springtime" (1869); "New Stanzas" (1880); and a translation of Gæthe's "Herman and Dorothea."

**Betting, or Wagering**, a contract by which two or more parties agree that a certain sum of money or other thing shall be paid or delivered to one of them on the happening or not happening of an uncertain event. At common law, wagers are not *per se*, void, but statutes prohibiting betting have been passed by many of the States. When one loses a wager and gets another to pay the money for him, an action lies for the recovery of the money. Wagers on the event of an election laid before the poll is open, or after it is closed, are illegal. In horse-racing, simple bets upon a race are unlawful both in England and the United States. In the case even of a legal wager, the authority of a stakeholder, like that of an arbitrator, may be rescinded by either party before the event happens.

**Betts, Craven Langstroth**, an American poet and story writer, born in New Brunswick, in 1853. Besides translating "Songs from Béranger" in the original meters, he wrote "The Perfume Holder, a Persian Love Poem;" and, with A. W. H. Eaton, "Tales of a Garrison Town."



## Betty

**Betty, William Henry West**, better known as the **YOUNG ROSCIUS**, an English actor, born at Shrewsbury in 1791; first appeared on the stage at the age of 11 in Belfast, and achieved an immediate success. For almost five years he sustained the heaviest parts before crowded and enthusiastic audiences. In 1805 Mr. Pitt adjourned the House of Commons to permit members to witness the boy's Hamlet. He quitted the stage as a boy actor in 1808, but after studying for a while at Cambridge, returned to it in 1812. He retired finally in 1824, and lived for 50 years in the enjoyment of the fortune he had so early amassed. He died in London, Aug. 24, 1874.

**Betula**, a genus of plants, the typical one of the order *betulaceæ* (birchworts). The *B. alba*, or common birch, the *B. nana*, or dwarf birch, and the *B. papyracea*, or paper or canoe birch, are species included in this genus.

**Betwa**, a river of India rising in the Vindhya range in Bhopal, and, after a N. E. course of 360 miles, joining the Jumna at Hamirpur.

**Beust** (boist), **Friedrich Ferdinand, Count von**, an Austrian statesman, born in Dresden, Jan. 13, 1809. He adopted the career of diplomacy, and as member of embassies or ambassador for Saxony resided at Berlin, Paris, Munich and London. He was successively Minister of Foreign Affairs and of the Interior for Saxony. At the London conference regarding the Schleswig-Holstein difficulty he represented the German Bund. He lent his influence on the side of Austria against Prussia before the war of 1866, after which, finding his position in Saxony difficult, he entered the service of Austria as Minister of Foreign Affairs, became President of the Ministry, Imperial Chancellor, and, in 1868, was created Count. In 1871-1878 he was Ambassador in London, in 1878-1882, in Paris. He died near Vienna, Oct. 24, 1886.

**Beveland, North and South**, two islands in the Province of Zeeland, Netherlands, in the estuary of the Scheldt. North Beveland is 13 miles in length, contains about 15,000 acres; pop. 6,000; in 1532 it was submerged and remained under water for several years. South Beveland is about 20 miles in length, contains 84,000 acres; pop. 23,000; principal city, Goes (pop. 5,000); the soil is fertile, producing wheat, potatoes and fruits.

**Beveridge, Albert Jeremiah**, an American lawyer, born in Highland county, O., Oct. 6, 1862; was brought up on a farm; graduated at De Pauw University; and engaged in law practice in Indianapolis. He entered political life in 1883, and soon won a reputation as an effective orator. On Jan. 17, 1899, he was elected United States Senator

## Bewick

for Indiana, as a Republican. Soon after his election he went to the Philippine Islands; made a thorough study of conditions there; and later delivered a thrilling speech in the Senate in support of the Administration's policy in the Far East. In 1909-1910 he was a conspicuous "insurgent" leader in Congress.

**Beverly**, a city in Essex co., Mass.; on the Boston and Maine railroad; 2 miles N. of Salem. It was founded Oct. 14, 1668; was incorporated as a city March 23, 1894; contains several villages; and is connected by trolley lines with Salem, Peabody, Gloucester, and Wenham. It is the seat of the New England Institute for the Deaf and Dumb; is principally engaged in the manufacture of ladies' boots and shoes, and leather; has considerable shipping and fishery interests; contains high and graded schools, a public library, a National bank, a number of handsome residences belonging to Boston business men; and has a property valuation exceeding \$16,000,000. Pop. (1900) 13,884; (1910) 18,650.

**Bevis of Hampton**, the hero of a popular English medieval romance. The son of Sir Guy, Earl of Hamtoun, who was treacherously murdered by Divoun, Emperor of Almayne, he was given by his false mother to some heathen merchants to be sold for a slave among the Paynim. By them he was carried to Ermony, where he soon became dear to King Ermyn, and dearer still to his only daughter, the lovely Josian. His chief exploits were the overthrow of Brademond of Damascus, of a monstrous boar, of the giant Ascapard, whom he spared to become his squire, and of a dreadful dragon near Cologne. His famous sword Morglay he won in battle; his horse Arundel was the gift of Josian. Still more romantic episodes in his story are his carrying his own death-warrant in a sealed letter to the vassal Brademond, his escape from his noisome dungeon after seven years' imprisonment, and recovery of his wife, who had preserved his love, though nominally the wife of King Ynor of Mombraunt. He next returned to England to avenge his father's death, then sailed for Ermony and defeated Ynor in a desperate battle. His last great fight was in the streets of London, when he slaughtered 60,000 citizens, and forced King Edgar to grant him terms. Thirty-three years he then spent in love and perfect happiness at Ermony, dying at the same moment as his wife, while his famous steed Arundel had died just before. The romance was edited by Dr. E. Kölbing for the Early English Text Society, in 1885.

**Bewick, Thomas**, an English wood engraver, born in Northumberland in 1753. He was apprenticed to Beilby, an engraver in Newcastle, and executed the woodcuts



for Hutton's "Mensuration" so admirably that his master advised him to turn his attention to wood engraving. With this view he proceeded to London, and, in 1775, received the Society of Arts prize for the best wood engraving. Returning in a short time to Newcastle, he entered into partnership with Beilby, and became known as a skilled wood engraver and designer by his illustrations to "Gay's Fables," "Æsop's Fables," etc. He quite established his fame by the issue, in 1790, of his "History of Quadrupeds" (text compiled by Beilby), the illustrations of which were superior to anything hitherto produced in the art of wood engraving. In 1797 appeared the first, and in 1804 the second, volume of his "British Birds," generally regarded as the finest of his works (text partly by Bewick). Enlarged and improved editions of both books soon followed. Among his other works may be cited, the engravings for Goldsmith's "Traveller," and "Deserted Village." Parnell's "Hermit," and Somerville's "Chase." He died in 1828. His younger brother JOHN, who gave promise of attaining equal eminence, died in 1795, aged 35.

**Beyle, Marie Henri** (bāl), better known under the pseudonym of "Stendhal," a French novelist and critic, born in Grenoble, Jan. 23, 1783. In spite of the interruptions due to the political upheavals in which he became involved, he found time to display his critical and imaginative genius in "Rome, Naples and Florence in 1817," "History of Painting in Italy," and "About Love," but his celebrity now rests on "The Chartreuse (Carthusian Nun) of Parma," a magnificent fiction, brilliantly original, witty, and absorbing; and to a less extent upon "The Red and the Black" (*i. e.*, Priests and Soldiers), a romance possible only to a writer with the widest knowledge of men and things. He died in Paris, March 23, 1842.

**Beyrout, or Beirut**, a flourishing commercial town, situated in a most picturesque position on the coast of Syria, and at the foot of Lebanon, 55 miles from Damascus, and 147 from Jerusalem. It is the chief seaport, market-town, and emporium of all the trade with the shores of Syria, Palestine, and Cilicia, with a regular service of Egyptian, French, and British steamers. The latter bring Manchester goods, woollens, Rangoon rice, hides, copper, iron, and coal, and return to England with corn and silk. Since the opening of the Suez Canal, a direct Eastern trade in spices, coffee, indigo, and jute has sprung up. The roadstead is full of sand banks, and large ships cannot approach within half a mile of the shore, but shelter is found during stormy weather in the Beyrout river, about 3 miles from the town. Shipbuilding has received some at-

tention. In 1859 a line of omnibuses, the first ever seen in Syria, was established here, and a French company completed in 1863 a good road to Damascus, of which Beyrout is the port; in 1875 an English company completed an extensive system of waterworks; and in 1886 a concession for gasworks was sold to a Paris company. A Scottish school for Jews has been founded at Beyrout, as also the depot of the American-Syrian mission, with a school, printing press, turning out a very large number of Arabic Bibles every year, and hospital with medical staff. In 1902 the population of the town was estimated at 118,800 against 8,000 in 1844, this increase being largely due to the settlement in 1860 of numbers of the Christian refugees from Damascus.

On Sept. 4, 1903, a native Christian killed a Moslem. On the following day the Moslems rose against the Christians in different parts of the city, and for two days there was general rioting in which a number of persons, chiefly Greek Christians, were killed. The Christians fled from the city or remained at home behind barricaded doors, while armed and excited Moslems paraded the streets and assaulted all Christians who appeared thereon. On the 7th the city began to assume a more quiet condition, as it became known that men would be landed from the United States cruisers "Brooklyn" and "San Francisco" to preserve order should rioting be resumed. The warships had been ordered there just before the uprising, on a report that the United States Vice-Consul at Beyrout had been assassinated on Aug. 23.

**Béza, or Béze, Theodore de**, a French Protestant theologian and reformer, born in Vezelay, in 1519. After studying at Orleans and Bourges, he went, in 1539, to Paris, where he spent nine years, and then went to Geneva and married a woman to whom he had long been secretly engaged. Soon afterward he was appointed Professor of Greek at Lausanne, a post which he held for 10 years. In 1558, he was sent to ask the intercession of several German princes in behalf of the persecuted Huguenots in France. The next year he settled at Geneva, and was thenceforth the associate of Calvin till his death, and his successor as Professor of Theology and head of the Protestant party. Beza undertook a mission to the King of Navarre, and succeeded in winning him to the side of the reformers. He took a leading part at the celebrated Colloquy of Poissy, and was allowed to preach in Paris. He attended the Prince of Condé during the Civil War, and was at the battle of Dreux. Beza took part in several other synods and conferences between the opposing religious parties. His energy and activity of mind, like his bodily health, continued unabated



## Béziers

till he was nearly 80 years of age, and he only ceased preaching in 1600. Among his works are a Latin translation of the New Testament and "History of the Reformed Churches in France." He died in 1605.



THEODORE DE BÉZA.

**Béziers** (bez-yār'), a town in Southern France, Department of Hérault, beautifully situated on a height and surrounded by old walls, its chief edifices being the cathedral, a Gothic structure, crowning the height on which the town stands, and the old Episcopal palace, now used for public offices; manufactures: woolens, hosiery, liquors, chemicals, etc., with a good trade in spirits, wool, grain, oil, verdigris, and fruits. In 1209 Béziers was the scene of a horrible massacre of the Albigenses. Pop. (1901) 52,510.

**Bezique** (bez-ēk'), or **Besique**, a popular game of cards of French origin in which a double pack containing the aces, tens, kings, queens, knaves, nines, eights, and sevens are used, valued in the order given. The game is played by two persons, to whom eight cards are dealt. Trumps may be determined either by turning up the first card of the stack or by the suit of the first marriage. The non-dealer leads for the first trick, and the winner of each trick has the succeeding lead. After each trick, each player draws one card from the top of the stack, the winner of the trick taking the top card. The playing is as in whist, the leader taking the trick unless his opponent plays a higher card of the same suit or a trump. It is not necessary to follow suit until the stack is exhausted, when one must do so and take each trick, if possible. Counting is done by means of the values of the cards; each ace or ten-spot taken in a trick counts 10, the winner of the last trick of each hand scores 10, and if trump is turned, both

sevens count 10 for the turner, and if one exchanges from his hand a seven of trumps for another turned trump or if one declares the other seven of trumps 10 more is scored. The game is won by the player who first makes 1,000 points, and if his opponent has not made 500 the game counts double. There are certain combinations of cards other than the above, which, when declared, count as follows: Double bezique (both queens of spades and both knaves of diamonds) 500; sequence of five highest trumps, 250; and 4 aces, 100; any 4 kings, 80; any 4 queens, 60; any 4 knaves, 40; bezique (queen of spades and knave of diamonds), 40; royal marriage (king and queen of trumps), 40; marriage (king and queen of same suit), 20. A declaration is made by placing the declared cards face up on the table where they remain till played or the stack is exhausted, except in the case of the seven of trumps. To score, a declaration can only be made after winning a trick and before drawing, and but one declaration can be made at a time. After a card has been used in one combination it may be used to form another, excepting when used to form an equal or inferior combination in the same class as before. A player need not declare a combination which he holds and only before the stack has been exhausted can a declaration be made.

**Bezoar**, a morbid secretion sometimes found in the intestines of the wild goat of Persia (*capra aegagrus*), or any other Eastern ruminant. It consisted of a portion of the undigested food of the animal agglutinated into a ball. Its full name was *lapis bezoar orientale* = Oriental bezoar stone. Not often met with, and having had attributed to it, without a particle of evidence, the power of acting as an antidote to all poisons, as well as curing many diseases, it sometimes fetched in the market 10 times its weight in gold. Also a similar concretion from the intestines of the American llamas (*auchenia llama* and *A. vicugna*). This was known as the *lapis bezoar occidentale* (Occidental or Western bezoar stone). It never had quite the reputation of its Eastern compeer, but has shared its fall in being at last contemptuously dismissed from the pharmacopœia of all civilized lands.

**Bhagavatgita** (be-häg-è-vet-gē'te), or **Bhagavadgita**, in Sanskrit literature, a song relating a discourse between Krishna and his pupil Arjun in the midst of a battle. Schlegel considers it the most beautiful and perhaps the only true philosophical poem in the whole range of known literature. Its teaching is pantheistic. It consists of 18 lectures. It has been translated into many languages.

**Bhagalpur** (be-häg-äl'pör), a city in Bengal, capital of a district and division of the



## Bhamo

same name, on the right bank of the Ganges, here 7 miles wide. There are several indigo works in the neighborhood. Pop. (1901) 75,760. The division of Bhagalpur has an area of 20,492 square miles, and a population (chiefly Hindus and Mohammedans) of 8,063,160. The district has an area of 4,268 square miles; pop. 1,966,158.

**Bhamo**, a town of Burma on the Upper Irrawaddy, about 40 miles from the Chinese frontier. It is the starting-point of caravans to Yunnan, and is in position to become one of the great emporiums of the East in event of a regular overland trade being established between India and West China.

**Bhartpur**, or **Bhurtpore**, the capital of a protected State in Rajputana, India, is a large town, measuring about 8 miles in circuit, 35 miles W. of Agra by rail. It is worthy of notice chiefly on account of its two sieges in 1805 and 1827. Pop. (1901) 42,997. The State of Bhartpur has an area of 1,974 square miles; pop. (1901) 626,665, mostly Jāts.

**Bhartrihari**, an Indian poet, reputed author of a book of apophthegms, according to legend a dissolute brother of King Vikramāditya (1st century B. C.), who became a hermit and ascetic. The collection of 300 apophthegms bearing his name is, however, probably an anthology. Two hundred of them were translated into English and published at Nürnberg by Abraham Roger as early as 1653, the first Indian writings known in Europe.

**Bhatti**, an Indian epic poet of the 6th or the 7th century. His poem, named after him "Bhattikāvya," is in 22 cantos. Its theme is the deeds of Rāma; but the author designed the work to be also an exemplification of the rules of grammatical and rhetorical composition. It was published with a two-fold commentary at Calcutta (1828).

**Bhavabhūti** (be-hä-vä-be-hö'të), surnamed "Śrī-kantha," an Indian dramatist, who flourished in the first half of the 8th century, and wrote at least three plays: the "Mahāvīracarita" ("life of the great hero"), and the "Uttararāmacharita" ("later life of Rama"), forming together, in seven acts each, a dramatized version of the story of the Ramayana; and the "Mālatī-mādhava," a domestic drama in 10 acts, full of life and incident. Bhavabhūti is often compared with Kālidāsa, whom he equaled in vigor and variety, but hardly in genius. All three plays have been translated into English.

**Bhawalpur.** See BAHAWULPUR.

**Bhavishyapurana** (bha-vish'ya-pö-rä'nä), one of the 18 puranas in Sanskrit literature,

## Bhutan

known as the "purana of the future," from the supposition that it is a revelation of future events by Brahma which was communicated by Sumantu to Satanika, one of the kings of the Pandu family. The opening of this purana treats of the creation; but it is now considered scarcely more than a transcript of Manu. It also forms a code of rites and observances. The work is not regarded as prophetic.

**Bheels**, or **Bhils**, a Dravidic race inhabiting the Vindhya, Satpura, and Satmala Hills, a relic of the Indian aborigines driven from the plains by the Aryan Rajputs. They appear to have been orderly and industrious under the Delhi emperors; but on the transfer of the power in the 18th century from the Moguls to the Marathas they asserted their independence, and being treated as outlaws took to the hills. Various attempts to subdue them were made by the Gaekwar and by the British in 1818 without success. A body of them was, however, subsequently reclaimed, and a Bheel corps formed, which stormed the retreats of the rest of the race and reduced them to comparative order. The hill Bheels wear little clothing, and live precariously on grain, wild roots and fruits, vermin, etc., but the lowland Bheels are in many respects Hinduized. Their total numbers are about 750,000.

**Bhopal**, a native State of Central India, under British protection, on the Nerbudda, in Malwah. Area, 6,874 square miles. The country is full of jungles, and is traversed by a part of the Vindhya Mountains. The soil is fertile, yielding wheat, maize, millet, peas and other vegetable productions of Central India. Chief exports: sugar, tobacco, ginger and cotton. The district is well watered by the Nerbudda, Betwa and minor streams. Pop. (1901) 665,961. The capital of above State, also called Bhopal, is on the boundary between Malwah and Gundwana. Pop. (1901) 77,023. There are fine artificial lakes E. and W. of the town.

**Bhutan**, an independent State in the Eastern Himalayas, with an area of about 16,800 square miles, lying between Tibet on the N. and Assam and the Jalpaiguri District on the S., and consisting of rugged and lofty mountains, abounding in sublime and picturesque scenery. Pop. over 30,000. The Bhutanese are a backward race, governed by a Dharm Rajah, regarded as an incarnation of deity, and by a Deb Rajah, with a council of eight. They are nominally Buddhists. After various aggressive incursions and the capture and ill treatment of Ashley Eden, the British envoy, in 1863, they were compelled to cede to the British considerable portions of territory, in return for a yearly allowance of £2,500.



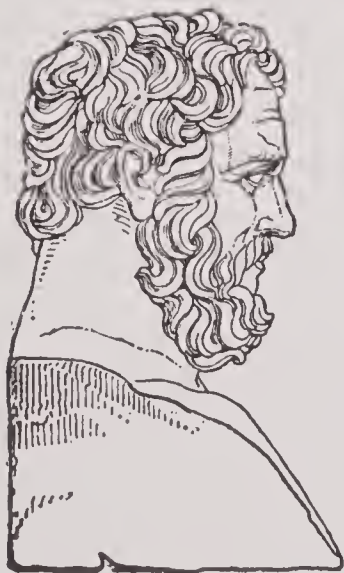
**Biafra, Bight of**, a large bay on the W. coast of Africa, at the head of the Gulf of Guinea, between Capes Formosa and Lopez. The principal rivers flowing into it are the Niger, the New and Old Calabar rivers, the Rio del Rey, the Kamerun, and the Gaboon; its islands are Fernando Po (Spanish), and St. Thomas' and Prince's Islands (Portuguese). Opposite Fernando Po are the Kameruns.

**Bianchini, Francesco** (bē-an-kē'nē), an Italian astronomer, born in Verona, in 1662. He improved many astronomical instruments, and discovered the spots on the planet Venus. His principal work is "Universal History," in Italian. He died in 1729.

**Biard, Auguste Francois** (bē-är'), a French *genre* painter, born in 1798; traveled extensively, visiting Spain, Greece, Syria, Egypt, Mexico, Brazil, etc. Among his best known pictures are the "Babes in the Wood" (1828;); the "Beggar's Family" (1836); the "Combat with Polar Bears" (1839); and the "Strolling Players," now in the Luxembourg. A strong element of caricature runs through most of his works. He died in 1882.

**Biarritz**, a watering-place and noted winter resort in France; on the Bay of Biscay in the Department of the Basses-Pyrénées; 4 miles S. W. of Bayonne. It was the royal summer residence during the Second Empire, which largely built up the fame of its baths and natural attractions.

**Biart, Lucien** (bē-är'), a French novelist, poet and writer of travels, born in Versailles, June 21, 1829. He published a number of novels, containing masterly descriptions of Mexican and South American nature and customs. Among his works are "The Mexican Women" (1853), poems; "Adventures of a Young Naturalist" (1869); "The Clients of Dr. Bernagius" (1873); "Across America" (1876), crowned by the Academy, etc.



BIAS.

**Bias**, one of the seven sages of Greece; a native of Priene, in Ionia; celebrated for his practical knowledge and strict regard to justice. He flourished about 550 B. C., and died at a very advanced age.

**Bib**, also called **Brassy, Pout**, or **Whiting Pout** (*gad-*

*us luscus*), a fish of the same genus as the cod, haddock, and whiting, quite common on many parts of the British

coasts, found also on those of Norway, Sweden, Greenland, etc. It is seldom more than a foot long, but differs from the other British *gadidæ* in the great depth of its body, which equals at least one-fourth of the entire length. The back is arched, and the nape exhibits a rather sharp ridge. The head is invested with a loose, dilatable membrane. The names bib and pout, both originally local English names, were at one time supposed to refer to distinct species (*G. lusca* and *G. barbata*), but these, probably, are really one.

**Bibbiena** (bēb-yā'nä), (BERNARDO DOVIZIO, who was styled Bibbiena), an Italian poet, born at Bibbiena, Aug. 4, 1470. For many years secretary to Cardinal Giovanni de Medici, in whose election as Pope Leo X. he is said to have had a considerable share, he was appointed treasurer, and soon after raised to the dignity of cardinal. In this dignity he became an ardent promoter of art and science. His comedy, "Calandria," is probably the earliest in Italian literature. He died Nov. 9, 1520.

**Biberach** (bēb'rach), a town of Würtemberg, delightfully situated on the Reiss, 23 miles S. S. W. of Ulm. It retains its old ramparts and towers, and in front of the theater is a monument to Wieland, who was born in the neighborhood. There are manufactures of machinery, artificial flowers, leather, bells, children's toys, etc. In 1796 Moreau won a great victory over the Austrian General, Latour, at Biberach, the latter losing 4,000 prisoners. Here, also, in 1800, Saint Cyr defeated the Austrian General, Cray. Biberach fell into the possession of Baden in 1802, but four years afterward was ceded to Würtemberg.

**Biberich**, or **Biebrich**, a village of Prussia, in the province of Hesse-Nassau. It is situated about four miles from Wiesbaden on the E. bank of the Rhine in one of the most beautiful regions along that river's course. At Biberich is the ducal residence, one of the finest buildings in the Rhine valley.

**Bible** (French *bible*, with similar forms in other languages, from Greek *biblia*, books, from *biblos*, the inner bark of the papyrus, used for writing on, hence a book), the collection of Sacred Writings or Holy Scriptures of the Christians. The older and larger division of these writings is also received by the Jews as embodying their faith, and is called the Old Testament, or Scriptures of the Old Covenant, because the Jewish religion was represented as a compact or covenant between God and the Jews, and the Greek word for covenant (*diathēkē*) signifies also last will or testament. The same figure was applied to the Christian religion, which was considered as an extension of the old covenant, or a covenant be-



tween God and the whole human race. The sacred writings peculiar to the Christians are, therefore, called the Scriptures of the New Covenant, or the New Testament. Protestants and Roman Catholics do not altogether agree as to the books that ought to be admitted into the canon or list of writings belonging to the Old Testament. A certain number of books classed by the former under the head of Apocrypha are called by the latter "deutero-canonical," as being admitted into the canon at a later date than the rest, but are held to be of equal authority.

The books of the Old Testament as they are arranged in the authorized Roman Catholic Latin version, called the Vulgate, and declared canonical by the decree of the council of Trent, are as follows, those marked with the \* belonging to the Apocrypha of the Protestants: Genesis, Exodus, Leviticus, Numbers, Deuteronomy, Joshua, Judges, Ruth, I Samuel, or I Kings; II Samuel, or II Kings; I Kings, otherwise called III Kings; II Kings, otherwise called IV Kings; I Chronicles, II Chronicles, I Esdras (as it is called in the Septuagint and the Vulgate), or Ezra; II Esdras, or Nehemiah; \* Tobit, \* Judith, Esther, Job, Psalms, Proverbs, Ecclesiastes, Song of Solomon, or Canticles, \* The Book of Wisdom, \* Ecclesiasticus, Isaiah, Jeremiah, Lamentations, \* Baruch, Ezekiel, Daniel (including the stories of Susanna and Bel and the Dragon), Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi, \* I Maccabees and \* II Maccabees.

The books received by the Jews were divided by them into three classes: (1) The Law, contained in the Pentateuch or five books of Moses, being the first five of the Bible. (2) The Prophets, comprising Joshua, Judges, I and II Samuel, I and II Kings, Isaiah, Jeremiah, Ezekiel, and the 12 minor prophets. (3) The Ketubim, or Hagiographa, that is, holy writings, containing the Psalms, the Proverbs, Job, in one division; Ruth, Lamentations, Ecclesiastes, Esther, the Song of Solomon, in another division; Daniel, Ezra, Nehemiah, I and II Chronicles, in a third. These books were written in the Hebrew language, while those which are rejected from the canon as apocryphal by the Protestants are found only in Greek or Latin. Biblical critics often divide the Scriptures of the Old Testament into the Pentateuch, or five books of Moses; the Historical books, from Joshua to Esther inclusive; the Doctrinal or Poetical books of Job, Psalms, Proverbs, Ecclesiastes, and the Song of Solomon; and the Prophetical books consisting of the writings of the four major prophets — Isaiah, Jeremiah, Ezekiel, Daniel, and the 12 minor. There is no difference of opinion between Protestants and Roman Catholics regarding the canon

of the New Testament, the books of which consist of the four Gospels of St. Matthew, St. Mark, St. Luke, and St. John; the Acts of the Apostles; the epistolary writings known briefly as Romans, I and II Corinthians, Galatians, Ephesians, Philippians, Colossians, I and II Thessalonians, I and II Timothy, Titus, Philemon, Hebrews, James, I and II Peter, I, II, and III John, and Jude; and lastly the Apocalypse or Revelation.

*Old Testament.*—The books of Moses (or at any rate "the book of the law") were deposited, according to the Bible, in the tabernacle, near but not in the ark: the other sacred writings, it is further supposed, were successively deposited in the same place as they were written. After the building of the temple, they were placed by Solomon in it. On the capture of Jerusalem by Nebuchadnezzar, the autographs probably perished, but numerous copies were preserved, as is inferred from allusions in writers subsequent to the Babylonish captivity. It is believed by many that the canon of the Old Testament was settled soon after the return from Babylon and the reestablishment of the Jewish religion. This work was accomplished, according to the traditions of the Jews, by Ezra, with the assistance of the great synagogue, who collected and compared as many copies as could be found. From this collation a correct edition of the whole was prepared, with the exception of the writings of Ezra, Malachi, and Nehemiah, which were added afterward. The first definite statement regarding the contents of the Hebrew canon is by Josephus (about A. D. 70), who states that it consisted of 22 books "justly believed to be divine." Allowing for differences of division in early times it is probable that these represent our present Old Testament books, apart from the Apocrypha. It is confidently stated that no existing apocryphal, or non-canonical book is ever appealed to in the New Testament as scriptural, yet the canon was long in considerable uncertainty.

The scriptures were, no doubt, originally written on skins or parchments rolled up into rolls or volumes. The ancient Hebrew characters were considerably different from the more modern square ones with which we are familiar, the latter being probably an importation from the East brought in along with the Chaldee language, and superseding the ancient mode of writing as the one language superseded the other. When the change was made is doubtful — some refer it to the time of Ezra, others think that it was not long anterior to the Christian era. The original Hebrew also was written without what are known as "vowel points," indicating the true ancient pronunciation; these were only gradually introduced through the labors of the Jewish scholars of what is



called the Masoretic period, the system being completed from the 6th to the 9th century, and the present or Masoretic text being thus produced. A division of the books into certain sections or chapters is very ancient, but the existing division into chapters and verses is of comparatively modern origin. Cardinal Hugo de Sancto Caro, who flourished in the 13th century, is said to have divided the Vulgate into chapters, for convenience of reference, but the present division into verses is said to be based on a similar division introduced by the Masoretic scholars in the Middle Ages, and adopted by Robert Stephens in his edition of the Vulgate in 1555. The first English translations in which it appeared were the Geneva Bible, the Bishops' Bible, and the Authorized Version of 1611. The punctuation is also the work of modern scholars. The most ancient manuscripts of the Hebrew text of the Bible are not much more than seven or eight centuries old; a manuscript in the Bodleian library is thought to be 700 years old; one in the Vatican is supposed to have been written in 973.

The printed editions of the Hebrew Bible are very numerous. The earliest appeared in Italy. The first edition of the entire Hebrew Bible was printed at Soncino, in 1488. The Brescian edition of 1494 was used by Luther in making his German translation. The two Rabbinical Bibles printed at Bromberg are famous, and the editions of Athias, a Jew of Amsterdam, 1661 and 1667, are much esteemed for their beauty and correctness. Van der Hooght, whose edition is a standard, followed the latter. Kennicott did more than any one of his predecessors to settle the Hebrew text. His Hebrew Bible appeared at Oxford, in 1776-1780, 2 vols. folio. The text is from that of Van der Hooght, with which 630 MSS. were collated. De Rossi, who published a supplement to Kennicott's edition (Parma, 1784-1799, 5 vols. 4to), collated 958 MSS. The Germans, in recent times, have done much toward correcting the Hebrew text. Dr. S. Davidson's is a handy modern edition of the Hebrew text.

The earliest and most famous version of the Old Testament is the Septuagint, or Greek translation, completed it is believed in the 2d century B. C. The Syriac version, called the Peshito, was made in the 2d century after Christ, and is celebrated for its fidelity. The famous Latin version of St. Jerome, known as the Vulgate, was finished in 405. The ancient Chaldee or Aramaic *targums*, that is translations or paraphrases are also of importance, especially that of Onkelos on the Pentateuch and that of Jonathan Ben Uzziel on the Prophets.

*New Testament.*—The New Testament, besides being originally written in Greek, also differs remarkably from the Old in this respect, that while the writings compre-

hended in the earlier collection range over a period of 1,000 years, those included in the latter were produced almost contemporaneously—most of them probably between A. D. 50 and A. D. 70. The collection consists of 27 writings, ascribed either to apostles or to persons intimately associated with them. Five of the works are in the form of historical narratives, four of which relate from different points of view the story of Christ's life, while the fifth describes the formation and extension of the Church by the ministry of the leading apostles. Twenty-one are epistolary. Thirteen of these bear the name of St. Paul as their author, nine being addressed to various Christian communities, three (I and II Timothy, and Titus)—called the pastoral epistles—to office-bearers in the Church, and one to a private individual (Philemon). The epistle to the Hebrews is anonymous, but was certainly not the work of St. Paul. Seven other letters—one ascribed to James, two to Peter, three to John, and one to Jude—are often known as the catholic (that is, general) epistles, as having been intended for the use of Christians in general. The only remaining work is the Apococalypse or Revelation of St. John. Of these writings the epistles are the earliest in date and were written to various Christian communities to give advice in special circumstances, to explain points of doctrine, or to warn against mistaken beliefs. They are adapted to the special conditions and mental attitude of those to whom they were addressed; thus in the letters to the Corinthian Christians, who dwelt in Greece, various speculative questions are discussed. The first three Gospels, called the synoptic Gospels, were probably written in or near A. D. 70, that of Mark being perhaps the earliest. They are supposed by many to be all founded on an earlier Greek translation of an Aramaic account of the sayings of Christ which Papias ascribes to Matthew. The fourth Gospel is of much later date (about A. D. 100), and has a markedly different character. It gives an account of Christ's life not so much from an objective and historical as from a subjective and personal point of view.

From the 5th century to the present time the canon of the New Testament has remained unaltered, but if we go back a century farther this unanimity of sentiment is broken. At that time a distinction was made between the *homologoumena* or acknowledged, and the *antilegomena* or controverted books; the former including the four Gospels, Acts, the Pauline epistles (including Hebrews), I John, I Peter, and, though with some hesitation, the Apocalypse. The earliest list we possess of the books of the New Testament emanating from the orthodox Church is the Muratorian canon (A. D. 160-170); and in it Jude,



II and III John, the Apocalypse, and another Apocalypse (that of Peter) are included, while I Peter is omitted. Of still earlier date is the heretical canon of Marcion (about 140 A. D.), which embraces only a gospel based on that of Luke and 10 of the Pauline epistles. Various early notices group the writings under the two general divisions of evangelical and apostolic; and the more detailed information obtained from the oldest extant MSS., versions, and catalogues of books exhibits substantially the same arrangement as that now followed in our Bibles. Few copies, however, contained the whole of the New Testament; most frequently the Gospels were in one volume, the Acts and Epistles in another, while the Apocalypse was comparatively seldom associated with the other books. The general order of the books was: Gospels, Acts, Catholic Epistles, Pauline Epistles, Apocalypse; from which arrangement, however, there are individual deviations, especially as regards the book of Acts. The four Gospels are almost constantly in their familiar order; and in the Pauline epistles the letter to the Hebrews exhibits almost the only variation, being sometimes — and indeed most frequently — inserted before the pastoral epistles. Besides the books with which we are familiar there were many others, such as The Shepherd of Hermas, the Epistle of Barnabas, the Acts of Paul, the Revelation of Peter, and the Teachings of the Apostles, which long held a doubtful position in regard to apostolic authority; and it was not till the Council of Laodicea (360 A. D.) that their use was definitely forbidden.

The originals of the writings now collected in the New Testament do not seem to have remained long in existence. There is no certain mention of them in the early fathers; for the two passages in Ignatius and Tertullian which have been supposed to refer to them, apply to the Old Testament as contrasted with the New, and to the Greek as contrasted with the Latin translation. Although the originals have thus vanished, we may form some approximate idea of their outward appearance. The material was probably paper (II John, 12), made of the Egyptian reed or papyrus; parchment, though not unknown (II Timothy, iv: 13), being at that time too dear for ordinary use. Ink and the reed pen are mentioned in III John, 13. The sheets when written were made up in the form of a roll. The text was written in columns, and the writing was continuous, without any intervals between the words, and without any system of punctuation. The characters were what are known as uncial, consisting wholly of large, erect, square or but slightly rounded, capitals. The different writings were speedily multiplied by means of copies; and it is from such of these copies as have

been preserved, taken in connection with ancient versions and quotations in the writings of the fathers, that we are enabled to ascertain or approximate to the true text. The oldest manuscripts extant are referred to the 4th century, and on comparing these with later ones we find that various changes were introduced. All the manuscripts of the New Testament are in the volume form consisting of folded sheets, and not in rolls. The division into columns was at first retained, but the number of columns varied. The uncial characters by degrees lost their stiffness and uprightness, and by the 10th century the smaller cursive writing prevailed. It was but seldom that a codex contained the whole New Testament; and if it did, it probably embraced the Septuagint also. Only four of the uncials, and but few even of the cursives, approach completeness. Many of the manuscripts have glosses on the margin, or even a continuous chain of patristic comments. Punctuation came into general use about the 8th century, but no uniform system existed for several centuries. Our present mode was only established after the beginning of the 16th century by the Venetian printers, Aldus and Paulus Manutius, and was applied to the New Testament by Erasmus and R. Stephens. The need of some division of the text for purposes of reference was early felt, and so we find that various systems of division were introduced at different periods. Our modern arrangement of chapters, already referred to, was made by the Spanish cardinal, Hugo de Sancto Caro (died 1263). The subdivision into verses, as we now have it, was established by Robert Stephens in 1555. The titles and subscriptions of the books form no part of the original text, and they merely represent the ancient tradition as to the authorship of the books. The subscriptions in the case of some of the epistles are demonstrably erroneous.

During the 1,400 years of our era preceding the invention of printing, the text of the New Testament was preserved and transmitted by means of manuscript copies; and as the transcribers were liable to the various possibilities of error incident to such a process, the text naturally underwent numerous minute changes or variations in the course of frequent transcription. For long the existence of various readings was almost unknown, but in 1707 Dr. Mill announced that he had collected 30,000 for his edition. This number has since been greatly enlarged, and now not less than 120,000 are recorded. In deciding the correct text in such cases our chief authorities are the manuscripts. Their value depends partly on their antiquity and partly on other considerations, internal and external. The number of the uncial or older manuscripts (down to the 10th century), after deducting duplicates, is 127, and there



are in all about 1,500 cursives. For convenience of reference the former are designated by letters of the Roman or Greek alphabet, the latter by numerals. Among the leading are the Codex Alexandrinus (A), now in the British Museum, assigned to the first half of the 5th century; Codex Vaticanus (B), in the Vatican Library, assigned to the 4th century; Codex Ephraemi (C), a palimpsest in the Imperial Library at Paris, of the 5th century; Codex Bezae (D, for the Gospels and Acts), a Græco-Latin MS. in Cambridge University Library, assigned to the 6th century; and the Codex Sinaiticus, discovered by Tischendorf in 1859, believed to be at least as old as B. After manuscripts come the ancient versions, of which the chief are two Syriac translations, the Peshito and the Philoxenian; two Egyptian, the Memphitic and the Sahidic; the Ethiopic; the Gothic of Ulfilas (very fragmentary); the different remains of the version known as the old Latin and the Vulgate. A third authority consists in the citations of the books in the works of the fathers, but this is much less reliable than the other two.

The Greek New Testament was first printed on the eve of the Reformation in two nearly contemporary editions, that of the Complutensian Polyglot projected by Cardinal Ximenes (1514), and that of Erasmus (1516). Erasmus issued other editions, and was followed by the learned Parisian printer, Robert Stephens, whose great edition (1550), designated Regia (Royal), presented the first systematic collection of various readings. Beza's edition of 1589 and that of Stephens of 1550 were the chief authorities on which the English Authorized Version of 1611 was based. The celebrated Elzevir editions appeared at Leyden in 1624 and 1633. Subsequent editions of importance were Walton's Polyglot (1657), Dr. Mill's (1709), Bengel's (1734), and Wetstein's (1751), followed by the celebrated Griesbach's, who published his editions in 1774-1775, 1796-1806. Lachmann's larger edition appeared in 1842-1850, and was followed by Tischendorf's, one of the most important of all, and that of Tregelles (1857-1859). Westcott and Hort's edition, which does not greatly differ from Tischendorf's, appeared in 1881. Another recent text is that which gives the readings adopted in the Revised Version of 1881.

All the books of the New Testament have come down to us as originally written in the Greek language. The Greek of the New Testament, however, differs considerably from that of the classical writers, and belongs to what was called the common dialect, that form which the language assumed after the Macedonian supremacy had brought the various Greek-speaking communities under a common rule. The writers of

the New Testament were all, or nearly all, Jews; and while employing the Greek language, they exhibit many traces of their native idiom, so that their writings present more or less of a Hebraic coloring. The body, as has been well said, is Greek; the spirit is Hebrew. The language of the authors of the New Testament was powerfully influenced by that of the Septuagint, but it was more idiomatic. The New Testament writers frequently use well-selected Greek terms, which the Alexandrian translators have not employed; and form their phrases in accordance with genuine Greek idiom, where the Septuagint keeps by the Hebrew. The Hellenistic idiom in the Septuagint moves in the fetters of a close translation; in the New Testament it exhibits the freedom and flexibility of original composition.

*English Translations.*—Paraphrases of portions of the Bible into Anglo-Saxon alliterative meter were made by Caedmon, and are still extant, and we possess also the Psalms, the Gospels, and other portions of Scripture in Anglo-Saxon. Wyclif's translation, made by the reformer in conjunction with a coadjutor, Nicholas de Hereford, was begun about 1356, and completed in 1380. A revised and improved edition of this was executed by John Purvey, Wyclif's friend, and finished in 1388. The first printed version of the New Testament in English was the memorable translation of William Tyndale, one of the early martyrs to the Reformation. Before his exile from England, Tyndale had revolved in his mind this work, by which he proposed that he should make "the boy that driveth the plow to know more of the Scriptures than the priests." He executed it during his residence on the Continent, where his last years were spent in labors and travels connected with this enterprise. His New Testament was partly printed at Cologne in 1525, the complete edition appearing at Worms. Other editions were printed in different continental cities—Hamburg, Antwerp, Strassburg, Nuremberg, etc.—at different dates. It was proscribed and burned in England, but copies were smuggled over and used in secret. The Pentateuch was also published by Tyndale in 1530, a second edition in 1534. He also translated some of the prophetic books. His translation was superior to all previous versions in purity, perspicuity, and accuracy, and it formed the basis of all subsequent translations, particularly of the Authorized Version. The first printed English translation of the entire Bible was published by Miles Coverdale in 1535. It was undertaken at the instance of Cromwell in opposition to Tyndale's translation, and being made, not from the originals but from German and Latin versions, was inferior to Tyndale's. It is in black-letter and contains the Apocrypha. After the death



of Tyndale, John Rogers, who was the first to suffer death for his religion in the reign of Queen Mary, undertook the completion of his translation of the Old Testament, and the preparation of a new edition. In this edition the latter part of the Old Testament (after II Chronicles) was based on Coverdale's version. It was printed at Antwerp, in black-letter, and the translator's name was given as Thomas Matthew. Through the influence of Archbishop Cranmer it was allowed to be published in England and was dedicated to Henry VIII. It was in one volume folio, dated 1537, and contained useful prefatory matter and marginal notes. A second edition appeared in 1538; and a revised edition was published in 1539, under the superintendence of Richard Taverner, who also added matter of his own. In the same year as Taverner's another edition appeared, printed by authority, with an engraving, said to be by Holbein, on the title-page, in costly type, and forming a sumptuous folio, with a preface by Cranmer, and hence called Cranmer's Bible, otherwise the Great Bible. This was the first Bible printed by authority in England, and a royal proclamation in 1540 ordered a copy of it to be placed in every parish church. This continued, with various revisions, to be the authorized version till 1568. In 1557 an English translation appeared at Geneva, beginning with the New Testament, based on Tyndale's, and completing the entire Bible in three years. This was the work of Whittington, Coverdale, Goodman, John Knox, and other exiles. It was accompanied by notes of a polemical and Calvinistic tendency. It was commonly called the Geneva Bible, but became even better known by another title, the Breeches Bible, from its rendering of the last clause of Genesis iii: 7: "They sewed fig-tree leaves together and made themselves breeches." This version was generally adopted by the Puritan party, and was for 60 years the most popular in England. It was allowed to be printed in England under a patent of monopoly in 1561. It was the first printed in Roman letters, instead of the old black-letter, which reduced its bulk and price. It was also the first English edition (as already mentioned) to adopt the plan of a division into verses. It omitted the Apocrypha, left the authorship of the epistle to the Hebrews open, and put words not in the original in italics.

The Bishops' Bible, published in 1568 to 1572, was based on Cranmer's and revised by Archbishop Parker and eight bishops. It succeeded Cranmer's as the authorized version, and was rendered as attractive as profuse illustration and expensive getting up could render it, but this made it inaccessible to the people, and it did not commend itself much to scholars. In 1582 an edition of the New Testament, translated from the Latin Vulgate, appeared at Rheims, and

in 1609-1610 the Old Testament, with notes, was published at Douay. This is commonly called the Douay Bible, and is the English version recognized by the Roman Catholic Church. It professed to be based on a greater respect for the Septuagint, the Vulgate, and other ancient translations, than the previous English versions, and was accompanied by notes as dogmatic as those of the Geneva Bible. In one respect it was markedly deficient, in purity of English diction.

In the reign of James I. a Hebrew scholar, Hugh Broughton, insisted on the necessity of a new translation, and at the Hampton Court Conference (1604) the suggestion was made by Dr. Rainolds of Oxford, as spokesman of the Puritan representatives, and accepted by the king. The work was committed to 54 scholars, but only 47 took part in it. They were divided into six companies, who had their respective tasks assigned them and met apart. The revision was begun in 1607, and occupied three years. The whole work was revised by 12 of the translators, two out of each company, and a final revision was made by Dr. Myles Smith, the writer of the preface, and Dr. Bilson, Bishop of Winchester. The completed work was published in a folio volume in 1611. The translators were enjoined to follow the ordinary Bible read in the churches commonly called the Bishops' Bible, and not to make alterations unless the meaning of the original could be more accurately conveyed. The general accuracy of this translation, which is usually known as the Authorized Version, and the purity of its style, so won the approbation of scholars and commended it to readers generally that from the time of its adoption it has superseded all other versions. This general adoption, however, which no previous authorized version had succeeded in obtaining, though evidently resting more on its own merits than on official sanction, has probably had an injurious effect on the critical study of the Bible, which the continued use of a variety of versions must have tended to foster. Latterly, however, the advances made in Hebrew scholarship and biblical criticism gave rise to a general demand among those interested in the study of the Bible for a revision of the Authorized Version, and the task was undertaken by a number of the Anglican clergy, with the aid of associates from various other bodies. The work was set afoot by the convocation of Canterbury, which in 1870 appointed a committee to consider the question of revision. The committee in a few months reported favorably on the scheme, recommending that "the revision be so conducted as to comprise both marginal renderings and such emendations as it may be found necessary to insert in the text of the authorized version"; stating also "that in the above



resolutions we do not contemplate any new translation of the Bible, or any alteration of the language, except where in the judgment of the most competent scholars such change is necessary." The work of translation was accomplished by two committees, British and American, the function of the latter being wholly an advisory one. Two companies were soon formed—one for the Old, the other for the New Testament—and the revised version of the New Testament was issued in 1881, while that of the Old Testament appeared in 1885. In accuracy, at least, the revised version is greatly superior to the Old, but probably it will not supersede it. The American committee published in 1901 an American Revised Version, in which were presented the readings originally suggested by it to the British Committee, but not embodied in the Revised Version, and also various other alterations made by it subsequent to 1885. Of other translations than the English Authorized Version, that of Luther, which formed an epoch in the history of the German language, is the most remarkable. The New Testament portion was published in 1522, the Old Testament from 1525 onwards, and the first complete edition appeared in 1534.

**Bible and Science, Accord of.** It is equally a mistake to go to the Bible for science, or to science for the historical and moral teachings of the Bible; but in each case we can go to the other for confirmatory evidence. In history and morals, the Bible is the main witness, while in the realm of natural philosophy, science is the main witness. But the evidence for the moral teachings of the Bible may be strengthened by studying the analogies of nature, and as an historical witness the Bible may be cross-questioned to see if its statements conform to the natural conditions implied. On the other hand, science may be cross-questioned to see if its purported conclusions conform to the plain teachings of the Bible regarding morals and history. In this article we will submit some of the most important portions of Bible history to the cross-questioning which is made possible by scientific investigations.

I. At the outset it is important to note that both the facts of science and the language of the Bible have to be interpreted and that, therefore, what seem to be contradictions between science and the Bible may be merely contradictions between false interpretations of one or the other, or of both. Since the Bible is a literary book mainly designed for the accomplishment of a moral purpose, it is not proper to treat its words and phrases as if they were in a scientific treatise, where a strict literal interpretation is properly adhered to. The Bible should be allowed all the freedom

of interpretation which belongs to other literature of its class. When God is said to do things which are accomplished through secondary agencies, it is no more fair to attribute error to the statement than it would be to one in which the president of a modern corporation is said to manufacture goods which he has never touched or seen, and which are not made by hand at all, as the etymology of the word would imply. Keeping this principle in mind, we will notice first that the Bible and science are in remarkable accord in the matter of the creation of the universe. The Bible most unequivocally makes the universe the work of a personal God: "In the beginning God created the heavens and the earth." To this bold statement, which heathen philosophers never dared to make, science not only can make no valid objection, but must add the support of her own positive testimony. Among physicists there are no greater names than those of Lord Kelvin, Faraday, and Clerk-Maxwell, all of whom are, or were, devout believers in the Bible. Two famous sayings of Clerk-Maxwell voice the sentiment not only of these, but of almost all profound students of chemistry and physics. After tracing the protean forms of matter down to the ultimate atoms, with which the chemist deals in all his formulæ, Clerk-Maxwell affirms that they bear every mark of being "manufactured articles"; while, after having traced to its limits every variety of evolutionary theory, he affirmed with the utmost confidence that every one of them must have a God to make it work. Thus are these philosophers brought back to almost the identical opening words of Genesis as the statement of their highest philosophy.

II. The first verse of Genesis is followed by a more detailed statement, indicating that the original creation was succeeded by an orderly development, progressing from the simpler forms of matter and life to the complex forms which we see at the present time. This involves periods of time, even if one should restrict the meaning of the word "day" to twenty-four hours, which is by no means necessary, when one considers the great latitude given to the meaning of the word "day" both in the Bible and in general literature. Now, it is a most striking fact, which cannot be lightly disregarded, that the order of the creation as stated in the first chapter of Genesis is so closely parallel to that which is brought to light by modern science, that even carping critics can find but little fault with it, while a large array of eminent geologists, like Guyot, Dawson, Dana and Winchell, emphatically declare that the scheme is so perfect as to preclude the idea of its being of human origin. No uninspired man, three thousand years ago, could have hit upon a



scheme according so closely as this does with the ripest fruits of modern science. The criticisms of Huxley and others are based upon small matters, involving such a doubtful interpretation of literary phrases that they are scarcely worthy of notice. The production of such a scheme, so accordant with the actual facts, by a Jew twenty-five hundred or three thousand years ago, without the aid of divine inspiration, would be a greater wonder than its production through divine inspiration.

III. In the story of the flood, the Bible indicates a period of instability in the earth's crust such as does not now exist. Hence there has been a strong tendency either to regard the story as entirely unhistorical, or to minimize the event to such an extent that it loses its significance. The Bible says that the flood was largely caused by the "breaking up of the fountains of the great deep," which is a very good geologic phrase for the subsidence of the land. It also affirms that the destruction was so extensive that an ark was necessary to preserve not only Noah and his family, but the species of animals most closely associated with him. When one observes the literary character of the document and keeps in view its moral purpose, it is easy to see that it is unfair to impose upon the language a strictly literal interpretation. The "general" phrases used are such as are often employed under the restrictions of the known conditions to which they are applied. When, for example, we say, "Every one knows," or "The whole heavens were black," no one thinks of giving an absolutely literal interpretation to the words used. As Dr. Dawson has well said, the story of the flood reads like the "log" of a sea-captain, in which the general phrases are, from the nature of the case, restricted to the horizon of his vision. It is to be noticed, in confirmation of the account, that the dimensions of the ark are scientific in their proportions—its length, breadth and depth being nearly the same as those of the latest steamships made to cross the Atlantic. In round numbers, the ark was 500 feet long, 80 wide and 50 deep. The "Great Eastern" was 680 feet long, 83 wide and 48 deep. That such correctness of proportions could not have been ignorantly obtained by guesswork is shown by the fact that everybody else who has dealt freely with the subject has destroyed the harmony. The cuneiform tablets make the vessel so broad and high that it would be utterly unseaworthy, viz., 1,000 feet long and 233 feet wide and deep; while Berosus makes it 1,200 feet broad, and Origen claimed that it was 135,000 feet long, and 3,750 feet wide. What kept the biblical writer from making a fool of himself as these others have done? The simple answer is, that he confined him-

self to the facts which had come under his observation.

Returning now to the scientific question of a recent abnormal instability of the earth's crust, such as is implied in the biblical account of the deluge, we may cite as evidence the well-known geological facts that all the high mountain systems of the world belong to the latest geological (the Tertiary) epoch, and received their main elevation shortly before the advent of man, while there is abundant evidence that since man came into the world there have been extensive oscillations of level fitted to cause catastrophes beyond anything of which we have had modern experience. More and more these oscillations of land level are seen to connect themselves with the glacial epoch, which came on at the close of the Tertiary period and, continuing until after the advent of man, ended in a series of rapid changes of level affecting a large part of the Northern hemisphere. The general public has scarcely yet begun to realize the extent of the tremendous shifting of forces which took place during this epoch. Six million square miles of territory in the Northern hemisphere were covered with ice a mile deep, making six million cubic miles. This ice was formed by the accumulation of snow, which represented water evaporated from the ocean, and was sufficient to lower the ocean level 250 feet the world over. In weight the ice was twice as great as the whole of the North American continent, amounting to twenty-four thousand million tons. Any one who appreciates what it means to have that amount of weight transferred from the ocean beds to a limited portion of the land surface of the Northern hemisphere will have such a sense of the instability of the earth's crust at that time that Noah's flood will be easily credible from any point of view. The means for its accomplishment will be seen to be so ready at hand that the calamity will make no excessive demands upon our credulity. The means and the end will not be disproportionate. We do not claim, however, by this deductive reasoning, to prove the flood. We simply accept the evidence of the Bible, and by this means remove the exaggerated objections to the occurrence of the event which have hindered belief. The Bible narrative is brief, and aimed principally at giving the moral effects of the catastrophe. Still, the sobriety of the account goes far to establish its genuineness and accordance with fact.

IV. In like manner, recent studies into the geology of the Jordan Valley go far to confirm in a remarkable degree the biblical account of the destruction of Sodom and Gomorrah, and of the crossing of the Jordan by the children of Israel under the leadership of Joshua. In both these ac-



counts it is to be observed that there is a remarkable brevity, leading to the exclusion of all superfluous matter, and of everything which is out of harmony with physical conditions. One who is familiar with the general tendency of the human mind to enlarge such narratives by the addition of explanatory and legendary surmises, cannot read these Bible accounts without being convinced that they are the records of eye-witnesses with which no one has ventured to tamper.

The Jordan Valley is a great crack in the earth's surface, along which the western edge has slipped down to the extent of 4,000 or 5,000 feet. This is what the geologists call a "fault," and, all things considered, it is probably the most remarkable of its kind in the world. Along the line of such a fault, further movement is likely to continue and be connected with earthquakes, which would lead to openings into the depths of the earth. In this case, the movements are in an exhausted oil and gas district, the signs of which are abundant, both in the existing rocks and in the large quantities of bitumen or asphalt which are found about Jericho and the Dead Sea. The description of the destruction of Sodom and Gomorrah fits so perfectly to the explosion and burning of such a combustible reservoir that it could not have been invented, but must be the simple tale of an eye-witness. The description of the scene witnessed by Abraham from the heights of Hebron as he looked over into the valley of the Jordan at the time of this catastrophe has been matched time and time again in the great Russian oilfields at Baku. It is a striking commentary upon the matter-of-fact character of this description that in the "National Geographic Magazine" Mr. Robert T. Hill, who was sent by the society to Martinique to investigate and report upon the calamity there, opened his report with the graphic words of this Bible story, "The Lord rained fire and brimstone, and the smoke of the country went up as a furnace."

The story of the crossing of the Red Sea affords another remarkable opportunity for testing the truth of the account by the physical conditions. The biblical story is remarkable for the prominence it gives to the secondary causes associated with the event. "The Lord caused the sea to go back by a strong east wind" which blew all night and made the sea "dry land"; and when the waters came back to overwhelm the Egyptians it was God "who did blow with his wind that the sea should cover them." The Gulf of Suez now ends in a narrow point of shallow water extending a few miles north of the city; but there is every evidence to show that at a comparatively recent time the region northward was depressed 25 or 30 feet, so that an arm

of the gulf projected 30 or 40 miles northward to the present station of Ismailia. Under such conditions the isthmus which now separates Suez from the Bitter Lakes would be covered with water 6 or 7 feet deep, when the strong east wind spoken of in the Bible would easily lower the level of the water so much that this isthmus would be dry. The west winds blowing over Lake Erie are frequently known to lower the water 7 or 8 feet at Toledo, while the east winds lower it an equal amount at Buffalo. We have, therefore, but to suppose that the children of Israel were encamped just south of the Bitter Lakes in a region which fits the description exactly, when God through the agency of the wind opened a way of escape before them, and through the same agency closed the passage behind them, so as to overwhelm their pursuers. The statement that the "waters were a wall unto them" on their right and on their left simply means that they were protected by the water upon either flank—the Gulf of Suez on their right and the Bitter Lakes upon their left. Thus Nahum (xxxviii.), speaking of Egypt, says, ". . . whose rampart was the Nile and her wall was the sea." So strictly does this biblical account conform to the geological conditions involved that it is impossible to regard it as anything but a straightforward story of an eye-witness which has not been remodeled by the imaginations of the original writers or of the transcribers. It is not a myth or a legend, but a true story supported by every kind of scientific examination.

The crossing of the Jordan by the children of Israel is supported by similar cross-examination. There is nothing fantastic in the biblical account, but in the simplest manner it is said that "the waters which came down from above stood and rose up upon an heap very far from the city of Adam, that is beside Zaretan: and those that came down toward the sea of the plain, even the salt sea, failed and were cut off" (Josh. iii. 16). Here the description corresponds exactly to what would occur if such a landslide on the brink of the river as we know to have taken place at the Cascades of Columbia River in Oregon, had taken place in the Jordan a short distance above the ford. This would have produced a temporary dam setting the water back to Zaretan, maintaining a dry bed below until the host had passed over, when the water would have surmounted the obstruction and soon resumed its ordinary course. A study of the trough of the Jordan above the ford makes such a catastrophe easily credible. Or another method of producing the results described might easily have been through the agency of an earthquake which pushed a ridge or wave of earth across the valley to obstruct the current



of the river temporarily. The description of the event in the Bible fits in with either of these secondary causes, and, like that of the crossing of the Red Sea, is free from exaggerated and fantastic conceptions.

Thus, in general, it may be confidently affirmed that the Bible history is so in accord with the physical conditions involved, and is so far from making extravagant demands upon our belief in the miraculous, that its credibility is supported, rather than lessened, by scientific cross-examination. Space forbids showing this here respecting the experiences of Israel in Egypt and numerous other crucial instances, but all would tend, in a similar manner, to confirm the general credibility of Old Testament history.

G. FREDERICK WRIGHT.

**Bible Societies**, societies formed for the distribution of the Bible or portions of it in various languages, either gratuitously or at a low rate. A clergyman of Wales, whom the want of a Welsh Bible led to London, occasioned the establishment of the British and Foreign Bible Society, which was founded in London, March 7, 1804. A great number of similar institutions were soon formed in all parts of Great Britain, and connected with the former as a parent society, to support it with pecuniary contributions and to receive in return a supply of Bibles. On the Continent of Europe, in India, in the Australian colonies, in Canada and elsewhere, similar societies have been formed and are connected with the home society which is by far the largest of the kind in the world. It carries on the distribution of the Scriptures, partly directly, by means of agents of its own established in the different countries, under whom are colporters who disseminate the society's publications among the people; and partly indirectly, by the assistance it gives to other associations of various kinds, all engaged in work more or less akin to its own. Thus churches engaged in missionary or home work are everywhere indebted to the British and Foreign Bible Society for assistance lent, and in particular the Society for the Propagation of the Gospel in Foreign Parts and the Church Missionary Society, which between them use some 70 languages in their missions, are for 60 out of those 70 languages entirely dependent on the Bible Society. Other institutions aided by free grants of books, or of books at reduced prices, include such as the missions to seamen, soldiers, and fishermen, Young Men's Christian Associations, missionary societies, the Salvation Army, Dr. Barnardo's Homes, etc.; while grants of money are made directly to the expenses of Bible women in London and to several societies for the employment of idle women in the East, such as the Church of England Zenana Missionary Society, and the Zenana Bible and Medical Mission. Since

the formation of this great society in 1804 the translation, printing, and distribution of the whole or part of the Bible has been promoted by it directly in 286 languages or dialects, and indirectly in other 65, making a total of 351, exclusive of different versions and revisions in the same language or dialect. Among the European languages in which the whole Bible has been circulated are Welsh, Gaelic, Irish, Manx, French, Spanish, Portuguese, Italian, Flemish, Dutch, Danish, Norwegian, Swedish, Icelandic, German, Russian, Polish, Bohemian, Hungarian, modern Greek, ancient Greek, Turkish, Rumanian, Servian, Bulgarian.

In some cases the whole Bible has been translated on behalf of a comparatively small population. Thus, to mention only European tongues, we have separate versions for the use of the Lithuanians, the Wends of Saxon Lusatia, the Wends of Prussian Lusatia, the Romansch people of the Engadine, the Romansch of the Grisons, the Lapps, the Finns, the Livonians, and the Esthonians. Among the languages of Asia the Bible has been translated into Armenian (ancient and modern), Arabic, Syriac, Persian, Sanskrit, Hindustani, Bengali, Hindi, Uriya (Orissa), Telugu, Kanarese, Tamil, Malayalam, Marathi, Gujarathi, Singhalese, Assamese, Burmese, Chinese, Mongol, Japanese, and Malay. There are also versions in Maori, Fijian, and several other languages of the Pacific islands; in Abyssinian (Amharic), Swahili, Malagasi, Sechuana, Zulu, and one or two other languages of Africa; in Eskimo and Cree among American tongues; while many of the languages in which portions of the Scriptures have been circulated by or through the society are unknown to ordinary readers even by name. In many cases the society has been instrumental in getting languages reduced to a written form for the first time in order to provide the people using them with the Scriptures. The society has a large annual income, arising partly from subscriptions, donations, legacies, etc., and partly from the sale of its publications, which, of course, are often sold at a loss. Latterly its annual expenditure has been usually about £200,000, and in one year rose as high as £240,000. Altogether, from its commencement to 1898, its expenditure amounted to £12,744,000. For the year ending March 31, 1898, the income amounted to £229,749, the expenditure to £221,857. The total issue of the society in the same year of Bibles and portions of the Bible was 4,387,152, there being 2,073,467 of these issued from the Bible House, London, and the rest from the depots abroad. The aggregate of the society's issue now amounts to about 160,000,000. At the beginning of the 19th century it is probable that there were not more than 4,000,000 or 5,000,000 copies of the Scriptures in the world, the number of



## Bible Societies

translations then employed for the Bible amounting to about 50. Since the establishment of the British and Foreign Bible Society about 160,000,000 copies of the Word of God, in whole or in part, have, as just mentioned, been circulated by its directly; while other kindred societies which have sprung out of it, or acted in concert with it, have distributed 94,000,000 copies more; so that during the 19th century the total number of copies or portions of the sacred Scriptures distributed in this way has amounted to about 254,000,000.

The Edinburgh Bible Society was established in 1809, and up to 1826 was connected with the British and Foreign Bible Society. It then took up a separate position, and remained independent till in 1861 it united with the National, the Glasgow, and other Bible societies, into a whole called the National Bible Society of Scotland, having its headquarters in Edinburgh and Glasgow. The revenue of the society is between £30,000 and £40,000, and the yearly circulation of Bibles and portions of Scripture about 800,000. The society has many auxiliaries, and circulates the Scriptures in Great Britain and colonies, on the Continent, and in China, Japan, etc. The total issue is now over 12,000,000. The Hibernian Bible Society, which has its headquarters in Dublin, was established in 1806. Its object is to encourage a wider circulation of the Holy Scriptures, without note or comment, in Ireland.

On the Continent of Europe the principal Bible societies are the Prussian, which was established at Berlin in 1805, and has issued over 3,000,000 copies; the Würtemberg, instituted in 1812, with auxiliaries; the Berg (Elberfeld), instituted 1813; the Saxon, 1814; the Netherlands, 1815; and the Swedish. The Russian Bible Society in St. Petersburg, founded in 1813, vied with the British, and printed the Bible in 31 languages and dialects spoken in the Russian dominions; but it was suppressed by an imperial ukase in 1826. A new Bible society was then instituted at St. Petersburg—namely, the Russian Evangelical Bible Society, which supplies the Bible to Russian Protestants. The British and Foreign Society has colporters in the country. In 1817 the distribution of the Bible by such societies was forbidden in Austria, and those already existing in Hungary were suppressed. Italy, Spain, and Portugal have had as yet no Bible societies; but the British societies are energetic in providing them with Bibles in their own tongues.

In the United States the great American Bible Society, formed in 1816, acts in concert with the auxiliary societies in all parts of the Union. The annual income of the society is now over \$500,000, and its total issue has amounted to about 64,000,000 copies. These have been mostly in English,

## Bible Statistics

Spanish, and French, from the society's plates. The managers have occasionally purchased Bibles in Europe, and issued them to applicants, in German, Dutch, Welsh, Gaelic, Portuguese, modern Greek, and some other European languages. They have also furnished money to print translations into pagan languages, by American missionaries. It is the object of the society to supply every one who can read in the United States, before devoting much attention to distribution abroad. Yet Spanish America and Ceylon, Greece, and the Sandwich Islands have been furnished with Bibles by the society. Other American societies are the Pennsylvania Bible Society, the American and Foreign Bible Society, and the American Bible Union.

**Bible Statistics**, an interesting compilation, said to be the fruits of three years' labor by the indefatigable Dr. Horne, and given by him in his introduction to the study of the Scriptures. The basis is an old English Bible of the King James version.

*Old Testament*.—Number of books, 39; chapters, 929; verses, 23,214; words, 593,493; letters, 2,728,100.

*New Testament*.—Number of books, 27; chapters, 260; verses, 7,959; words, 181,253; letters, 838,380.

*The Bible*.—Total number of books, 66; chapters, 1,189; verses, 31,173; words, 773,746; letters, 3,566,480.

*Apocrypha*.—Number of books, 14; chapters, 184; verses, 6,031; words, 125,185.

*Old Testament*.—The middle book of the Old Testament is Proverbs. The middle chapter is Job xxix. The middle verse is II Chronicles xx, between verses 17 and 18. The shortest book is Obadiah. The shortest verse is I Chron. i: 25. The word "and" occurs 35,543 times. Ezra vii: 21 contains all the letters of our alphabet. The word "Selah" occurs 73 times and only in the poetical books. II Kings xix and Isaiah xxxvii are alike. The Book of Esther does not contain the words God or Lord. The last two verses of II Chronicles and the opening verses of the Book of Ezra are alike. Ezra ii and Nehemiah vii are alike. There are nearly 30 books mentioned, but not found in the Bible, consisting of civil records and other ancient writings now nearly all lost. About 26 of these are alluded to in the Old Testament.

*New Testament*.—The middle book is II Thessalonians. The middle chapter is between Romans xiii and xiv. The middle verse is Acts xvii: 17. The smallest book is II John. The smallest verse is John xi: 35. The word "and" occurs 10,684 times. The name Jesus occurs nearly 700 times in the Gospels and Acts, and in the Epistles less than 70 times. The name Christ alone occurs about 60 times in the Gospels and



Acts, and about 240 times in the Epistles and Revelation. The term Jesus Christ occurs 5 times in the Gospels.

*The Bible.*—The middle book is Micah. The middle (and smallest) chapter is Psalm cxvii. The middle verse is Psalm cxviii: 8. The middle line is II Chronicles iv: 16; the largest book is that of the Psalms; the largest chapter is Psalm cxix. The word Jehovah (or Lord) occurs 6,855 times. The word "and" occurs 46,227 times. The number of authors of the Bible is 50. The Bible was not until modern times divided into chapters and verses. The division of chapters has been attributed to Lanfrank, Archbishop of Canterbury, in the reign of William I.; but the real author of this division was Cardinal Hugo de Sancto-Caro, about 1236. The number of languages on earth is estimated at 3,000; the Bible or parts of it have been rendered into only about 180, or, languages and dialects together, 345. The first English translation complete of the Bible was by Wyclif in 1380. The first American edition was printed in Boston in 1752.

**Bibles, The Seven**, the seven principal Bibles of the world are the Koran of the Mohammedans, the Eddas of the Scandinavians, the Tripitikes of the Buddhists, the Five Kings of the Chinese, the three Vedas of the Hindus, the Zend Avesta and the Scriptures of the Christians. The Koran is, except the Eddas, the most recent of these seven Bibles and not older than the 7th century of our era. It is a compound of quotations from the Old and New Testaments, the Talmud and the Gospel of St. Barnabas. The Eddas of the Scandinavians was first published in the 14th century. The Tripitikes of the Buddhists contain sublime morals and pure aspirations, but their author lived and died in the 6th century before Christ.

The sacred writings of the Chinese are called the Five Kings, king meaning web of cloth or the warp that keeps the threads in their place. They contain the best sayings of the best sages on the ethico-political duties of life. These sayings cannot be traced to a period higher than the 11th century before Christ. The three Vedas are the most ancient books of the Hindus, and it is the opinion of Max Müller, Wilson, Johnson and Whitney that they are not older than 11 centuries before Christ. The Zend Avesta of the Persians is the grandest of all these sacred books next to our Bible. Zoroaster, whose sayings it contains, was born in the 12th century before Christ.

**Biblia Pauperum** (Bible of the poor), the name for block books common in the Middle Ages, and consisting of a number of rude pictures of Biblical subjects with short explanatory text accompanying each picture.

**Biblical Archæology, Society of**, a society founded in London Dec. 9, 1870, "for the investigation of the archæology, history, arts, and chronology of ancient and modern Assyria, Palestine, Egypt, Arabia, and other Biblical lands; the promotion of the study of the antiquities of those countries, and the record of discoveries hereafter to be made in connection therewith." The association has already risen into great power and reputation. It was before this society that George Smith, on Dec. 3, 1872, read his paper on "The Assyrian Account of the Deluge," translating the celebrated "Deluge Tablet."

**Biblical Criticism**, the science which has for its objects (1) to decide which books are entitled to have a place in the Scripture canon, and (2) to bring the text of these canonical books to the utmost possible degree of purity. In prosecuting the first of these aims, the Biblical critic must not be confounded with the Christian apologist; the function of the former is a strictly judicial one, while the office of the latter is that of an advocate. One important subject of investigation is as to what Old Testament books were recognized as divine by the ancient Jewish Church or Synagogue; as also what New Testament books were at once and universally welcomed by the early Christian Church, and what others were for a time partially rejected, though they ultimately found acceptance everywhere. In seeking to purify the text, the Biblical critic must do much toilsome work in the collation of codices or manuscripts. He does not put the whole of these on one level and admit whatever reading has a majority of manuscripts in its favor; but attempts to test the value of each one apart, forming an hypothesis if he can as to when, where, and from whom it emanated, and from what other manuscripts it was copied at first, or, in technical language, to what recension it belonged. Those which he values most for New Testament criticism are the "Codex Sinaiticus," written probably about the middle of the 4th century; and the "Codex Alexandrinus" and "Codex Vaticanus," dating, it is believed, from about the middle of the 5th century.

Subjoined is a list of a few of the chief passages in the New Testament on which Biblical critics have thrown doubt: Mark xvi: 9-26; John v: 4; viii: 1-11; Acts viii: 37; I John v: 7, and, perhaps, the doxology appended to the Lord's Prayer, "For thine is the kingdom," etc. (Matt. vi: 13.) These omissions will not overthrow any theological doctrine held by the Churches.

**Bibliography**, the science or knowledge of books, their authorship, the dates of their first publication, and of the several editions they have gone through, with all other points requisite for literary history.



This, it will be perceived, is not the meaning of the word in Greek. The Greek term generated the French *bibliographie*, with the meaning (identical with neither the Greek nor the English one) of acquaintance with ancient writings and skill in deciphering them. About A. D. 1752 the modern sense of the word was arising, though the old one still held its ground. Finally, in 1763, the publication of De Bure's "Bibliographic Instructif" established the new meaning, and gave the death blow to the old one. It was not the first book which had appeared on literary history, Conrad Gesner's "Bibliotheca Universalis," containing a catalogue of all the Hebrew, Greek, and Latin books he knew, had long preceded it, having appeared in 1545. Among the standard works on bibliography may be mentioned Watt's "Bibliotheca Britannica," published in England in 1824; and Lowndes' "Bibliographer's Manual," published in the same country in 1834. The "Catalogue of the Library of Congress" or of any other library is a bibliographical production; so, also, is every publisher's catalogue.

**Bibliomancy**, divination by the Bible, sometimes called *Sortes Biblicæ*; a common practice among the early Christians, who were accustomed to regulate their conduct by opening the Sacred Scriptures, and accepting the passage which first presented itself as a guide. Although condemned by the councils of Vannes in 465; Agde, in 506, and Orleans in 511, this mode of divination was practiced for many years. The Mohammedans exercise a similar divination by means of the Koran. The ancients used the works of Homer and Vergil in the same manner—the *Sortes Homericæ*, and the *Sortes Vergilianæ* being popular means of prognosticating future events.

**Bibliomania**, the passion of the book miser, which impels to the gathering and hoarding of books without regard to their literary value or practical utility; or, in its nobler aspect, in Andrew Lang's phrase, the "love of books for their own sake, for their paper, print, binding, and for their associations, as distinct from the love of literature." The word in English is modern, having been introduced from France about 1750; but the thing must be in some form as ancient as the existence of printed or written documents. In this, as in other passions of the like kind, the freaks of individual fancy are endless: while one man disdains everything save the tallest copy of a rare work in the finest condition, another takes pity on the dingiest waif of the back street bookstall. Fashion, too, exercises a great influence on the form in which bibliomania displays itself; it is no longer the prevailing hobby to collect Elzevir and Foulis editions, but he is a special favorite of the gods who possesses a set of the parts

of "Pickwick" in the original green paper covers, or of early Thackerays in their original yellow. Competition between collectors leads to the most extravagant prices being paid in the book auction. Bernard Quaritch, the London bookseller and bibliophile (died Dec. 17, 1899), had the credit of having paid the largest sum recorded as the price of a single volume—\$24,750 for No. 1650 at the Syston Park sale, in 1884—"Psalmorum Codex" (folio, Mogunt. Fust and Schöffer, 1459). At the Syston sale also the so-called Mazarin Bible (one of the 25 copies known to have belonged to Cardinal Mazarin), which is the first printed Bible, printed by Gutenberg and Fust about 1450, brought \$19,500. At the sale of the Earl of Jersey's Oesterley Park library in 1885, the only perfect copy of Malory's "King Arthur," printed by Caxton, was sold to a Chicago merchant for \$9,750; Caxton's "Historyes of Troye" brought \$9,100; and Caxton's "Eneydos" brought \$11,750.

**Bibra**, Ernst von (bē'brā), a German scholar and writer, born in Schwebheim, Bavaria, June 9, 1806; was left an orphan with a large fortune at an early age; devoted himself to physical science, publishing various works that brought his name before the public. He traveled in South America, taking home with him collections important both from the ethnological and naturalist's view point. Among his numerous works are "Travels in South America," "Memories of South America," "Sketches of Travel and Novels" (1864), etc. He died in Nuremberg, June 5, 1878.

**Bibracte** (bē-brak'tē), a town of ancient Gaul; was the capital of the *Ædui*, whom Cæsar once defeated; the modern Autun.

**Bibulus**, Lucius Calpurnius, a Roman politician. He was consul with Julius Cæsar in 59 B. C., which office he acquired through the influence of the aristocratic party. After his opposition to Cæsar's agrarian law had failed, he secluded himself in his house, whence he issued edicts against the measures of Cæsar. In 49 B. C. Pompey appointed him commander of the fleet in the Roman Sea. In the following year Cæsar eluded him and crossed over into Greece. He died near Coreyra, Greece, in 48 B. C.

**Bicarbonate**, a name given to the acid carbonates of potassium ( $\text{KHCO}_3$ ), sodium ( $\text{NaHCO}_3$ ), ammonium ( $\text{NH}_4\text{HCO}_3$ ), etc. Also a carbonate dissolved in water containing carbonic acid gas, as carbonate of calcium thus dissolved, reprecipitated on boiling. Bicarbonate of potassium,  $\text{KHCO}_3$ , is obtained by passing  $\text{CO}_2$  gas through a saturated aqueous solution of  $\text{K}_2\text{CO}_3$  (potassium carbonate). It crystallizes in colorless rhombic non-deliquescent crystals,



which are soluble in four times their weight of water. It does not give a precipitate with  $\text{BaCl}_2$  in the cold. Bicarbonate of potassium is a direct antacid, and is employed in the treatment of acute rheumatism and for removing uric acid from the system.

**Bicci, Ersilio** (bē'chē) an Italian poet, born in Pisa, 1845. He studied in Florence, and became Professor of Italian Literature in the *Licei Dante and Toscanelli* of that city. His best composition is in the collection styled "New Verses."

**Bice**, the name of two colors used in painting, one blue, the other green, and both native carbonates of copper, though inferior kinds are also prepared artificially.

**Bicêtre** (bē-sāt're), a village of France, 1 mile from Paris, where, in the reign of Charles V., a large building was erected for disabled soldiers, but which was destroyed in the wars under Charles VI. It was rebuilt by Louis XIII., and was used as a military asylum until the *Hôtel des Invalides* was established at Paris. It was afterward used as an hospital for the old, the sick, and the insane, and also served as a prison. A fort was built here in 1842.

**Bichloride of Gold**, in chemistry and pharmacy,  $\text{Au}''\text{Cl}_2$ , a substance which has risen into notoriety on account of the use made of it by the late Dr. Keeley of Dwight, Ill., in the cure of dipsomania and chronic alcoholism. Its general characteristics chemically, posologically, and in physiological action are to a great extent similar to those of mercury bichloride. Its employment by Dr. Keeley produced a profound impression on the medical world, and many advocates both for and against its virtues exist. The success, from a financial standpoint, of the Dwight sanitarium, induced many imitators and much harm has been done by unskillful persons using this dangerous and most powerful medicinal agent.

**Bickersteth, Edward**, an active and devoted clergyman of the Church of England; the son of a surgeon in Kirkby-Lonsdale, Westmoreland; was born there, March 19, 1786. He was educated in the grammar school of his native town, and at the age of 14 was placed in a situation in the postoffice, London. After remaining there for six years he served an apprenticeship of five years as an articled clerk with a London attorney. He then commenced business as a solicitor in Norwich, in partnership with his brother-in-law, Mr. Bignold (having married in 1812)—an undertaking which rapidly prospered, and from which he soon found himself realizing a large and increasing income. A great change, however, now came over his mind—the truths of religion made a deep impression on him,

and he began to exert himself in promoting their diffusion among his fellowmen. Among other works accomplished by him was the establishment of the Norwich Church Missionary Society. He also published in 1814 "A Help to the Study of the Scriptures," which met with great success. But nothing could now satisfy him till he had fairly embarked all his energies in the cause of religion, and he accordingly resolved to abandon the legal profession for that of a minister of the Church of England. The Church Missionary Society wished to send him abroad on a special mission to Africa, and in this view the Bishop of Norwich, dispensing with the usual course of a university education, admitted him to deacon's orders, Dec. 10, 1815, and a fortnight afterward he was admitted to full orders by the Bishop of Gloucester. Mr. Bickersteth thereupon, with his wife, proceeded to Africa, from which, after accomplishing satisfactorily the objects of his mission, he returned in the following autumn. He now filled the office of secretary to the Church Missionary Society, and from this period to 1830, when he resigned it, was most zealous and indefatigable in the performance of its multi-form duties. In the year last mentioned he became rector of Watton in Hertfordshire, and spent there the remainder of his life. By this time Mr. Bickersteth was widely known throughout the kingdom as one of the most influential and popular clergymen of the evangelical section of the Church. Besides taking a constant and active share in furthering the cause of the various religious societies, including the Evangelical Alliance, of which he was one of the founders, he likewise issued from the press a series of publications which had an immense circulation. These include, among others: "The Christian Student," "A Treatise on the Lord's Supper," "A Treatise on Prayer," "The Signs of the Times," "The Promised Glory of the Church of Christ," "The Restoration of the Jews," "A Practical Guide to the Prophecies," besides sermons and tracts without number. In 1846, while proceeding to a meeting of the Evangelical Alliance, he sustained an accident by being thrown from his chaise and run over by a cart, but he lived till Feb. 24, 1850.

**Bickmore, Albert Smith**, an American naturalist, born in St. George, Me., March 1, 1839; graduated at Dartmouth College in 1860, and studied under Agassiz at the Lawrence Scientific School of Harvard. In 1865–1869 he traveled in the Malay Archipelago and in Eastern Asia; in 1870 became Professor of Natural History in Madison (now Colgate) University; and, in 1885, Professor in charge of the Department of Public Instruction at the American Museum



of Natural History, New York city. His publications include "Travels in the East Indian Archipelago" (1869); "The Ainos or Hairy Men of Jesso;" "Sketch of a Journey from Canton to Hankow," etc.

**Bicknell, Frank Martin**, an American author, born in Melrose, Mass., Jan. 24, 1854; graduated at the English High School in Boston, in 1872; was engaged in business till 1888; and afterward devoted himself to literature. He has contributed largely to "St. Nicholas," "Harper's Young People," "Youth's Companion," "Outing," New York "Evening Post," etc. He wrote "The City of Stories," "The Apprentice Boy," etc.

**Bicknell, Thomas Williams**, an American educator, born in Barrington, R. I., Sept. 6, 1834; was graduated from Brown University in 1860. During his senior year in college he was elected to the Rhode Island Legislature, and after graduation was principal of schools in Rehobart, Bristol and Providence, R. I., and in Elgin, Ill. In 1869-1875 he was commissioner of the public schools of Illinois, and during this incumbency he secured the establishment of the State Normal School. He founded, edited and owned "The Journal of Education," "The Primary Teacher," "The American Teacher," "Education," and "Good Times," between 1874 and 1886. He has been President of the Rhode Island Institute of Instruction, the American Institute of Instruction, the National Council of Education, the National Educational Association, the Interstate Commission for Federal Aid, the Chautauqua Teacher's Reading Union, and the Massachusetts, New England and International Sunday School Unions. He has written "State Educational Reports," "John Myles and Religious Toleration," "Life of W. L. Noyes," "Brief History of Barrington," "Barrington in the Revolution," and "The Bicknells."

**Bicycle**, a two-wheeled instrument driven by pedal cranks on either side and propelled by the rider, who sits astride upon a seat, or saddle, which is mounted on a frame in which the wheels are set. A handle bar in front is used to guide the forward wheel, which acts as a steering wheel, to preserve or change the direction. In the early, and now obsolete form, the bicycle was propelled by striking the rider's feet on the ground. The rider sat upon a figure or frame, roughly resembling the body of a horse. The bicycle is a gradual evolution from a four-wheeled, self-propelling machine invented as long ago as 1649. In March, 1784, a man named Ignaz Trexler, of Graz, invented a horseless wagon, the wheel of which the rider propelled with his feet. It was said to have attained the velocity of a galloping horse. About 1816 the ducal for-

ester of Baden, Karl von Drais, Freiherr von Sauerbroon (1784-1851), built a rudimentary bicycle, consisting of two wheels, one before the other, connected by a perch, the forward wheel axled in a fork swiveled to the forward end of the perch and bearing a cross-bar or handles for steering. The rider sat astride the perch and propelled the machine by thrusting his feet on the ground and on level ground could easily make 5 miles an hour. The Drasine, or Draisine, as this first machine was called, was patented in Paris in 1816. It was introduced into England in 1818, and patented there with some improvements by a man named Knight. It very soon acquired the name of "dandy horse" or "hobby horse." In 1819 the "hobby horse" was brought to the United States and created great enthusiasm in many of our leading cities. But the fever did not last long. The grotesque appearance of a person leaning forward on his elbows and kicking away at the ground beneath his clumsy vehicle, proved too much for the National sense of humor, and riders soon became objects of more or less ridicule. A typical "hobby horse" in the early '20's had the following specifications: Wheels, wood, 32 inches; wheel base, 4 feet 7 inches; backbone, wood, 5 feet 9 inches long; saddle, hard wood, 1 foot 6 inches long; handle bar, wood, 9 inches, elevated 48 inches above ground; finish, black paint; weight, 90 pounds. The elevated cross-piece half-way between the saddle and handle bar was of wood and supported the rider's arms while steering. In these days of rapid invention it seems strange that none of the makers of those old machines thought of putting cranks on the front axle. It is asserted, though not proved, that a Scotchman, Kirkpatrick McMillan, having tried a system of cranks, side-levers, connection rods, and pedals for propelling a tricycle, in 1835, applied them to a wooden bicycle in 1840, and used it with success. In 1846, Calvin Dalzel, or Dalzelle, who is said to have seen McMillan's machine, invented and rode a rear driving velocipede propelled by pedals on hanging levers which, by means of connecting rods instead of chains, rotated cranks on the rear axle. In 1855, Michaux, a Parisian carriage-maker, built a velocipede which was propelled by cranks on the front wheel. The same year a German instrument-maker, named Philipp Maritz Fischer, made a bicycle and used it extensively in traveling about the country. Ten years later Pierre Lallement invented the front driving velocipede, which gained a wonderful though short-lived popularity. He patented it in the United States in 1866. Edward Gilman, an English inventor, patented one on a similar plan a little earlier. Before the velocipede craze had passed the



English manufacturers conceived the idea of enlarging the front wheel, and the high bicycle with suspension wheels was speedily developed. For some years the two wheels were of very unequal size, the rider being mounted directly over the very large one, which at first was the rear and afterward the front one, the other wheel, which was very small, serving for steering and balancing. This form of wheel is still occasionally seen. In this shape the bicycle was chiefly a means of sport and recreation, and its use was limited. It was so high that mounting was difficult and a fall dangerous. It was used only by men and high speed was attained. For strength and lightness, iron and steel began to be used in its construction and factories sprang up for its manufacture. About 1884 the high wheel began to be abandoned for the modern type, usually called the "Safety," in which at first, the large wheel was made smaller and the smaller one larger, and afterward both wheels were made of equal diameter, speed being gained by the rear wheel having a high gear. The old type had hard rubber tires for the wheels. The introduction of the pneumatic tire in 1891, by J. B. Dunlop, wrought a practical revolution in the bicycle industry. The pneumatic tire consists of tubular rubber, inflated by an air pump. It is made to endure the wear of the roughest roads, and, while it reduces the jar and vibration of the machine, it also greatly increases the speed capacity over that of the older forms. Numerous improvements in the saddles, pedal gear, and assemblage of the spokes, have been made. The problems of weight, strength, balance, and speed, have been studied by the best machinists. The finest materials have been introduced and improved machinery has reduced the construction of bicycles to a science in which ingenuity and skill have been incited by the competitions of an enormous and increasing trade. Ball-bearings have been generally adopted for the axles, a great variety of spring surfaces for the seats have been tried, and the weight has been reduced without decreasing the strength, by the introduction of tubular frame work, made of the strongest steel. This development of the bicycle has been partly the result and partly the cause of its rapid introduction into general use. From being merely an instrument for recreation and sport, it has become one of the most common vehicles upon the highways. A special form with a drop frame, suitable for women, enables them to use the bicycle almost as generally as men. The "Safety" bicycle has been adopted for military purposes by many of the nations of the world: by Austria-Hungary, in 1884; by England and Switzerland, in 1887; by Belgium, in 1889. The French army is said to be equipped with several thousand bicy-

cles and a perfected system of drill and tactics for advance guard duty, skirmishing, and rapid movements has been introduced into the various armies. A detachment of bicycle-mounted soldiers has been found useful in accompanying the motor Maxim gun, first tried in 1899. The military bicycle is especially constructed for hard work and rough usage. Some of the French machines are made to fold so that when the riders come to impassable ground they can double them up and carry them on their backs.

Numerous devices have been employed to get rid of the use of a chain in the driving mechanism of the bicycle, but of all the schemes as yet tried by the bicycle inventor only two, that known as the pin-wheel gearing and that called the shaft and bevel gear have met with any degree of success. The pin-wheel gearing may run smoothly at first, but the lack of durability has militated against it. The construction of the bevel-gear wheel is simple theoretically, but has been found to be a matter of greatest nicety in actual practice. The matter of cutting the gears so that they would fit exactly and would roll into each other without any slipping of friction has proved to be extremely difficult. Special machines had to be made for the purpose and experiments by the hundred conducted to get the exact form of the teeth determined and reproduced. The first bevel-gear wheels were made with an unusual strength of tubing in the back portions of the fork, making them weigh as high as 38 pounds. This has since been avoided to a large extent by the use of 50-point carbon tubing, which has been found more satisfactory than nickel steel, and gives rigidity without a greatly increased weight. The bevel-gear wheel, when completed, makes a very neat appearance, since the chain is entirely absent and the driving mechanism inclosed and hidden. Moreover, it is claimed that the longer these gears are used the more perfect the bearing surfaces of the teeth become, and, consequently, the easier the wheel runs. In the chain and sprocket gear the reverse of this is true, since as the links and rivets of the chain wear down, the distance between links, or the pitch, changes and ceases to fit the teeth of the sprocket wheel perfectly, causing friction and frequently hard running. This action is considerably augmented by the dust and grit to which a chain is exposed. The other type of chainless wheel which is finding favor with cyclists is considerably like the bevel-gear machine in the advantage claimed for it. Among the more modern improvements in the bicycle are those built for more than one person, including the tandem, the triplet, the quadruplet, the quintuplet, and even the noniplet, for nine persons; but these more extravagant forms are not in general use.



The almost universal use of the bicycle has brought about various associations, both in the United States and abroad, viz., the League of American Wheelmen, the English Cyclists' Touring Club and National Cyclist Union, the French Union Velocipedique, the German Bicycle Union and Tourists' Club, and others. These clubs have devoted themselves to the improvement of roads, the fostering of legitimate racing, a preparation of maps, the protection of travelers, and the general advancement of sport.

**Biddeford**, a city in York co., Me.; on the Saco river, and the Boston and Maine railroad; 15 miles S. W. of Portland, and 5 miles from the Atlantic Ocean. It derives its name from Bideford, England; was settled under a patent in 1630, although a small settlement was made in the vicinity near the mouth of the river in 1616, and was given a city charter in 1855. The city has an excellent waterpower promoted by a fall of 42 feet in the river here; manufactures of cotton goods, large lumber interests, and extensive ledges of granite which provide an important and growing industry. There are two National banks, more than a dozen churches, daily, weekly and monthly periodicals, public library, trolley line to Old Orchard Beach, and a property valuation of over \$7,000,000. Pop. (1890), 14,443; (1900) 16,145; (1910) 17,079.

**Biddle, Anthony Joseph Drexel**, an American publisher, journalist and miscellaneous writer, born in Pennsylvania, in 1874. He has written "A Dual Role, and Other Stories," "An Allegory and Three Essays," "The Madeira Islands," "The Froggy Fairy Book," etc.

**Biddle, Arthur**, an American lawyer, born in Philadelphia, Pa., Sept. 23, 1852; graduated at Yale in 1873; studied law and was admitted to the bar in 1878. Later he became a member of his father's firm and devoted much time to the study of certain branches, the results of which were published in his works, "Treatise on the Law of Stock Brokers" (1881); "Treatise on the Law of Warranties in the Sale of Chattels" (1884); and "The Law of Insurance" (1893). He died in Atlantic City, N. J., March 8, 1897.

**Biddle, Clement**, the "Quaker Soldier," was born in Philadelphia, May 10, 1740. Although a strict Quaker, he identified himself with the Revolutionary cause even to the extent of going to war. He was present at the battles of Princeton, Brandywine, Germantown and Monmouth. He also shared the sufferings of Valley Forge. He resigned active service in 1780, but assisted in the making of the Federal Constitution in 1787. After that he was United States marshal of Pennsylvania. He died in Philadelphia, July 14, 1814.

**Biddle, James**, an American naval officer, born in Philadelphia, Pa., in 1793; entered the navy as a midshipman on the "Philadelphia" in 1800, and was on that frigate when she was wrecked on the Barbary coast in 1803. In the War of 1812 he served on the "Wasp" in the capture of the British sloop "Frolic," and was captain of the "Hornet" at the capture of the "Penguin." In 1845 he was given command of the East India Squadron and concluded the first treaty between the United States and China. He died in Philadelphia, Oct. 1, 1848.

**Biddle, John**, father of the modern Unitarians, born in Wotton-under-Edge, in Gloucestershire, in 1615; was educated at Oxford, and became master of a free school at Gloucester. He was repeatedly imprisoned for his anti-Trinitarian views, and the Westminster Assembly of Divines having got Parliament to decree the punishment of death against those who should impugn the established opinions respecting the Trinity were eager for his punishment, but the act was not put in force. A general act of oblivion, in 1652, restored him to liberty, when he immediately disseminated his opinions both by preaching and by the publication of his "Twofold Scripture Catechism." He was again imprisoned, and the law of 1648 was to be put in operation against him when, to save his life, Cromwell banished him to St. Mary's Castle, Sicily, and assigned him 100 crowns annually. Here he remained three years, until the Protector liberated him in 1658. He then continued to preach his opinions till the death of Cromwell, and also after the Restoration, when he was committed to jail in 1662, and died a few months after. He wrote "Twelve Arguments Against the Deity of the Holy Spirit," "Confession of Faith Concerning the Holy Trinity," etc.

**Biddle, Nicholas**, an American naval officer, born in Philadelphia, Pa., Sept. 10, 1750. After serving in the British navy and in the Arctic exploring expedition led by Captain Phipps, he returned to his native country at the outbreak of the Revolution, and was one of the five officers who received the rank of captain at the organization of the American navy in 1775. In command of the "Andrea Doria" he accompanied Fleet-Captain Hopkins to the Bahamas, and was present at the capture of New Providence. In 1777 he took command of the 32-gun ship "Randolph," the first American frigate ever launched. He met the British "Yarmouth," 64 guns, on March 7, 1778, and in the ensuing action the "Randolph" blew up, causing the death of her captain and about 315 others.

**Biddle, Nicholas**, an American financier, born in Philadelphia, Pa., Jan. 8, 1786;



became secretary to John Armstrong, United States Minister to France, in 1804, and subsequently went to England as secretary to James Monroe, then United States Minister. He returned home in 1807, was elected to the Pennsylvania Legislature in 1810, and was appointed a director of the United States Bank in 1819. He became president of the bank in 1823 and managed it ably down to the expiration of its charter. The financial trouble precipitated upon the country by Jackson's withdrawal of the Government deposits in 1833 gave an unfortunate ending to Biddle's career as a banker, but while both his ability and his integrity were questioned at the time he has been amply vindicated since. Besides miscellaneous writings, he published a "Commercial Digest," and "History of the Expedition under Lewis and Clarke to the Pacific Ocean." He died in Philadelphia, Feb. 27, 1844.

**Biddle, Richard**, an American lawyer, born in Philadelphia, Pa., March 25, 1796; studied law and was admitted to the bar in Pittsburg, Pa. In 1837-1841 he was a member of Congress. He was the author of a "Memoir of Sebastian Cabot, with a Review of the History of Maritime Discovery" (1831), etc. He died in Pittsburg, July 7, 1847.

**Biddulph, Sir Michael Anthony Shrapnel**, an English military officer, born in Cleeve Court, Somersetshire, in 1823. He entered the Royal Artillery in 1844; became Captain in 1850; Major in 1854; Colonel in 1874; Major-General in 1877; Lieutenant-General in 1881; and General in 1886. He served in the Crimean War at Alma, Inkermann, Balaklava, and the siege of Sebastopol. In India he commanded the field force and marched to Kandahar and the Helmund, and returned by the Tal Chotali and Boree to the Indus, in 1878-1879. He was retired in 1890, and in 1896 became Gentleman Usher of the Black Rod. He published "Illustrated Forrester's Norway" (1849). He died July 31, 1904.

**Biddulph, Sir Robert**, an English military officer, born in London, Aug. 26, 1835. He entered the Royal Artillery in 1853; became Captain in 1860; Major in 1861; Colonel in 1872; Major-General in 1883; and General in 1892. He served in the Crimean War, 1854-1856, and in the Indian Mutiny campaign, 1857-1859; was High Commissioner for Cyprus in 1879-1886; Inspector-General of Recruiting in 1886-1888; Director-General of Military Education in 1888-1893; and governor and commander-in-chief at Gibraltar, in 1893-1899.

**Bidental Reptiles**, in palæontology, the name given by Andrew Geddes Bain, surveyor of military roads in South Africa, to certain notable reptiles found there about

500 miles E. of Cape Town. The name was given because of their possessing two long, curved, and sharp pointed tusks. Prof. Owen founded for them the genus *dicynodon*, and considered them to belong to a new tribe or order of saurians.

**Bidie, George**, an English medical officer, born in Blackies, Banffshire, April 3, 1830; educated at the University of Aberdeen. He was appointed to the Madras Medical Service in 1856; served with the Madras Artillery and the 12th Royal Lancers in 1856-1858; and with the 1st Infantry, Haidarabad Contingent, 1858-1860. He was Professor of Botany and Materia Medica in the Madras Medical College and superintendent of the Madras Lunatic Asylum, in 1866-1870; secretary in the head office of the Medical Department, in 1870-1883; deputy surgeon-general, in charge of the British Burma Division in 1884; Sanitary Commissioner of the Madras Presidency in 1885-1886. He discovered, in 1867, a preventive for an insect pest which threatened to destroy the coffee growth in Southern India. In 1898 he became honorary surgeon to the Queen. His publications include "Reports on the Ravages of the Borer Insect on Coffee Estates" (1869); "Handbook of Practical Pharmacy" (1883); "Catalogue of Gold Coins in the Government Central Museum, Madras" (1874); "Neilgherry Parasitical Plants Destructive to Forest-trees" (1874); "Catalogue of Raw Products of South India sent to Paris Exhibition" (1878); "Native Dyes of Madras" (1879); "Pagoda or Varaha Coins of South India" (1883); "Sand-binding plants of South India" (1883). etc.

**Bidpai** (bid'pī), or **Pilpai**, the reputed author of a very ancient and popular collection of Eastern fables. The original source of these stories is the old Indian collection of fables called "Panchatantra," which acquired its present form under Buddhist influences not earlier than the 2d century B. C. It was afterward spread over all India and handed down from age to age in various more or less different versions. An abridgment of this collection is known as the "Hitopadesa." The "Panchatantra" was translated into Pehlevi in the 6th century of our era. This translation was itself the basis of a translation into Arabic made in the 8th century; and this latter translation—in which the author is first called Bidpai, the chief of Indian philosophers—is the medium by which these fables have been introduced into the languages of the West. The first English translation was published in 1570.

**Bidwell, John**, an American politician, born in Chautauqua county, N. Y., Aug. 5, 1819. In 1831 his parents moved to Ashtabula county, O., where he acquired an aca-



demical education and taught school. He went to California in 1841; served in the Mexican War, reaching the rank of Major; was a member of the Constitutional Convention of 1849; and of the National Democratic Convention in Charleston, in 1860. In the Civil War he was brigadier-general of California militia. In 1864 he was elected to Congress as a Republican; in 1866 was a member of the Philadelphia Convention; in 1890 was the unsuccessful Prohibition candidate for Governor of California; and, in 1892, unsuccessful candidate of his party for the Presidency. He died in Chico, Cal., April 5, 1900.

**Bieda** (bē'da), the modern name of the ancient Blera, a town in Italy. It is noted for its extensive Etruscan necropolis of rock-hewn tombs, built in several terraces. These tombs are interesting from their imitation of dwellings. They have molded doorways, and within the ridge beams and rafters of the roof are cut in relief. There are rock benches on three sides, made to receive the dead, and besides the doors, numerous windows.

**Biedermann, Aloys Emanuel**, a German theologian, born in Oberrieden, March 2, 1819; educated at Basel and Berlin. In 1850 he became Professor Extraordinary of Theology at Zurich, and Professor Ordinary in 1864. He was author of "Free Theology" (1844); "Christian Dogmatics" (1869), etc. In theology he was a Rationalist. He died in Zurich, Jan. 25, 1885.

**Biedermann, Friedrich Karl**, a German author, born in Leipsic, Sept. 25, 1812. He became Professor of Philosophy in Leipsic University in 1838 and held this chair till 1845, when he was deposed on account of his political opinions. In 1849 he played an important role in the Parliament of Frankfort, and was reinstated as Professor at Leipsic, but was again removed in 1853 for political reasons. He was editor of the "Deutsche Allegemeine Zeitung" in 1863-1866; and founded and edited a number of other liberal papers. His works include "Wissenschaft und Universitat" (1838); "Die Deutsche Philosophie von Kant bis auf unsere Tage" (1842-1843); "Vorlesungen uber Socialismus und sociale Fragen" (1847); "Erinnerungen aus der Paul's Kirche" (1849), etc.

**Biefve, Eduard de** (bēf'və), a Belgian painter, born in Brussels, Dec. 4, 1809; painted many portraits, and was also noted for his scenes from history. His best known work probably is his "Compromise of the Netherland Nobles at Brussels, 1566." He died in Brussels, Feb. 7, 1882.

**Biel, or Byll, Gabriel**, a German philosopher, born in Spire, about 1442; educated at Heidelberg and Erfurt; and became a cathedral preacher in Mainz. In 1477 he

was made provost of Urach, and an adviser in the founding of the University of Tübingen, where he became Professor of Theology, in 1484. He has been erroneously called "the last of the Schoolmen." His principal work was "Collectorium ex Occamo." He died in Tübingen, 1495.

**Biela** (bē'la), **Wilhelm, Baron von**, an Austrian army officer, born in Roslau, Prussia, March 19, 1782; known from his discovery of the comet bearing his name. He died in Venice, Feb. 18, 1856.

**Biela's Comet**, a comet which took its name from Major Biela of the Austrian army, who traced it out in 1826 and furnished such data regarding its movements as to convince the other astronomers of his day that he had a proprietary right to it. The same comet had been noticed on March 8, 1772, and again in 1805. It was reckoned that the comet had passed its perihelion six times between the two periods without being detected by the astronomers. On another visit it passed out of sight on Jan. 8, 1833. Its next appearance was in July, 1839. It was found again late in November, 1845, and in the following month an observation was made of one of the most remarkable phenomena in astronomical records, the division of the comet. It put forth no tail while this alteration was going on. Prof. Challis, using the Northumberland telescope at Cambridge, on Jan. 15, 1846, was inclined to distrust his eyes or his glass when he beheld two comets where but one had been before. He would call it, he said, a binary comet if such a thing had ever been heard of before. His observations were soon verified, however. Late in August, 1852, the larger came into view and three weeks later the smaller one, now much fainter than its former companion, was seen about a million miles in the lead. Schiaparelli's investigations showed it to be probable that the comet is the illuminated central mass of a stream of meteorites. The Leonid stream of meteors revolves around the sun in a period of  $33\frac{1}{4}$  years, and the earth passes their orbit every year, but meets the main swarm only when it is passing the point of intersection of the two paths. On Nov. 12, 1799, Nov. 13, 1833, and Nov. 14, 1866, the earth is known to have encountered a dense portion of the stream. Astronomers looked for the reappearance of this stream of meteors Nov. 13-14, 1899, but were disappointed, only a few stray meteors putting in an appearance.

**Bielinski, or Belinski**, a Russian critic and journalist, born in 1815. He was editor of the "Observer," which ceased to appear in 1839. He was also one of the chief contributors to the "Annales de la Patrie." He died in St. Petersburg, 1848.



**Bielovski, August** (bē-lōv'skē), a Polish poet, born at Kreehowiee, Galieia, in 1806. Among his poetical compositions is to be mentioned the historieal rhapsody, "Lay of Henry the Pious." He wrote a "Critical Introduction to the History of Poland." He died in 1876.

**Bielozero** (Polish, the white lake), a lake 25 miles long by 20 miles broad, in the Province of Novgorod, Russia; named from its milky appearance, caused by the wash of the chalk formation of its bed. It has an outlet into the Volga by the river Sheksua.

**Bielshöhle** (bēls'he-la), a stalactite cavern in the Harz Mountains, on the right bank of the Bode. It was discovered about 1672, but first made accessible in 1788. Its entrance is 108 feet above the bed of the stream; and its total length is 230 yards.

**Bielski, Marcin** (bēls-kē), a Polish historian, born in Biala about 1495. His works include "Kronika s'wiata" (1550); "Kronika Polska" (a history of Poland, completed by his son and published in 1597). He died in Biala, 1575.

**Bienne** (bē-en'), or **Biel**, a town of Switzerland, canton of Bern, 16 miles N. W. of Bern, beautifully situated at the N. end of the lake of the same name, and at the foot of the Jura. Pop. 11,623. The LAKE is about 10 miles long by 3 broad. It receives the waters of Lake Neufchâtel by the Thiel and discharges itself into the Aar.

**Biennial**, a plant that requires two seasons to come to maturity, bearing fruit and dying the second year, as the turnip, earrot, wall flower.

**Bienville, Jean Baptiste le Moyne** (byen-vēl'), a French colonist, born in Montreal, Feb. 23, 1680. In 1698, with his brother, Iberville, he left France to found a colony at the mouth of the Mississippi. In 1700 he constructed a fort 54 miles above the mouth of the river, and in 1701, at the death of Sauvolle, a second brother, he succeeded to the direction of the colony, the seat of which became Mobile. In 1718 he received a commission as governor of Mississippi, and about this time founded the city of New Orleans. In 1724 he was summoned to France, and, on Aug. 9, 1726, was removed from office. In 1733 he was sent back to the colony as governor, with the rank of lieutenant-general. In 1743 he was again removed and returned to France, where he died in 1765.

**Bierbaum, Otto Julius** (bēr'baum), a German poet, born in Grüneberg, Silesia, June 28, 1865. He is a rising man of letters; his "Songs of Experience" (or "Poems That Were Lived") (1892), is as yet his most noteworthy volume.

**Biernatzki, Johann Christoph** (bēr-näts'kē), a German pietist, poet, and story

writer, born at Elmshorn, Holstein, Oct. 17, 1795. A country pastor, he devoted himself to the versification of his own precepts and beliefs, the volume "Faith" being the result. In "The Brown Boy," and "Hallig, or the Adventures of Castaways on an Island in the North Sea," he displays a not unpleasant capacity for prose narrative. He died at Friedrichstadt, May 11, 1840.

**Bierstadt, Albert**, an American painter, born near Düsseldorf, Germany, Jan. 7, 1830; removed with his parents to Salem, Mass., in 1831; began to paint in oils in 1851; and in 1853 returned to Düsseldorf to study his art, spending a winter in Rome, traveling in Italy and Switzerland, and returning to the United States in 1857. In 1859 he accompanied General Lander's expedition to the Rocky Mountains, and spent several months in studies of mountain scenery. He was elected a member of the National Academy in 1860. In 1861 he finished his painting, "Laramie Peak," and in 1863 "View of the Rocky Mountains—Lander's Peak." These at once gave him a high reputation. He traveled in Europe in 1867, 1878 and 1883, on the Pacific coast in 1873, and in Alaska in 1889. He has received medals in Austria, Bavaria, Belgium, and Germany, was given the cross of the Legion of Honor in 1867, and in 1869 the Russian Order of St. Stanislaus, of which he received also the second class in 1872, and also the Turkish Order of the Medjidieh. Among his best known paintings are "North Fork of the Platte" (1864); "Looking Down the Yosemite" (1865); "El Capitan, on Merced River" (1866); "Storm on Mt. Rosalie" (1866); "Valley of the Yosemite" (1866), in the Lenox Library, New York; "Settlement of California," and "Discovery of the Hudson River," both in the Capitol at Washington; "Emerald Pool, on Mt. Whitney" (1870); "In the Rocky Mountains" (1871); "Great Trees of California" (1874); "Valley of Kern River, California" (1875); "Estes Park, Colorado" (1878); "Mountain Lake" (1878); "Mt. Corcoran in the Sierra Nevada" (1878); "Geysers" (1883); "Storm on the Matterhorn" (1884); "Valley of Zermatt, Switzerland" (1885); "On the Saco, New Hampshire" (1886), etc. He died in New York city, Feb. 18, 1902.

**Bies=Bosch**, a marshy sheet of water interspersed with islands, between the Dutch Provinces of North Brabant and South Holland, formed in 1421 by an inundation which destroyed 72 villages and 100,000 people.

**Biester, João Ernesto** (bēs'ter), a Portuguese dramatist, born at Lisbon in 1829. He wrote some 90 plays, the most noteworthy among them being "The Nineteenth Century Gentleman," "Luck and Labor,"



and "The Scandal Mongers." He died in 1880.

**Biet, Antonio** (bêt), a French missionary, in 1652 accompanied 600 colonists to Cayenne, where he remained 18 months. He was the author of "Voyages de la France Equinoxiale" (1664), with a Galibi dictionary at the end.

**Bièvre** (byav're), **Marquis de**, born in 1747; served in the corps of the French musketeers, was a life guard of the King of France, and acquired much reputation by his puns and repartees. He is the author of several amusing publications, including "Le Séducteur," a comedy in verse; an "Almanach des Calenbourgs," or collection of puns; and there is also a collection of his jests called "Bièvrana." He died in 1789.

**Biffin**, a variety of excellent kitchen apple, often sold in a dry and flattened state.

**Bifrost** (bēf'röst), in Northern mythology the name of the bridge represented as stretching between Heaven and Earth (Asgard and Midgard); really the rainbow.

**Bigamy**, in civil law: (1) English, the act of marrying a second time, while the first husband or wife is still known to be living. By a law passed in 1276, it was punished with death. In 1603, during the reign of James I., it was made felony, without benefit of clergy. By a law passed in 1794, the capital penalty was modified into imprisonment or transportation. If a person marry a third wife, while the first two are still living, the law makes the offense still be called only bigamy, although polygamy would be a more accurate designation. (2) In the United States, the statutory provisions against bigamy or polygamy are in general similar to, and copied from, the statute of James I., excepting as to punishment, and excepting the Congressional legislation against those practicing polygamy as a part of their religious belief. See MORMONS.

**Big Bend Country**, a volcanic plain near the center of the State of Washington. It covers 4,800 square miles, a third of it being gently rolling, brown loam prairie, suitable for farming, and the rest low hills and plateaus of bunch grass and sage brush, where livestock is ranged. The Columbia river curves round this region, bounding it on the N. and W. and partly on the S. W. for 20 miles, and flowing in a ravine 1,500 feet below the general level. It is traversed by several remarkable chasms, many miles long, and from a furlong to half a league wide, with sheer walls of black basalt 500 feet high. There are a number of wheat farms in the region.

**Big Bethel**, a village in Virginia, on the peninsula between the York and James rivers; the scene of a battle, June 10, 1861,

between the Federal and Confederate forces. It resulted in the defeat of the Federal army with the loss of about 100 men. Maj. Theodore Winthrop was killed in this battle.

**Big Black River**, a river of Mississippi, flowing into the Mississippi at Grand Gulf. Its valley constitutes a fine cotton region 200 miles long. The name is also applied to Black river, in Southeastern Arkansas.

**Big Bone Lick**, a salt spring, in Boone county, Ky., 11 miles S. of Burlington, where fossil remains of mastodons and other extinct fauna have been found.

**Bigelow, Erastus Brigham**, an American inventor, born in Boylston, Mass., April 2, 1814; became a leading manufacturer in Clinton, Mass.; invented looms for suspender weaving, for counterpanes, for coach lace and for carpets; and published a text book on shorthand writing, "The Tariff Question" (1862), and other works. He died in Boston, Dec. 6, 1879.

**Bigelow, Frank Hagar**, an American clergyman and meteorologist, born in Concord, Mass., Aug. 28, 1851; graduated at Harvard in 1873, and at the Episcopal Theological School at Cambridge, Mass.; was ordained in 1880, and became assistant rector at St. John's Church in Washington, D. C. In 1873-1876 and 1881-1883 he was Astronomer at the Cordoba Observatory, Argentine Republic; in 1884-1889, Professor of Mathematics at Racine College, Wisconsin; and in 1893 became Professor of Meteorology in the United States Weather Bureau. He has written many articles on solar and terrestrial magnetism, astronomy and meteorology. His most important contribution to astronomy is a monograph on the solar corona, which was published by the Smithsonian Institution in 1889.

**Bigelow, Jacob**, an American physician, born in Sudbury, Mass., Feb. 27, 1787; graduated at Harvard College in 1806, and began medical practice in Boston in 1810. He early became known as a botanist, and a number of plants were named for him by Sir J. E. Smith, in the supplement to "Rees' Cyclopædia," by Schrader, in Germany, and De Candolle in France. He founded Mount Auburn Cemetery, in Cambridge, which was the first garden cemetery established in the United States. He was Professor of Materia Medica in Harvard College in 1815-1855, and Rumford Professor there in 1816-1827. His works include "Useful Arts Considered in Connection with the Applications of Science" (1840); "Florula Bostoniensis" (1824); "American Medical Botany" (1817-1820); "Nature in Disease" (1854); "A Brief Exposition of Rational Medicine," "The Paradise of Doctors, a Fable" (1858); "History of Mount Auburn" (1860);



## Bigelow

"Modern Inquiries," and "Remarks on Classical Studies" (1867). He died in Boston, Jan. 10, 1879.

**Bigelow, John**, an American author, born in Malden, N. Y., Nov. 25, 1817; graduated at Union College, in 1835, and became first a lawyer and afterward a journalist. In 1845-1846 he was inspector of Sing Sing prison; in 1849-1861 one of the editors of the New York "Evening Post;" in 1861-1864, United States Consul-General at Paris; and in 1864-1867, Minister to France. He was Secretary of State of New York in 1875-1877. In his will Samuel J. Tilden appointed him his biographer and one of the three trustees of the bulk of his estate, set apart for the establishment of a public library in New York city. On Feb. 22, 1895, a joint committee, representing the Tilden Trust Fund and the Astor and Lenox Libraries, agreed on a plan for the consolidation of those interests and the establishment of a great public library to be known as the New York Public Library, Astor, Lenox and Tilden Foundations. The agreement was ratified by the several interests, an act of incorporation was obtained from the Legislature, and, on May 27, Mr. Bigelow was elected President of the consolidated Board of Trustees, and appointed Chairman of the Executive Committee. His works include "Molinos the Quietist," "France and the Confederate Navy," "Life of William Cullen Bryant," "Life of Samuel J. Tilden," "Some Recollections of Edouard Laboulaye," "The Mystery of Sleep," "A Life of Franklin." In 1885 he published "The Writings and Speeches of Samuel J. Tilden," and in 1888, "The Complete Works of Benjamin Franklin."

**Bigelow, John, Jr.**, an American military officer, born in New York, May 12, 1854; son of the preceding; was educated in Paris, Bonn, Berlin, Freiburg, and Providence, R. I.; graduated at the United States Military Academy in 1877; and was assigned to the 10th United States Cavalry. In 1887-1889 was adjutant-general of the militia in the District of Columbia; and in 1894-1898, Professor of Military Science at the Massachusetts Institute of Technology. During the war with Spain he was wounded in the attack on San Juan, Cuba, July 1, 1898. He published "Principles of Strategy, Illustrated Mainly from American Campaigns" (rev. ed., 1894).

**Bigelow, Melville Madison**, an American lawyer, born in Eaton Rapids, Mich., Aug. 2, 1846; graduated at the University of Michigan in 1866, and engaged in practice in Boston. His works include "The Laws of Bills, Notes and Checks," "English Procedure in the Norman Period," "The Law of Fraud on Its Civil Side," "Elements of Equity," "Elements of the Law of Torts,"

## Biggar

"Placita Anglo-Normannia," "The Law of Wills," "The Law of Estoppel," "Leading Cases in the Law of Torts," etc.

**Bigelow, Poultney**, an American author, born in New York, Sept. 10, 1855; son of John Bigelow; graduated at Yale University and at the Columbia Law School in 1882, and was admitted to the bar. In 1875-1876 he took a journey around the world in a sailing ship, which was wrecked on the coast of Japan. He traveled in China, Africa, the West Indies, and Demerara. He has made canoe voyages on the principal waters of Europe, and was the first person to take a canoe through the Iron Gates of the Danube. Emperor William II. has been his personal friend since they were students together in Germany. He wrote "The German Emperor and His Neighbors," "Paddles and Politics Down the Danube," "The Borderland of Czar and Kaiser," "History of the German Struggle for Liberty," "White Man's Africa," etc. He edited the "Outing" magazine, 1885-1887.

**Bigelow, Robert Payne**, an American biologist, born in Baldwinsville, N. Y., July 10, 1863; was graduated at Harvard in 1887; and studied at Johns Hopkins in 1891-1893. In 1893 he became Instructor in Biology, and in 1895 librarian in the Massachusetts Institute of Technology. He has written a number of papers on zoological subjects.

**Bigelow, Timothy**, an American military officer, born in Worcester, Mass., Aug. 12, 1739. On May 23, 1775, he led a company of minute men to Cambridge, and became a Major in Ward's regiment. He was under Arnold in the expedition to Quebec in 1775, and was there captured, remaining a prisoner till 1776. He became a Colonel in 1777, and assisted in the capture of Burgoyne. He also saw service at Valley Forge, Monmouth, West Point, and Yorktown. He died in Worcester, Mass., March 31, 1790.

**Biggar, Hamilton Fisk**, a Canadian physician, born in Oakville, Ont., March 15, 1839; educated at Victoria University, and pursued his medical studies at the University of Medicine and Surgery, Cleveland, O. In 1866 he began practice in Cleveland, and in 1867 was made Professor of Anatomy and Clinical Surgery in the Homœopathic Hospital College, there. Later he was, for 10 years, Professor of Clinical Surgery, with operations in the same college. In 1900 he held the chair of Surgical Diseases of Women and Clinical Surgery. Dr. Biggar founded the Cleveland Training School for Nurses, where he was Dean for 10 years. He wrote "Twelve Months of Surgery," "Loiterings in Europe," etc.

**Biggar, Joseph Gillis**, an Irish politician, born in Belfast, in 1828; succeeded



his father in mercantile business in 1861; entered politics in 1869; and was elected to Parliament for County Cavan in 1874. He was a member of the Supreme Council of the Irish Republican Brotherhood. When Charles Stewart Parnell entered Parliament in 1875 Biggar ranged himself on the side of that leader. He took an active part in the Land League movement. In 1877 he was expelled from the Fenian organization, and in 1880 delivered aggressive speeches in Ireland. He was one of the few prominent Irish members who were never in prison. He died in London, Feb. 19, 1890.

**Bigge, Sir Arthur John**, an English military officer, born in Stamfordham, June 18, 1849. He entered the Royal Artillery in 1869; served in the Zulu War, 1878-1879, with distinction, and in 1879 was appointed aide-de-camp to Major-General Sir Evelyn Wood. In 1880 he became groom-in-waiting to the Queen and Assistant Private Secretary; in 1881 Equerry in Ordinary, and in 1895, Private Secretary and Equerry to the Queen.

**Biggs, Asa**, an American jurist, born in Williamston, N. C., Feb. 4, 1811; received an academical education; was admitted to the bar in 1831. He was a member of the Constitutional Convention of North Carolina in 1835; was elected to the State Legislature in 1840, 1842, and 1844; was a member of the commission appointed to revise the "Statutes" of the State in 1850, and was again sent to the Legislature in 1854. In 1854 he was elected a United States Senator; resigned in 1858, and was appointed Judge of the United States District Court of North Carolina. He died in Norfolk, Va., March 6, 1878.

**Biggs, Hermann M.**, an American physician, born in Trumansburg, N. Y., Sept. 29, 1859; was graduated at Cornell University in 1882, and at Bellevue Hospital Medical College in 1883; and became professor in the last institution in 1887, and Pathologist and Director of the Bacteriological Laboratories of the Health Department of New York city, in 1892. He has contributed frequently to medical periodicals.

**Big Horn**, the *haplocerus montanus* or wild sheep of the Rocky Mountains, named from the size of its horns, which are 3½ feet long, the animal itself being of the same height at the shoulder. The big horns are gregarious, going in herds of 20 or 30, frequenting the craggiest and most inaccessible rocks, and are wild and untamable. It is called also Rocky Mountain sheep.

**Big Horn Mountains**, a range of mountains beginning near the center of Wyoming and running N. into Montana, containing heights of from 8,000 to 12,000 feet, and covering 7,500 square miles.

**Big Horn River**, a river of Montana and Wyoming; rises in the Rocky Mountains near Fremont's Peak, and flows N. E. into the Yellowstone. Along its course is some of the grandest mountain scenery in the world. It is navigable in its lower course, and has a total length of 400 miles.

**Bignon, Louis Pierre Edouard** (bēn-yōn'), a French historian and statesman, born in La Meilleraye, Jan. 3, 1771; entered the National Assembly in 1817; became a peer of France in 1837; wrote a "History of France" (7 vols., 1827-1838). He received from Napoleon I. a bequest of 100,000 francs. He died in Paris, Jan. 5, 1841.

**Bignonia**, a genus of plants (that of the trumpet flowers), constituting the typical one of the order *bignoniaceæ* or bignoniads. It has four perfect stamens, two long and two short. The species, which are numerous, are nearly all of an ornamental character, owing to their fine, large, trumpet like, monopetalous corollas, colored red, blue, yellow, or white. They are trees or shrubs, in the latter case often climbing; found in, or sometimes even beyond, the tropics of both hemispheres, and constituting a feature in the flora of the regions which they inhabit. Many are from the warmer parts of this country. India also has various species. One of the latter, the *bignonia indica*, called in the Bombay Presidency taetoo, has supra decomposed leaves, from 4 to 6 feet long, panicles of flowers about 4 to 6 feet long, and legume-like capsules more than 2 feet long by three and a half inches broad. Numerous bignonias have been introduced into the hothouses and greenhouses of this country, and several of the hardier sort will grow in the open air in the middle temperate latitudes.

**Bignoniaceæ**, an order of plants, ranked by Dr. Lindley as the type of his bignonial alliance. The stamens are five, but always one and sometimes three are abortive, so as to make the species tetradynamous or diandrous plants. The ovary is two or spuriously four celled and polyspermous. The capsule is two celled, and sometimes so long as to appear like a legume. The inflorescence, which is terminal, is generally somewhat paniced. The leaves are mostly compound. The bignoniads are trees or shrubs, as a rule climbing. They are highly ornamental plants from the tropics of both hemispheres.

**Bigordi, Domenico**, an Italian painter, born in Florence, in 1449; was nicknamed Ghirl Andajo; teacher for a time of Michael Angelo and Granacci; founder of a new school of painting; painted chiefly sacred subjects, and executed notable frescoes in Rome, Florence, and other cities. His



## Big Rapids

"Adoration of the Magi," a panel in the Church of the Innocents, and the "Annunciation," on a cathedral entrance in Florence, are among his best works. He died in Florence, Jan. 11, 1494.

**Big Rapids**, city and county-seat of Mecosta co., Mich.; on the Muskegon river, and several important railroads; 56 miles N. of Grand Rapids. The river is here dammed in two places, providing a very valuable water power. The city has the Holly system of waterworks, and an extensive trade in lumber and manufactures of furniture, sash, doors and blinds, coiled elm hoops, shingles, etc. Among the noteworthy institutions is the Ferris Industrial School. There are daily and weekly newspapers, a private bank, several hotels, and a property valuation of nearly \$2,000,000. Pop. (1900) 4,686; (1910) 4,519.

**Big Sandy Creek.** (1) A river of Colorado that flows into the Arkansas, 200 miles long. (2) A river of Indiana, that flows into the Ohio.

**Big Sandy River**, a river forming the boundary between West Virginia and Kentucky, and flowing into the Ohio; having two confluent forks, Tug Fork, that rises in West Virginia, and West Fork, that rises in Kentucky. It is navigable for 100 miles of its lower course; flows through a timber and coal region.

**Big Sioux** (sû), a river of South Dakota that flows into the Missouri near Sioux City; it is 285 miles long.

**Big Stone Lake**, a large lake of Big Stone county, Minn., drained by the Minnesota river; it is about 25 miles long.

**Big Trees**, the *sequoia gigantea*, "big tree" of California, is found only on the W. slope of the Sierra, while the *sequoia sempervirens*, or "redwood," belonging to the same genus, is confined to the Coast Range.

The Calaveras Grove of *sequoia gigantea* is the northernmost of the California groves of big trees, and it is the nearest to San Francisco. It is, however, comparatively seldom visited, as the Mariposa Grove is conveniently included in the usual route to the Yosemite. The Calaveras Grove covers an area 1,100 yards long and 70 yards wide, 4,750 feet above the sea, and contains about 100 trees of large size, besides many smaller ones. The tallest now standing is the *Keystone State*, which is 325 feet high and 45 feet in girth. The *Mother of the Forest* (denuded of its bark) is 315 feet high and has a girth of 61 feet, while the prostrate *Father of the Forest* measures 112 feet in circumference. Two other trees are over 300 feet high, and many exceed 250 feet. A house has been built over a stump with a diameter of 24 feet. The bark is sometimes 1½ feet in thickness. About 5 miles to

## Bijapur

the S. is the Stanislaus or South Grove, also containing many fine trees.

The Mariposa Grove of big trees, so called from its situation in Mariposa county, occupies a tract of land (6,500 feet above the sea) 4 square miles in area, reserved as a State Park, and consists of two distinct groves, one-half mile apart. The Lower Grove contains about 100 fine specimens of the *sequoia gigantea*, including the *Grizzly Giant*, the largest of all, with a circumference of 94 feet and a diameter of 31 feet. Its main limb, 200 feet from the ground, is 6½ feet in diameter. In ascending to the Upper Grove, which contains 365 big trees, the road passes through a tunnel, 10 feet high and 9½ feet wide (at the bottom), cut directly through the heart of a living *sequoia*, 27 feet in diameter. About 10 of the trees in the Mariposa Grove exceed 250 feet in height (highest 272 feet) and about 20 trees have a circumference of over 60 feet, three of these being over 90 feet. The Calaveras Grove has taller trees than any of the Mariposa Grove, but the latter has those of greater circumference. The wood of the *sequoia gigantea*, like that of the *sequoia sempervirens*, is easily worked, durable, and susceptible of a high polish. The *sequoia sempervirens*, or redwoods, sometimes reach a height of 300 feet.

The Santa Cruz Grove of big trees contains about a score of the genuine redwood with a diameter of 10 feet and upward. The largest is 23 feet across; one of the finest, named the *Pioneer*, has a girth of 70 feet. The redwood is one of the most prized varieties of lumber, and is shipped in great quantities to the Eastern States, where its ornamental qualities are fully appreciated.

**Big Woods**, a forest region in the S. E. part of Minnesota, extending S. from St. Cloud to Le Sueur, where it crosses the Minnesota, and sends branches toward Faribault and Mankato. It is 100 miles long and from 10 to 40 miles wide, covering 5,000 square miles, four-fifths of which lie N. of the Minnesota. This great belt of hardwood timber is one of the most valuable forests in the West.

**Bihé** (bê-hâ), a fruitful district of South Africa, E. of Benguela, and under Portuguese influence. Bihé is an important caravan center, as the only route across the continent passes through it. Area, 2,500 square miles. Pop. 95,000.

**Bijapur** (bê-jä-pör'), a decayed city in the Bombay Presidency, 160 miles S. E. of Poona. It was for centuries the flourishing capital of a powerful kingdom, but fell therewith under various dynasties in succession, Hindu and Mussulman, till in 1686 it was captured by Aurungzebe. It passed, during the early part of the 18th



century, into the hands of the Mahrattas, and became British in 1848. Now that a gradual decay has done its worst, Bijapur presents a contrast perhaps unequaled in the world. Lofty walls of hewn stone, still entire, inclose the silent and desolate fragments of a once vast and populous city. With the exception of an ancient temple, the sole relic of aboriginal domination, the ruins are Mohammedan, and consist of beautiful mosques, colossal tombs, a fort, with an inner citadel, a mile in circuit. The British Government has done everything to prevent further decay. Pop. (1901) 23,811.

**Bijns, Anna** (bīnz), a noted Flemish poet, born in Antwerp, 1494. Much admired for her melodious verses, full of metaphors and showing great technical skill, she was styled the "Brabantine Sappho" by her contemporaries. The first of her volumes of collected verse bore the title, "This Is a Beautiful and Truthful (or Sincere) Little Book," while a second is known as "Spiritual Refrains." She died in Antwerp, April 10, 1575.

**Bikaner**, a native State of Rājputāna, India, under the superintendence of a political agent and the governor-general's agent for Rājputāna, lying between 27° 12' and 30° 12' N. lat., and 72° 15' and 73° 50' E. long. Area, 23,173 square miles; pop. (1901) 584,627. BIKANER, the capital, is surrounded by a fine wall 3½ miles in circuit. It has a fort, containing the rajah's palace, is irregularly built, but with many good houses, and manufactures blankets, sugar candy, pottery, etc. Pop., including suburbs, (1901) 53,075.

**Bikelas, Dimitrios** (bē-kā'las), a Greek poet and essayist, born at Hemopolis, in the island of Syra, in 1835. After completing his studies, he went to London, where his parents had settled, and since 1874 he has lived in Paris. After having published a collection of his poems in London in 1862, he devoted himself to the task of making Shakespeare's dramas known in Greece through excellent metrical translations. As a prose writer he has won wide reputation with his tale, "Lukis Laras" (1879), which was translated into 13 languages.

**Bilaspur**, a district in the chief commissionership of the Central Provinces of India, lying between 21° 22' and 23° 6' N. lat., and between 80° 48' and 83° 10' E. long. Area, 7,798 square miles; population, 1,017,327. The administrative headquarters of the district are at Bilaspur, which is also the principal town. It is pleasantly situated on the S. bank of the Arpa, and has a population of 7,775.

**Bilbao**, a town of Northern Spain, the capital of the Basque Province of Vizcaya, is situated in a mountain gorge on the Nervion, 8 miles S. E. of its mouth at

Portugalete, and 63 miles N. by E. of Miranda by rail. Bilbao is well built. The place, which is purely a trading town, prides itself on being kept exceptionally clean. Pop. (1900) 83,306. Bilbao was founded in 1300 by Diego Lopez de Haro under the name of Belvao—*i. e.*, the fine fort—and soon attained great prosperity. In the 15th century it was the seat of the most authoritative commercial tribunal in Spain. It suffered severely in the wars with France, first in 1795, and again in 1808, when 1,200 of its inhabitants were slaughtered in cold blood. During the Carlist struggles Bilbao stood two great sieges, Zumalacarreguy here receiving his death wound in 1835, while in 1874 the place was vainly besieged and heavily bombarded by the forces of Don Carlos for four months.

**Bilberry**, the name given to one or two species of *vaccinium*, a genus of plants belonging to the order *vacciniaceæ* (cranberries). It is especially used of the *vaccinium myrtillus*, called also the whortleberry. It has angular stems, drooping, urceolate, almost waxy flowers, greenish with a red tinge, and black berries very pleasant to the taste. It grows in woods and healthy places. The great bilberry or bog whortleberry is an allied species with rounded stems, smaller flowers, and less agreeably tasted fruit. It grows in mountain bogs. It is called also the bleaberry or blaeberry. The name is also applied to the fruit of the species described. That of the bilberry, properly so called, is eaten in the places where it grows, either as it is or with milk. It is made also into jellies and tarts. It is astringent, and may be used in diarrhœa and dysentery. The fruit of the *V. uliginosum* is acid, and produces giddiness and headache when eaten in too large quantity.

**Bilbilis**, an old Iberian city of Spain, 2 miles E. of the modern town of Calatayud, in the Province of Saragossa, chiefly celebrated as the birthplace of the poet, Martial, but also famed for its highly tempered steel blades.

**Bilderdijk, Willem** (bil'der-dīk), a Dutch poet, born in Amsterdam, Sept. 7, 1756; reached the highest point of his lyric genius in the "Miscellaneous Poems" and patriotic pieces, notably the hymn, "Willem Fredrik," and "The True Love of Fatherland." Of his great didactic poems most are imitations; *e. g.*, the "Country Life," after a French original; "Man," after Pope's "Essay on Man." His epic, "Destruction of the First World," a work not unworthy of his genius, was left uncompleted. He died in Amsterdam, Dec. 18, 1831.

**Bile**, an animal fluid secreted by the liver. It is collected from venous and not from arterial blood. It is a viscid, transparent



liquid of a very deep yellow or greenish color, darkening by exposure to the air. Its odor is disagreeable; its taste nauseous and bitter. It has an alkaline reaction. Strecker has shown that it is essentially a mixture of two acids, the glycolic and the taurocholic acid, the first containing nitrogen without sulphur and the latter having both. The principal coloring matter of the bile is called bilirubine or cholepyrrhine. In 1,000 parts it contains:

|                                |                        |
|--------------------------------|------------------------|
| Water.....                     | from 823 to 903 parts. |
| Solid matter.....              | from 177 to 92 parts.  |
| Bile acids with alkali.....    | from 108 to 56 parts.  |
| Fat and cholesterine.....      | from 47 to 40 parts.   |
| Mucus and coloring matter..... | from 24 to 15 parts.   |
| Ash.....                       | from 11 to 6 parts.    |

When the bile is elaborated in the liver, it is received from the secreting vessels by very minute tubes, which, uniting, form the hepatic duct. The bile is conveyed into the gall bladder by means of the cystic, or into the duodenum by the choledoch duct; that which makes its way into the former receptacle is called the cystic bile, and that which enters the latter the hepatic bile. Cystic bile is deeper in color and more viscid, pungent, and bitter than hepatic bile. One main use of bile is to convert chyme into chyle as one step in the process of digestion.

**Biled-ul-gerid** (-jer'id), a tract of North Africa, lying between the S. declivity of Atlas and the Great Desert, noted for the production of date palms.

**Bilfinger**, or **Bulffinger**, **Georg Bernhard**, a German philosopher, born in Cannstatt, Württemberg, Jan. 23, 1693; was Professor of Theology in Tübingen, and Privy Councilor in Stuttgart. He wrote "*Dilucidationes de Deo, anima humana*," (1725), etc. He died in Stuttgart, Feb. 18, 1750.

**Bilge**, the breadth of a ship's bottom, or that part of her floor which approaches to a horizontal direction, on which she would rest if aground. Bilge water, water which enters a ship and lies upon her bilge or bottom; when not drawn off it becomes dirty and offensive. Bilge ways, planks of timber placed under a vessel's bilge on the building slip to support her while launching.

**Bilguer**, **Paul Rudolf von** (bēl-ger), a Prussian military officer, born in Ludwigslust, Mecklenburg-Schwerin, Sept. 21, 1815. He was a lieutenant in the army, and was best known as an authority on chess. He was the author of "*Handbuch des Schachspiels*," etc. He died in Berlin, Sept. 10, 1840.

**Bilharzia** (*distomum* or *gynæcophorus hæmatobius*), a parasitic flat worm in the fluke or trematode order, and belonging either to the same genus as the common liver fluke (*D. hepaticum*), or to one very

closely related. The most remarkable fact about this worm is the separation and relation of the sexes. In all other trematodes the sexes are united, the animals are hermaphrodite, but here a grooved canal, formed from two folds of skin on the ventral surface of the larger male, contains the female. Pairs thus united are found in the portal and other vessels in the abdominal region, both in men and monkeys. They are especially abundant in boys, and cause hæmaturia and other troubles. These are mainly due to the inflammation caused by the deposition of the ova in the vessels of the mucous membrane of ureter, bladder, intestine, etc. They occur from Egypt southward to the Cape. It is said that about half of the Fellah and Copt population of Egypt suffer from this parasite. The embryos are eiliated, but the life history is not known.

**Biliary Calculus**, a concretion which forms in the gall bladder or bile ducts; gall stone. It is generally composed of a peculiar crystalline fatty matter which has been called cholesterine.

**Bill**, a cutting instrument hook shaped toward the point, or with a concave cutting edge; used by plumbers, basket makers, gardeners, etc.; made in various forms and fitted with a handle. Such instruments, when used by gardeners for pruning hedges, trees, etc., are called hedge bills or bill hooks. Also an ancient military weapon, consisting of a broad, hook shaped blade, having a short pike at the back and another at the summit, attached to a long handle, used by the English infantry especially in defending themselves against cavalry down to the 15th century, and by civic guards or watchmen down to the end of the 17th.

**Bill**, a written or printed paper containing a statement of any particulars. In common use a tradesman's account, or a printed proclamation or advertisement, is thus called a bill. In legislation a bill is a draft of a proposed statute submitted to a legislative assembly for approval, but not yet enacted or passed and made law. When the bill has passed and received the necessary assent, it becomes an act.

**Bill of Adventure**.—A writing signed by a merchant, in which he states that certain goods shipped in his name really belong to another person, at whose risk the adventure is made.

**Bill of Attainder**.—A bill declaring that the person named in it is attainted and his property confiscated. The Constitution of the United States declares that no State shall pass any bill of attainder.

**Bill of Costs**.—A statement of the items which form the total amount of the costs of a suit or action. This is demandable as



a matter of right before the payment of the costs.

*Bill of Credit.*—A letter sent by an agent or other person to a merchant, desiring him to give the bearer credit for goods or money. It is frequently given to one about to travel abroad, and empowers him to take up money from the foreign correspondents of the person from whom the bill or letter of credit was received.

*Bill of Entry.*—A written account of goods entered at the custom-house, whether imported or designed for exportation.

*Bill of Exceptions.*—A bill of the nature of an appeal from a judge who is held to have misstated the law, whether by ignorance, by inadvertence, or by design. This the judge is bound to seal if he be requested by the counsel on either side so to do. The exceptions noted are reviewed by the court to which appeal is taken, and if the objections made to the rulings of the trial judge are well founded, the finding in the case is reversed, and usually the cause is remanded for a new trial.

*Bill of Exchange.*—A bill or security originally introduced for enabling a merchant in one country to remit money to a correspondent in the other. It is an open letter of request from one man to another desiring him to pay to a third party a specified sum and put it to the account of the first. If A. in London owe \$500 to B. in New York, and C. be about to travel from New York to London, then C. may pay the \$500 to B. before departure, and carry a bill of exchange on A. in London for the amount. If the last named gentleman be honest, and if he be solvent, he will repay the money to C. on reaching London, and C. will have reaped an advantage in having the cash in the form of a bill, which it was safer for him to carry in this form on the passage than if he had had it in notes or gold. In such a transaction, B., the person who writes the bill of exchange, is called the drawer: A., to whom it is written, is termed up to the time that he accepts it, the drawee, and after he has done so, the acceptor; and C., his order, or the bearer—in short, whoever is entitled to receive the money—the payee. The bill may be assigned to another by simple indorsement; the person who thus transfers it is named the indorser, and the one to whom it is assigned the indorsee or holder. Every one whose name is on the back of a bill is responsible if the person on whom payment should legitimately fall fail to meet his engagement. The first bills known in commerce were about A. D. 1328. Bills of exchange are also called drafts. Formerly it was deemed important to divide them into foreign, when they were drawn by a merchant residing abroad or his correspondent, and inland, when both the drawer and the

drawee resided in the same country. Now, the distinction is little attended to, there being no legal difference between the two classes of bills.

*Bill of Fare.*—A written or printed paper, enumerating the several dishes at a dinner table; or, in the case of hotels and public eating houses, enumerating the prices of the several articles which may be ordered for meals.

*Bill of Health.*—A certificate given to the master of a ship clearing out of a port in which contagious disease is epidemic, or is suspected to be so, certifying to the state of health of the crew and passengers on board.

*Bill of Indictment.*—A written accusation made against one or more persons of having committed a specified crime or misdemeanor. It is preferred to and presented on oath by a grand jury. If the grand jury find the allegations unproved, they ignore the bill, giving as their verdict, "Not a true bill;" if, on the contrary, they consider the indictment proved, their verdict is a "True bill."

*Bill of Lading.*—A document by which the master of a ship acknowledges to have received on board his vessel, in good order and condition, certain specified goods consigned to him by some particular shipper, and binds himself to deliver them in similarly good order and condition—unless the dangers of the sea, fire, or enemies prevent him—to the assignees of the shipper at the point of destination, on their paying him the stipulated freight. Usually two or three copies of a bill of lading are made, worded thus: "One of which bills being accomplished, the others stand void." A bill of lading may be transferred by indorsement like a bill of exchange.

*Bill of Parcels.*—An account given by a seller to a buyer, giving a list of the several articles which he has purchased, and their prices.

*Bill of Parliamentary Procedure.*—An instrument drawn or presented by a member or committee to a legislative body for its approbation and enactment. After it has successfully passed both houses and received the constitutional sanction of the chief magistrate, where such approbation is requisite, it becomes a law.

*Bill of Particulars.*—A paper stating in detail a plaintiff's case, or the set off on defendant's side.

*Bill of Rights.*—A bill which gave legal validity to the claim of rights, *i. e.*, the declaration presented by the Lords and Commons to the Prince and Princess of Orange on Feb. 13, 1688, and afterward enacted in Parliament when they became King and Queen. It declared it illegal, without the sanction of Parliament, to suspend or dispense with laws, to erect commission courts, to levy money for the use of the crown on



pretense of prerogative, and to raise and maintain a standing army in the time of peace. It also declared that subjects have a right to petition the King, and, if Protestants, to carry arms for defense; also that members of Parliament ought to be freely elected, and that their proceedings ought not to be impeached or questioned in any place out of Parliament. It further enacted that excessive bail ought not to be required, or excessive fines imposed, or unusual punishment inflicted; that juries should be chosen without partiality; that all grants and promises of fines or forfeitures before conviction are illegal; and, that, for redress of grievances and preserving of the laws, Parliament ought to be held frequently. Finally, it provided for the settlement of the crown. In the United States, a bill of rights, or, as it is more commonly termed in this country, a declaration of rights, is prefixed to the constitutions of most of the States.

*Bill of Sale.*—A deed of writing, under seal, designed to furnish evidence of the sale of personal property. It is necessary to have such an instrument when the sale of property is not to be immediately followed by its transference to the purchaser. It is used in the transfer of property in ships, in that of stock in trade, or the good-will of a business. It is employed also in the sale of furniture, the removal of which from the house would call attention to the embarrassed circumstances of its owner; hence the statistics of the bills of sale act as an index to measure the amount of secret distress existing in times of commercial depression. In not a few cases bills of sale are used to defeat just claims against the nominal or real vendor of the goods transferred.

*Bill of Sight.*—A form of entry at the custom-house by which one can land for inspection, in presence of the officers, such goods as he has not had the opportunity of previously examining, and which, consequently, he cannot accurately describe.

**Billaud-Varennés, Jacques Nicolas** (bē-yō'-vār-en'), the son of a French advocate at Rochelle, born in 1756; was educated at the same college as Fouché, and proved himself one of the most violent and sanguinary characters of the French Revolution. He bore a principal part in the murders and massacres which followed the destruction of the Bastille; voted immediate death to Louis XVI.; and officiated as president of the Convention on Oct. 18, 1793. He was afterward deported to Cayenne, and subsisted on a small pension allowed him by Petion. He died in Haiti, in 1819.

**Billaut, Adam** (bē-yē'), better known as "Maître Adam," a French poet, born at the beginning of the 17th century. A carpenter by trade, he wrote rude but original poems,

the gayety of which, together with the contrast they afforded with his occupation, made them very popular at the time. Voltaire called him "Vergil with the Plane." The three collections of his poems were entitled "The Pegs," "The Center-Bit," and "The Plane." He died in 1662.

**Bill Broker**, a financial agent or money dealer, who discounts or negotiates bills of exchange, promissory notes, etc.

**Bill Chamber**, a department of the Court of Sessions in Scotland, in which one of the judges officiates at all times during session and vacation. All proceedings for summary remedies, or for protection against impending proceedings, commence in the bill chamber, such as interdicts. The process of sequestration or bankruptcy also issues from this department of the court.

**Bille, Steen Andersen** (bē'le), a Danish naval officer, born in Copenhagen, Dec. 5, 1797. He was a member of the expedition that went to South America in 1840, and had command of a scientific expedition round the world, in the corvette "Galatea," 1845-1847. In his "Beretning om Corvetten Galathea's Reise omkring jorden, 1845-1846 og 1847" (1849-1851) he has given an account of this expedition. He died in Copenhagen, May 7, 1883.

**Bille, Steen Andersen**, a Danish naval officer, born Aug. 22, 1751; became admiral and also a minister of State. He greatly distinguished himself in an attack on Tripoli in 1798, and in the battle of Copenhagen in 1807. He died at Copenhagen, April 15, 1833.

**Billet**, the term given to a molding frequently introduced in mediæval architecture, consisting of a torus ornamented by alternate chequers, like a staff cut into short lengths and disposed horizontally or around a molding, and of another molding, composed of a series of small projections, arranged round a curve in alternate directions, but in a consecutive manner.

**Billeting**, a mode of feeding and lodging soldiers when they are not in camp or barracks by quartering them on the inhabitants of a town. The necessity for billeting occurs chiefly during movements of the troops or when any accidental occasion arises for quartering soldiers in a town which has not sufficient barrack accommodation. The billeting of soldiers on private householders is now generally abandoned, but all keepers of inns, livery stables, ale-houses, victualing houses, and similar establishments are liable to receive officers and soldiers billeted on them.

**Bill Fish**, the gar pike or long nosed gar (*lepidostēus ossēus*), a fish common in the lakes and rivers of the United States; but the name is also given to other fishes.



## Billiards

**Billiards**, a word probably derived from old French *billiard*, "a stick with a curved end;" in English, introduced as the name of a game, and made plural. The origin of billiards is uncertain. Some ascribe its invention to Henrique Devigne, an artist who flourished about 1570. It was brought into fashion by Louis XIV. (middle of 17th century), whose physicians recommended him exercise after eating. Others believe billiards to be of English origin. It is mentioned by Spenser ("Mother Hubbard's Tale," 1591), and by Shakespeare ("Anthony and Cleopatra," *circa*, 1607). The earliest description of billiards in English is in Cotton's "Compleat Gamester" (1674). The bed of the table was then made of oak; sometimes of marble. Slate beds were first used about 1827. The cushions were stuffed with flock; list was used later. India rubber cushions were first manufactured about 1835. The pockets, called hazards, were at first wooden boxes, nets being employed soon afterward. Each player pushed his ball with a mace (now corrupted into mace), made of heavy wood, and tipped at the broad end with ivory. The game played was the white winning game (single pool), five or three up. A player holding his adversary's ball won an end (or life); if he holed his own ball he lost a life (hence the terms winning and losing hazards). In addition, a small arch of ivory, called a port, and an ivory peg or king, stood on the table, and certain scores appertained to passing the port and to touching the king.

In 1734 French billiards first appear in Seymour's "Court Gamester." It is there stated that port and king are now wholly laid aside. Maces were still commonly used, but cue playing was permitted. Cues, however, had no tips until about the beginning of the 19th century. French billiards was very like single pool, a hazard counting two, a miss one, and a coup three. The game was played 12 up. The losing game, in which a player scored for a losing hazard, was also occasionally played. About 1775 the carambole game (later corrupted into cannon), was first heard of. A third ball, called the caram ball (etymology unknown), was introduced. Winning hazards and cannons counted to the striker, losing hazards against him; and a baulk (now first so called) compelled the next striker to play out of baulk, as at present. Early in the 19th century, the white winning and losing carambole game, now known as billiards, ousted all other varieties in England. It is played on a table 12 feet by 6 feet, surrounded by cushions, and having six pockets, of no fixed size, one at each angle of the two adjacent squares which form the bed of the table: three balls, diameter 2 1-16th inches, are used. The French have long dis-

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carded pockets, altogether, and play only a cannon game, with larger balls and a smaller table. The Americans added a fourth ball, and in their game cannons and winning hazards counted to the striker, and losing hazards against him. They then abolished the two side pockets, in consequence of their interfering with cannon play (or, as the Americans still spell it, more correctly, carom). Of late years pocket tables have been but little used in the United States, except for pool; and the size of the table has been gradually reduced to 10 feet by 5 feet; balls  $2\frac{3}{8}$  inches in diameter. The four ball game is now seldom played by experts, the three ball French carom game having superseded it in match play. Each carom counts 1; each miss, 1; and the game is usually 34 up. Sometimes it is played 21 up, misses not being reckoned, and each carom counting 1; or 45 up, each carom counting 2, and misses being scored. In the American game, push and crotch shots are generally barred. The crotch is a  $4\frac{1}{2}$ -inch square at each corner of the table. Whenever the centers of both object balls lie within the same crotch, only three caroms are allowed, unless at least one of the object balls is moved out of the crotch.

The highest breaks made at the English game are as follows: On an ordinary table, spot barred. John Roberts, Jr., twice during 1894 exceeded 1,000 in exhibition games, making 1,033 and 1,302: on an ordinary table, all in, Peall—2,413 (338 and 449 spots), at the Aquarium, Westminster, Nov. 4 and 5, 1886. Peall also holds the record on a championship (3 inch pocket) table, the spot being  $12\frac{3}{4}$  inches from the top cushion, instead of  $12\frac{1}{2}$  inches as in championship matches. His break was 445 (128 spots), at the Billiard Hall, on May 31, 1887. The best break on a championship table, with spot  $12\frac{1}{2}$  inches from the cushion, is by John Roberts, Jr. The break was 155, in a match for the championship, in June, 1885.

To play the game of billiards, the learner should first acquire an easy attitude. The left foot should be forward, a little to the left of the ball to be struck, with the toe pointing to the ball. The right foot should be about 18 inches behind the left, and nearly parallel to the edge of the table. The body should be inclined forward, with the face full in front of the ball. The cue should be lightly grasped with the right hand near the butt end, the hand being directly under the right elbow. The left hand should be placed on the table, with the space between the thumb and first finger opposite the center of the ball to be struck, the tip of the middle finger being eight or nine inches from the ball. To form the bridge on which the cue is to rest when aiming and striking, raise the knuckles



about two inches; raise the thumb, and press it against the third knuckle of the first finger. Spread the fingers a little, and press slightly on the table with the forefinger, little finger, and ball of the thumb.

The cue, when placed between the thumb and the first finger, should be nearly parallel to the bed of the table, and pointing to the center of the ball, or slightly above it. To deliver the cue properly, draw it back several inches, and then send it forward with a free and even motion, allowing the tip to pass beyond the spot occupied by the ball. For practice, place the ball on the spot in the middle of the baulk line, and drive it over the red spot, gently at first, so as to make the ball return into baulk. If struck truly in the center, it will return over the baulk spot. When able to accomplish this with tolerable certainty, increase the strength, and practice striking the ball a trifle above the center.

When able to hit the ball quite accurately above the center, at any strength, the learner should practice half-ball losing hazards. A half-ball stroke is one in which half the striker's ball overlaps half the object ball. Place the red on the spot. Draw an imaginary line from the red to the nearest shoulder of the middle pocket, and place the white on that line rather nearer to the shoulder than midway between it and the red. This gives a half-ball losing hazard with gentle strength into the top corner pocket. The white is to be struck in the center. Then move the white ball toward the opposite middle pocket, say about two inches. A half-ball losing hazard is still left, but it requires to be played stronger, and the ball should be struck above the center. Again moving the white ball toward the opposite middle pocket, a stronger half-ball loser is left, the limit being reached when the ball has been moved about  $8\frac{1}{2}$  inches, the stroke being then played as hard as possible. On either side of these limits, losing hazards can still be made into the corner pocket, but they require either side, or screw, or to be played finer or fuller than a half-ball.

To play with side, the ball must be struck on one side instead of in the center. If the ball is to travel to the right, right hand side is required; if to the left, left hand side. The cue should be held parallel to the direction of the aim, and not crossing the ball. The more gently the ball is struck, the more the side will tell. The amount of side required for given strokes can only be judged by practice. The effect of side is to alter the angle at which the striker's ball leaves the object-ball or the cushion; if side is put on in the direction in which the ball is going, the angle is increased; if reverse side is put on — *i. e.*, if the ball is struck

on the side away from that in which the ball is going, the angle is diminished.

To play with screw, the ball must be struck below the center, and the cue should be tightly grasped. Screws should never be played at top strength, and never finer than a three-quarter ball (three-quarters of each ball overlapping). The effect of screw is to make the striker's ball leave the object ball at a greater angle than it would if played without screw.

For following strokes, the striker's ball should be hit above the center, and the object ball fuller than a half-ball. For fine strokes, the striker must be careful to play his own ball truly in the center. How fine the object ball has to be struck to make a given stroke is a matter of practice.

Cannons follow the same principles as losing hazards. For pocket read ball, and the stroke is as already explained. Winning hazards depend chiefly on striking the ball accurately. Except when playing for position, the ball should be struck in the center. The striker should draw an imaginary line from the center of the pocket, through the object ball, and one inch beyond it, and should aim at the point where that line ends. A fine winning hazard or cut cannot be made if the angle formed by the imaginary line and the line traversed by the striker's ball is greater than a right angle.

The foregoing instructions are only intended to initiate the learner into the elements of the game. Besides the ordinary strokes described, much might be said about billiards which must here be passed over. In a complete treatise, push, kiss, bricole, massé, spot, and other strokes should be separately treated.

**Billings, John Shaw**, an American surgeon and librarian, born in Switzerland county, Ind., April 12, 1839; was graduated at Miami University, in 1857, and the Ohio Medical College, in 1860; was demonstrator of anatomy in the last institution, in 1860–1861; entered the Union army as an Assistant Surgeon, in 1861; was promoted to Lieutenant-Colonel and Deputy Surgeon General, June 6, 1894; and was retired, Oct. 1, 1895. He was Professor of Hygiene in the University of Pennsylvania, in 1893–1896; and in the last year was appointed Director of the New York Public Library (Astor, Lenox and Tilden foundations). After the close of the war Dr. Billings took charge of the library in the Surgeon-General's Office; reorganized the United States Marine Hospital Service; was Vice-President of the National Board of Health, in 1879–1882; and had charge of the compilation of vital and social statistics in the Eleventh Census (1890, *et seq.*). He is a member of a large number of American and foreign scientific societies, and his nu-



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merous publications include "Principles of Ventilation and Heating," "Index Catalogue of the Library of the Surgeon-General's Office, United States Army" (14 vols.), and "The National Medical Dictionary" (2 vols.).

**Billings, Josh.** See SHAW, HENRY WHEELER.

**Billings, William**, an American composer, born in Boston, Oct. 7, 1746; published "The New England Psalm Singer," "The Singing Master's Assistant," "Music in Miniature," "The Psalm Singer's Amusement," and other works. One of the earliest of American composers, he is accredited with having introduced into New England a spirited style of church music. He died in Boston, Sept. 26, 1800.

**Billingsgate**, a word said to have been derived from Belinus Magnus, a somewhat mythic British prince, father of King Lud, about B. C. 400. More probably it came from some unknown person called Billing. It is applied to the celebrated London fish market existent at least as early as A. D. 979, made a free market in 1699, extended in 1849, rebuilt in 1852, and finally exposed to the rivalry of another market begun 1874, completed 1876. The word is also used to indicate foul, abusive language, such as is popularly supposed to be mutually employed by fish-wives who are unable to come to an amicable understanding as to the proper price of the fish about which they are negotiating. Billingsgate is used as a synonym of coarse, vulgar abuse.

**Billington, Elizabeth**, an English singer, born in London, about 1769. Her mother was an English vocalist, her father a Saxon musician named Weichsel. She appeared as a singer at the age of 14, and at 16 married Mr. Billington, a double bass player. She made her debut as an operatic singer in Dublin, and afterward appeared at Covent Garden. She visited France and Italy, and Bianchi composed the opera of "Inez de Castro" expressly for her performance at Naples. In 1802-1811 she sang an Italian opera in London, and, having amassed a handsome fortune, she retired from the stage in 1811. Her private character was the cause of much scandal. She died in Italy, in 1818.

**Billion**, in English notation 1,000,000 times 1,000,000, and in England it is written 1,000,000,000,000, *i. e.*, with twice as many ciphers as 1,000,000 has. In the United States and in France the notation is different, the word billion signifying only 1,000 millions, written 1,000,000,000.

**Billiton**, a Dutch East Indian island between Banca and the S. W. of Borneo, of an irregular, sub-quadrangular form, about 40 miles across. It produces iron and tin,

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and exports sago, cocoanuts, pepper, tortoise shell, trepang, edible birds' nests, etc. It was ceded to the British in 1812 by the Sultan of Palembang, but in 1824 it was given up to the Dutch. Pop. (1900) 43,386.

**Billon**, an alloy of copper and silver, in which the former predominates, used in some countries for coins of low value, the object being to avoid the bulkiness of pure copper coin.

**Billy Barlow**, a street droll, a Merry Andrew. So called from a half idiot of the name, who fancied himself some great personage. He was well known in the East of London, and died in Whitechapel workhouse. Some of his sayings were really witty, and some of his attitudes really droll.

**Bilma**, a town of the Sahara, Central Africa, situated in 18° 40' N. lat., 14° E. long., on an oasis called the Wady Kewar. It is the capital of the Tibu country, important as a resting-place of caravans crossing the desert, but is a poor place.

**Bilney, Thomas**, an English martyr, born about 1495, probably at Norwich; studied at Trinity Hall, Cambridge, and was ordained in 1519. He was opposed to the formal "good works" of the Schoolmen, and denounced saint and relic worship; and to these mild Protestant views he converted Hugh Latimer and other young Cambridge men. In 1527 he was arraigned before Wolsey, and on recanting, absolved, but was confined in the Tower for over a year. Stung by remorse, after two years of suffering, he began to preach in the fields of Norfolk, but was soon apprehended and condemned; and although allowed to receive the sacraments of the Church from which he differed so little, he was burned as a heretic at Norwich, Aug. 19, 1531.

**Biloxi**, a city in Harrison co., Miss., on Biloxi Bay, opening into the Gulf of Mexico, and the Louisville and Nashville railroad; 80 miles N. E. of New Orleans. It is principally engaged in the canning of oysters, fish, fruit and vegetables, and has also considerable manufacturing and shipping interests. Biloxi is the site of the first settlement made upon the Mississippi by white men, under the direction of Pierre Le Moyne d'Iberville, in 1699. The city has electric lights, artesian waterworks, over 25 miles of shell roads, and an iron lighthouse with a light 62 feet above the sea level; and is a popular summer and winter resort. Pop. (1900) 5,467; (1910) 7,988.

**Biloxi Indians**, the name given to one of the 10 groups of tribes into which the Siouan stock of North American Indians is divided. In 1669 they had one village on Biloxi Bay near the Gulf of Mexico. Thirty years later there were three villages, Biloxi,



Paskagula and Moctobi. A few survivors of the tribe are still to be found near Le-compte, Rapides parish, La.

**Bimetallism** is a scheme to maintain two monetary standards in concurrent circulation at a fixed relative value. The term is a modern one, having originated probably with Cernuschi (*q. v.*) about the time of the serious fall in the value of silver in 1876, when new measures were thought to be necessary to support the value of silver. As distinct from the action of a single State, the proposal for combined agreement by several commercial nations upon the same ratio between two standards is commonly known as international bimetallism.

The theory of Bimetallism is based upon the so-called quantity-theory of money, and upon the compensatory action of two standards. The quantity-theory regards the level of prices as being fixed by the quantity of "money" in circulation compared with the money-work to be done. With a given circulation, it is held that an increasing volume of transactions would put such a demand upon the circulation that its value would necessarily be raised, bringing about, consequently, a fall in the level of prices. The compensatory action assumes that there may be changes in the conditions affecting the value of each of the two bimetallic standards; that, as one falls in value relative to the other, obligations and prices will be expressed in the lower standard, causing a concentration of monetary demand upon the less valuable standard; and that, as demand is withdrawn from the more valuable, and added to the less valuable, standard, the value of the former will fall and the value of the latter will rise, until an equilibrium is restored, so that both standards will circulate together. Under the compensatory action, while changes in relative values of the standards may be frequent—and must be sufficient to cause a shift from the one standard to another by the world of trade—it is claimed that the changes could not be as extreme as under a single standard.

The logic and theory of Bimetallism have been seriously attacked on grounds quite apart from its practical impossibility. In the first place, the theory of prices upon which Bimetallism rests has been declared to be wholly fallacious. When silver was abandoned by Germany, 1871-1873, the point was made that there was not enough gold in the world to do the money-work; if silver were given up, the increasing demand for "money" would raise the value of gold and lower prices; therefore, properly to increase the quantity of money, silver should be used as well as gold as a means of maintaining the requisite level of prices. Both theory and facts are now advanced to show the falsity of this position. From the point of view of

theory, a sharp distinction has been drawn between money in its function as a standard, and as a medium of exchange. Price is the quantity of the standard metal for which an article will exchange. To affect price, therefore, a change is necessary in the value of that "money" which is serving as a standard. Consequently, the separate forms of money which act as media of exchange are of little or no influence on prices. Inasmuch as gold is the standard, and many other things are devised to serve as media of exchange, the demand for "money" arising from increasing transactions is a demand for more media of exchange (such as bank notes, checks, etc.), and not necessarily for more of the metal adopted as a standard of prices. If the demand for media of exchange is met by banks—as it usually is—with a very elastic check-and-deposit currency, then there may be quite considerable fluctuations in the amount of the media of exchange without perceptibly affecting the value of that form of "money" which serves as the standard of prices. Thus, it is held by many economists that there is no direct relation between the level of prices and the quantity of that money which circulates as a medium of exchange. The compensatory action, moreover, depends on the willingness of States belonging to an international combination to see one metal entirely disappear as a standard, and to have all prices and obligations expressed in another metal. Only in that way could a restoration in the relative values of two metals be brought about. Providing this were allowed, it is still a question whether the demand thus created for media of exchange would so act on the value of a standard of prices throughout the whole world as to regulate the level of prices thereby. But on this point, Bagehot said it was useless to argue about Bimetallism, because it was a political impossibility: no nation would submit to the regulation of its internal monetary and fiscal system in the interest of a mere theory such as that proposed by Bimetallism, even though it might be of general concern to other nations. Great Britain's trade, for instance, is based to a large extent on the stability of bills of exchange drawn in gold, and she would not possibly submit to a loss of this advantage. In the reasoning of Bimetallism, it is assumed, also, that a demand for one standard, like gold, can be transferred without change to another standard, like silver. On the other side, it is maintained that the demand for gold is based on different considerations than is that for silver; consequently, gold and silver not being homogeneous, the demand for gold could not be transferred to a demand for silver. Gold has been wanted because it has a larger value in less bulk for large transactions and so



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is more desired in foreign trade. Also, there is a popular belief among men of affairs, whether well founded or not, that gold is less liable to fluctuations in its value than silver. Whatever the reason, it is claimed that whenever choice was free, gold has, in fact, been preferred to silver by commercial nations. The facts of history are thus used to prove that the demand for gold and silver is not homogeneous. Likewise, it is urged that the supply of gold comes mainly from different fields than that of silver: Gold being supplied from California and some other States of our Union, Australia, Russia, the Rand in Africa, British Columbia, and Alaska; while silver is found not only in the United States, but mainly in Mexico and South America. Thus two different metals, with separate sources of supply, and with demands quite unlike, cannot be regarded as homogeneous for monetary purposes. If not homogeneous in both demand and supply, it is held that the compensatory action would fail to work in practice.

In recent years, the discussion of Bimetallism has subsided. This outcome is due chiefly to the prevalent belief in the sufficiency of the gold supply. Advocates of the quantity-theory of money assert that, since the level of prices depends upon the quantity of money in circulation, the great recent production of gold has removed the objection to the gold standard raised about 1876 and thereafter, and that consequently the need of adding silver to the circulation is no longer so urgent. In this way the advocates of Bimetallism have maintained their consistency in accepting the gold standard. By those of differing views, the validity of this argument is challenged. Holding that the level of prices can be influenced either by changing the expenses of producing goods or by changes in the value of the gold standard, they admit that an increased quantity of the standard metal theoretically might lower its value and thus keep up the level of prices; but they insist that, in fact, the increasing supply of gold is the very reason why changes in prices of goods cannot be assigned to changes in the value of gold. They recall the truth that, owing to its durability, the supply of gold to meet existing demands is not the present supply, but all the supply since gold has been produced; hence, as years go on, the total supply becomes larger and larger, relatively to the annual supply, and, consequently, less and less influenced by ordinary changes in temporary supply or demand. To add a pail of water to a barrel-full would raise the level of the water; but to add a hog-head-full to Lake Superior would produce no perceptible effect on the level of water in Lake Superior. So with gold: the great additions of recent decades to the total supply forbid that ordinary fluctuations in

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demand or supply, even in terms of years, could perceptibly change the value of gold. It would, therefore, be illogical to argue that prices have been raised lately by the exceptional increase in gold of late years. In truth, the movement of gold prices seems to have no connection with the production of gold, as may be seen by comparing the statistics of this subject. While present prices (see Senate Aldrich Report on Prices) are about twenty per cent. lower than they were in 1860, or even in 1879, the production of gold has increased in the following way:

| Years.         | Gold Production<br>of the World. |
|----------------|----------------------------------|
| 1851-1860..... | \$1,696 millions                 |
| 1860-1872..... | 1,628 "                          |
| 1873-1892..... | 2,188 "                          |
| 1893-1902..... | 2,382 "                          |

In effect, we have a decline of the general level of prices contemporaneous with a prodigious increase in the supply of the very metal in which the prices of goods are estimated.

Historically, Bimetallism has been frequently introduced by legislative decree, but there seems to be no period of any consequence during which both gold and silver continued to circulate concurrently at a fixed legal ratio. However intended, the experiment has resulted in an alternative standard of one or the other metal. In the United States, a complete bimetallic system was inaugurated by Hamilton in 1792 at a ratio of 15 to 1, the mints being open freely to both gold and silver. The fall in the value of silver due to the large production of silver in Mexico after 1780 caused silver to flow to our mints, as the cheaper metal, according to Gresham's Law, and gold (very little, however, then circulating in our currency) to flow out. By 1814-1817, all gold had disappeared. In 1834, recognizing the actuality of silver as the standard money, Congress changed the ratio from 15 to 1 to about 16 to 1. This went too far and over-valued gold, which began to flow to the mints, while silver was withdrawn. By 1840 silver was practically out of circulation, and the gold discoveries of 1848 strengthened the tendency in favor of gold. In 1853 the United States accepted the single gold standard, and gave up the bimetallic system as impracticable. In France, Bimetallism was tried in 1803 at the ratio of 15½ to 1; but in time silver became the sole currency. Finally, in 1865, a group of States, led by France (Belgium, Switzerland, Italy, Greece and Rumania), under the name of the Latin Union, made a trial of Bimetallism. So long as gold flowed into, and silver flowed out of, these countries, no fears were expressed; but when, after 1873, silver began to come in and press to the mints, one after another of these countries



stopped the coinage of silver, thus ending this, the only known experiment in international bimetallism.

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See also COINAGE; CURRENCY; LATIN UNION, THE; MONEY. J. LAURENCE LAUGHLIN.

**Bin, Jean Baptiste Philippe Emile**, a French painter; working principally upon portraiture and decorative painting, in both of which lines he has been eminently successful; born in Paris, Feb. 10, 1825. He is a pupil of Gosse and Cogniet. In 1878 he was made a member of the Legion of Honor, and in 1881 was conspicuous as one of the founders of the Society of French Artists. Since that time he has taken an active part in politics, and has been elected mayor of the 18th *arrondissement*. His "Prometheus Chained" is in the Museum at Marseilles. Among his historic portraits are those of MM. Clemenceau, Rousseau, Deschamps, etc.

**Binary Star.** See DOUBLE STARS AND MULTIPLE STARS.

**Binary Theory**, in chemistry, a hypothesis proposed by Davy to reduce the haloid salts (as NaCl) and the oxygen salts (as NaNO<sub>3</sub>) to the same type, the monad Cl' being replaced by the monad radical containing oxygen (NO<sub>3</sub>)'. Acids are hydrogen salts, as HCl, or H(NO<sub>3</sub>)'. A radical is only part of a molecule, which can unite with or replace an element or another radical, atomicity for atomicity. Thus the dyad radical (SO<sub>4</sub>)" can replace two monad radicals, (NO<sub>3</sub>)'₂, as in the equation Pb"(NO<sub>3</sub>)₂ + Mg"(SO<sub>4</sub>)" = Pb"(SO<sub>4</sub>)" + Mg"(NO<sub>3</sub>)'₂. A radical cannot exist in a separate state.

**Binet, Victor Jean Baptiste Barthelémy** (bē-nā'), a French landscape painter, belonging to the realistic school, born in Rouen, March 17, 1849; made his debut in the Salon of 1878, showing "The Warren." One of the most famous of his pictures is "The Plain at St. Aubin-sur-Quillebœuf,"

in the Museum at Amiens. In 1889 he was awarded a first class medal at the Paris Exposition.

**Bingen** (bing'en), a German town in the Province of Rhine-Hesse, Hesse; on the left bank of the Rhine, and the right of the Nahe. It is of considerable historical interest, containing the ruins of the Castle of Klopp, blown up by the French in 1689; the remains of a 12th century monastery; and the tower, which, tradition tells us, was the scene of the tormenting death of Hatto, Archbishop of Mainz, said to have been eaten alive by mice in the 9th century. A statue of "Germania," heroic size, has been erected here to commemorate the German victories of 1870-1871.

**Binger, Louis Gustave** (ban-jā'), a French officer and African explorer, born Oct. 14, 1856. He made his way from the Upper Niger to Grand Bassam in 1887-1889, thus connecting the French possessions with the Ivory Coast. In 1892 he was commissioner of the French Government to settle the Ashanti boundaries with England.

**Bingham, Hiram**, an American Congregational clergyman, born in Bennington, Vt., Oct. 30, 1789; was one of the first missionaries of the Congregational Church to be sent to the Sandwich Islands, where he acquired much influence with the natives. He died in New Haven, Conn., Nov. 11, 1869.

**Bingham, John A.**, an American politician, born in Mercer, Pa., in 1815; studied at Franklin College, Ohio, and became a lawyer in 1840. He was elected to Congress as a Republican in 1854, and re-elected three times, retaining his seat from 1855 till 1863. He was chairman of the managers of the House in the impeachment of Judge Humphreys, for high treason, in 1862. President Lincoln appointed him a Judge Advocate in the army in 1864, and later in the same year solicitor of the United States Court of Claims. He was special judge advocate in the trial of the assassins of President Lincoln. In 1865 he was again elected to Congress, and retained his seat till 1873. He was one of the managers of the impeachment trial of President Johnson. From 1873 to 1885 he was United States minister to Japan. He died in Cadiz, O., March 20, 1900.

**Bingham, Joseph**, an English writer; born in 1668; distinguished himself as a student at Oxford, and devoted his attention particularly to ecclesiastical antiquities. He was compelled to leave the university for alleged heterodoxy, but was presented to the living of Headbourn-Worthy, near Winchester, and afterward to that of Havant, near Portsmouth. His great work, "Origines Ecclesiasticæ, or Antiquities of the Christian Church," in 10 volumes, was published 1708-1722. He died in 1723.



**Bingham, Kinsley S.**, an American legislator, born in Camillus, N. Y., Dec. 16, 1801; studied law, and went to Michigan in 1833. He was a judge of probate, Speaker of the State House of Representatives; a member of Congress in 1849-1851; Governor of Michigan in 1855-1856, and United States Senator in 1859-1861. He died in Green Oak, Mich., Oct. 5, 1861.

**Binghamton**, city and county-seat of Broome co., N. Y., at the junction of the Chenango and Susquehanna rivers, and on several railroads; 50 miles E. of Elmira. It occupies a site more than 850 feet above tide water, and both rivers are here spanned by several bridges. The city is supplied with water by the Holly system, which cost over \$1,500,000; has nearly 100 miles of streets lighted by electricity, and contains over 30 churches and chapels, public school property valued at over \$425,000, a public library, two National banks, and an assessed property valuation exceeding \$20,000,000. Among the attractions of Binghamton, which has been named the "Parlor City," are Ross Park, Bennett Grove, and the Driving Parks and Fair Grounds. The noteworthy buildings include the State Asylum for the Insane, United States Government Building, State Armory, new courthouse, new city hall, two orphan asylums, the Commercial Travelers' Home, an opera house, and the Casino. Binghamton ranks as the third cigar manufacturing city in the United States, and, according to the census of 1890, it then had 704 manufacturing establishments, employing \$9,058,651 capital and 10,191 persons; paying \$4,349,162 for wages, and \$7,659,207 for material, and having a combined output valued at \$15,040,152. Other important manufactures are scales, chemicals, furniture, sheet metal work, glass, gloves, and refined oils. An interesting feature of the city is the large number of cottages owned by the working people. Binghamton received a city charter in 1867. Pop. (1890) 35,005; (1900) 39,647; (1910) 48,443.

**Bingley, Ward**, the Garrick of the Dutch stage, was born at Rotterdam in 1755, of English parents. In 1799 he made his debut on the stage of Amsterdam, and almost from the first took his place at the head of his profession, not only in the Dutch theaters, but also in those which performed French plays in Amsterdam and The Hague. He died at The Hague in 1818.

**Binnacle**, corrupted from bittacle, a wooden case or box in which the compass on board a ship is kept to protect it from injury. A light is placed within it at night to insure that its indications are seen. It is placed immediately in front of the wheel

or steering apparatus, and secured to the deck, usually by metal stays. The after portion has glass windows, so that the compass is at all times visible to the helmsman, who stands at the wheel.

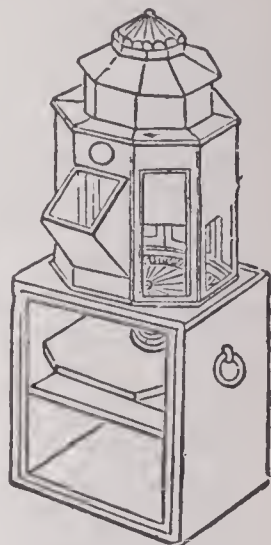
**Binney, Hibbert**, a Canadian clergyman, born in Nova Scotia, Aug. 12, 1819; graduated at Oxford University in 1842. He became Bishop (Anglican) of Nova Scotia and Prince Edward Island, in 1851, this being the first instance of England founding a bishopric in her colonies. He attended the General Convention of the Protestant Episcopal Church held in Chicago in 1886. He died in 1887.

**Binney, Horace**, an American lawyer, born in Philadelphia, Jan. 4, 1780; was graduated at Harvard in 1797; and for many years was at the head of the Pennsylvania bar. He had a number of distinguished cases in his career; the most noted one being the defense of the city of Philadelphia against the executors of Stephen Girard. He was also a director in the United States Bank. He wrote many valuable papers, and was the author of "The Leaders of the Old Bar of Philadelphia," and "The Privilege of the Writ of Habeas Corpus Under the Constitution." He died in Philadelphia, Aug. 12, 1875.

**Binney, Thomas**, an Independent preacher, theologian, and controversialist, born at Newcastle-on-Tyne, England, in 1798. He was pastor of Weigh House Chapel, London, for 40 years; was a voluminous writer on polemical subjects, his most successful venture as an author being "Is It Possible to Make the Best of Both Worlds?" a work for young men. He died in 1874.

**Binnie, Sir Alexander R.**, an English civil engineer, born in London, March 26, 1839; educated at private schools. He worked on the Welsh railways in 1862-1866, and for the Indian Public Works Department in 1868-1874; was engineer of the city of Bradford, in 1875-1890; constructed the Nagpore waterworks, the Blackwall tunnel, the Bradford waterworks, the Barking Road bridge, etc. In 1897 he was made chief engineer of the London County Council. His publications include articles and reports on professional subjects, lectures on waterworks, papers on rainfall, etc.

**Binocular**, literally, having two eyes or pertaining to both eyes; an instrument having two tubes, each furnished above with an eye glass, so as to enable one to see with



BINNACLE.



## Binomial

both eyes at once. Many opera glasses, telescopes, and microscopes are now binocular.

**Binocular Eye Piece.**—An eye piece so constructed and applied to the object glass as to divide the optical pencil transmitted to the latter, and form, as to each part of the divided pencil, a real or virtual image of the object beyond the place of division.

**Binocular Microscope.**—A microscope with two eye glasses, so that both eyes may use it simultaneously. When the invention of the stereoscope by Prof. Wheatstone had called attention to the value of binocular vision, attempts were made to render microscopes also binocular. Prof. Riddel, of New Orleans, Mr. Wenham, of London, and Prof. Nachet experimented, all more or less successfully, in this direction.

**Binocular Telescope.**—A pair of telescopes mounted in a stand, and having a parallel adjustment for the width between the eyes. The tubes have a coincident horizontal and vertical adjustment for altitude and azimuth. The inventor of this instrument is said to have been a Capuchin monk, Schyrleus de Rheita. Galileo also made a binocular telescope in 1617.

**Binomial**, literally, having two names.

**Binomial System.**—A system (that which now prevails) which gives to an animal, a plant, or other natural object, two names, the first to indicate the genus, and the second the species to which it belongs, as *Canis familiaris* (the dog), *Bellis perennis* (the daisy).

**Binomial Theorem.**—In algebra, a theorem, or it may be called a law, discovered by Sir Isaac Newton, by which a binomial quantity can be raised to any power without the trouble of a series of actual multiplications. Actual multiplication shows that the 7th power of  $x + a$  is  $x^7 + 7x^6a + 21x^5a^2 + 35x^4a^3 + 35x^3a^4 + 21x^2a^5 + 7xa^6 + a^7$ . It is evident that the several powers of the two letters  $x$  and  $a$  and the co-efficients stand so related to each other that study of them might enable one to deduce a law from them. In its most abstract form it is this: If  $(x + a)$  be raised to the  $n$ th power, that is,

$$(x + a)^n, \text{ it} = x^n + nx^{n-1}a + \frac{n \cdot (n-1)}{1 \cdot 2} x^{n-2}a^2 + \frac{n \cdot (n-1) \cdot (n-2)}{1 \cdot 2 \cdot 3} x^{n-3}a^3 + \dots \text{ etc.}$$

**Bintang**, an island of the Dutch East Indies, 40 miles S. E. of Singapore. Area 454 square miles; pop. 18,000. Gambir, rice and pepper are exported.

**Binturong** (*Arctitis* = bear-marten), a genus of carnivores in the civet section. Its resemblance to raccoons, beside which it used to be placed, is entirely superficial. It is a slow, arboreal and nocturnal animal, partly vegetarian, indeed omnivorous, in its

## Biograph

diet, with lank body, coarse, dark hair, long, tufted ears, and prehensile tail. There is but one species (*A. binturong*), found in India, Malay Archipelago, Sumatra and Java. It is easily tamed.

**Binué.** See BENUE.

**Bio=Bio** (byō-byō), the largest river of Chile, has a W. N. W. course of about 200 miles, from near the volcano of Antuco in the Andes to Concepcion on the Pacific Ocean. It is 2 miles wide at its mouth, and navigable for 100 miles. It was called Biu-biu ("double string") and Butanleuvu ("great river") by the aborigines. Here Valdivia first attacked the Araucanians.

**Bio=Bio**, a central province of Chile, in the valley of the Bio-Bio river, whence it derives its name; between Argentina and Arauco, with Concepcion and Nuble on the N. and Malleco on the S.; area, 5,245 square miles; pop. (1907) 98,035; capital, Angeles; pop. (1895) 7,868. It is in a fertile region with railroad communications.

**Biogenesis**, in biology, a word invented by Prof. Huxley, and first used by him in his address, as President of the British Association, at Liverpool, 1870, to indicate the view that living matter can be produced only from that which is itself living. It is opposed to abiogenesis. The first who established the doctrine of biogenesis was Francesco Redi. He considered that there were two kinds of it; the first, and by far the most common, that in which the offspring passes through the same series of changes as the parent, and the second, that in which the offspring is altogether and permanently unlike the parent. The former is now called homogenesis and the latter xenogenesis. Prof. Huxley, after summing up the argument for and against Redi's great doctrine of biogenesis, adds the words, "Which appears to me, with the limitations I have expressed, to be victorious along the whole line at the present day."

**Biograph**, an apparatus that displays in rapid sequence a long series of photographs. It belongs to a class of apparatus which followed the invention of the kinetoscope, and includes the vitascope, cinematograph, phantoscope, etc. It differs from the kinetoscope in that instead of showing small pictures through an enlarging lens by reflected light, it projects them on a screen.

The camera used in taking the negative from which motion pictures are made is provided with a mechanism similar to that employed in showing the finished photographs. Exposures are made at the rate of from 25 to 50 per second. After the film has been subjected to the usual photographic operations it is made to pass, in contact with a second sensitized film, beneath an incandescent lamp, and thus the photographs are printed upon the sensitized surface.



**Biography**

**Biography**, that department of literature which treats of the individual lives of men or women; and also, a prose narrative detailing the history and unfolding the character of an individual, written by another. When written by the individual whose history is told it is called an autobiography.

Though the term biography is modern, the kind of literature which it describes is ancient. In the Book of Genesis there are biographies, or at least memoirs, of Adam, Noah, Abraham, Isaac, Jacob, Joseph, and others. Homer's "Odyssey" may be considered to be an extended biography of Ulysses, limited, however, to the most interesting period of his life, that of his wanderings. Though the "Iliad" may be loosely called a history of the Trojan War, yet, accurately, it is a chapter from the biography of Achilles, describing calamities he brought upon the Greeks by the revenge which he took on Agamemnon for carrying off his female captive Briseis. The most elaborate Greek biography was Plutarch's "Parallel Lives" ("Bioi Paralleloi"), consisting of 46 memoirs of Greek, Roman, and other celebrities; it was published about A. D. 80. In B. C. 44, Cornelius Nepos had sent forth a biographical work, his "Vitæ Imperatorum" ("Lives of Commanders").

Modern biographical literature may be considered to date from the 17th century, since which time individual biographies have multiplied enormously. Dictionaries of biography have proved extremely useful, Moreri's "Historical and Critical Dictionary" (1671), being, perhaps, the first of this class. During the 19th century there were published the "Universal Biography" (45 vols., 1811-1862); "New General Biography" (46 vols., 1852-1866); Chalmer's "General Biographical Dictionary" (32 vols., 1812-1817); Rose's "Biographical Dictionary" (12 vols., 1848-1850); Leslie Stephen's "Dictionary of National Biography" (completed in 63 vols.—3 vols. supplement—the first of which appeared in 1885, and the last in 1900); Appleton's "Cyclopædia of American Biography" (7 vols., 1887-1900); White's "National Cyclopædia of American Biography" (New York); "Men and Women of the Time" (London); "Who's Who" (London); "Who's Who in America" (Chicago); Vaperean's "Universal Dictionary of Contemporaries" (Paris); "Lamb's Biographical Dictionary of the United States" (8 vols., 1897, *et seq.*); and "Canadian Men and Women of the Time." Among works of more limited aim may be noted various "Lives of the Saints," Fox's "Book of Martyrs," various "Lives of the Poets," Boswell's "Life of Johnson," etc.

**Biology** is the science of living things; that is, it is the study of organisms as contrasted with inorganic objects. In its gen-

**Biology**

erally accepted sense the term was first used by the French naturalist, Lamarck (*q. v.*), in the preface to his "Hydrologie," published in 1802. It was also suggested with the same signification by Treviranus as the title of a work, "Biologie, die Philosophie der lebenden Natur," the first of the five volumes of which appeared in the same year. The use of the word is the outcome of the recognition of the existence of certain fundamental properties common to both plants and animals. To a large extent it has superseded the older expression "Natural History," two branches of which, Botany and Zoölogy, had reached a high state of development before the newer word came into use. In its broadest signification the term would include many branches of human knowledge which are generally regarded as distinct sciences. Thus, a liberal application of the word would include history, anthropology, sociology, psychology and all other studies concerned with man and human society, both past and present. In practice, however, the subject is restricted almost exclusively to the study of organisms lower than man, though the branches of medicine are usually excepted, psychology being often included and sometimes history. The scope of biology may be gathered from the following tabulation, which is adapted from Huxley, and which is to be read from below upward:

|  |   |  |
|--|---|--|
| <div> <b>Biology</b><br/>                     (life, organisms)                 </div> | <div>                     {                     <div>                         Ætiology<br/>                         (causes)                     </div> <div>                         Distribution                     </div> <div>                         Physiology<br/>                         (function)                     </div> <div>                         Morphology<br/>                         (structure)                     </div> </div> | <div>                         {                         <div>                             Evolution,<br/>                             Adaptation,<br/>                             Variability,<br/>                             Heredity.                         </div> </div>   |
|  |   | <div>                         {                         <div>                             Geographical,<br/>                             Geological.                         </div> </div>   |
|  |   | <div>                         {                         <div>                             Reproduction,<br/>                             Irritability,<br/>                             Growth,<br/>                             Nutrition.                         </div> </div>  |
|  |   | <div>                         {                         <div>                             Classification,<br/>                             Embryology,<br/>                             Histology,<br/>                             Anatomy.                         </div> </div> |

So comprehensive is the subject that it is necessarily subdivided into numerous branches of restricted limits, and a "biologist" is consequently not to be regarded as one who is conversant with the general subject in all of its extensive ramifications, but rather as one whose interests and attainments are confined to some of the lesser branches.

While the word was coined in response to a general and increasing recognition of the many similarities between the two great groups of organisms as contrasted with their unlikeness to the mineral world, and of the desirability of a term which would express their most striking and distinctive feature, viz., the manifestation of vital activity, or the possession of life, the real warrant for the use of the word is found in the great



generalization of the German zoölogist, Max Schultze. This was based mainly upon the observations of Dujardin, a French zoölogist, upon certain amœboid organisms, the body substance of which he named *sarcodæ* (1835), and those of the German botanists Schleiden and von Mohl upon the contents of vegetable cells which the former called *Schleim* (1839), and for which the latter proposed the term *Protoplasma* (1846). Schultze (1861) insisted upon the essential similarity of the *sarcodæ* of Dujardin and the *Protoplasma* of von Mohl, and urged the use of the latter term as a suitable name for the substance. Thus, the fundamental likeness of plant and animal organisms was established and the reasonableness of including them in one general subject of investigation was confirmed. All subsequent studies have only served to emphasize the truth that plants and animals are fundamentally alike, and that they simply exhibit two somewhat contrasted phases of vital activity. A consideration of this activity shows that to a very great extent the life-phenomena can be explained in terms of physics and chemistry, though it must not be inferred from this statement that the mystery of life has yet been solved, and that an organism may be regarded in certain aspects is a machine; that is, a mechanism for the transformation of energy. The extremes of the life-phenomena are seen in the green plant on the one hand, and in the higher animals on the other. In the former case the striking feature is the constructive metabolic changes which manifest themselves in the formation, in the green parts or chloroplasts of the organism and under the influence of sunlight, of starchy substances or carbohydrates out of the simpler compounds, carbon dioxide and water. This constructive activity is associated with fixity of position or sedentary mode of life, the vegetable organism being thus a storehouse of energy locked up largely in its carbohydrates. On the other hand, the salient character of the animal is, in general terms, its activity as expressed in motion and sensation. It is a liberator of the energy received directly or indirectly from the plant in the form of food. From these extremes the branches of the genealogical tree lead back to organisms in which these activities are so equally balanced that the systematist despairs of being able ever to say that a given organism of this kind is to be called an animal rather than a plant, or *vice versa*. The genealogical tree, then, showing the general relationships of plants and animals may broadly be regarded as having the shape of the letter Y, one branch of which represents the plants and the other the animals, while the stem shows the position of the lower forms which cannot definitely be classified as plant or animal.

In considering these definitions, we must remember that in a living organism "dead" matter in the form of food and air is constantly being changed into "living" matter by the process of assimilation going on in the tissues, and then passes back into its "dead" condition in the excretions. We must also bear in mind that the tissues of a living organism consist very largely of material that is no longer protoplasm and is, hence, in the biological sense, not living. The outer layers of the skin and nails, the hair, much of the bones and teeth, the lymph and blood-plasma, the red corpuscles of the blood, the bulk of adipose tissue and large portions of the nervous system, to say nothing of many other important parts of the body, are not living substance, though they aid in the performance of functions essential to the presence and continuance of vitality. The boundary line between living and non-living matter is thus seen to be indistinct and indefinable, and the organic matter to have much in common with the inorganic as regards composition and activities.

The aim of biology is the elucidation and control of the life-phenomena. To a certain extent this has already been attained, as is shown by the operations of agriculture, horticulture, the breeding of animals, the practice of medicine, and in laboratory experiments on regeneration, artificial fecundation of eggs, etc. While in English and French usage the word "biology" includes the study of life-phenomena in a broad sense, the Germans persist in making it practically synonymous with ecology. See also BOTANY; PALEONTOLOGY; ZOÖLOGY, and the numerous titles in these departments.

CHARLES WRIGHT DODGE.

**Bion**, a Greek pastoral poet, born near Smyrna in the 3d century B. C. He appears to have passed the latter part of his life in Sicily. His pastorals betray a degree of refinement and sentimentality not found in the earlier and more spontaneous bucolic poets. Still extant is his "Lament for Adonis," often imitated by subsequent poets. Besides this there remain of his works only short pieces, many of them fragmentary.

**Biondo, Flavio** (be-yôn'dō), an Italian archæologist (1388-1463), whose encyclopædias have served as the foundation for all subsequent collections of archæological knowledge. They were called "Roma instaurata," "Roma triumphans," and "Italia illustrata."

**Bioplasm**, in biology, a term introduced by Prof. L. S. Beale, an English scientist, to designate forming, living, or germinal matter; the living matter of living beings. The term protoplasm had been



## Biot

previously used in an analogous sense, but Dr. Beale felt that a word more limited in signification was required.

**Biot, Edouard Constant** (bē-yō'), a Chinese scholar, born in Paris, July 2, 1803; son of Jean Baptiste Biot. He was at first a railway engineer; but his health failing, he retired from the public service, and devoted his leisure to the study of Chinese and the history of the social organization of the Celestial Empire. He was elected a member of the Academy in 1847. He wrote a "Dictionary of the Chinese Empire" (1842), and a multitude of memoirs on Chinese subjects. He died March 12, 1850.

**Biot, Jean Baptiste**, a French physicist and astronomer, born in Paris, April 21, 1774. He entered the artillery, but forsook the service for science, and, in 1800, became Professor of Physics in the Collège de France. Along with Arago he was (1806) sent to Spain to carry out the measuring of a degree of the meridian, and, in 1817, he visited England, and went as far N. as the Shetland Islands, in order to make observations along the line of the British arc of meridian. His most valuable contributions to science are on the polarization of light, for which he received the Rumford gold medal in 1840; his researches into ancient astronomy are also very valuable. Among the latter may be mentioned his "Researches into Ancient Chinese Astronomy" (1840), and "Studies in Indian Astronomy" (1862). His works on physics are esteemed; the third edition of his "Elementary Treatise on Physical Astronomy" (5 vols., 1841-1857) was translated into English. In 1849 Biot was made a commander of the Legion of Honor; he was also a member of the French Academy, and of most of the learned societies in Europe. He died in Paris, Feb. 3, 1862.

**Biotite**, a hexagonal and an optically uniaxial mineral, formerly called magnesia mica, hexagonal mica, and uniaxial mica; named after Jean Baptiste Biot. It exists in tabular prisms, in disseminated scales, or in massive aggregations of cleavable scales. Color: silvery-white, rarely bottle green, and by transmitted light often fiery red. Composition varies a good deal. One specimen had silica, 40.00; alumina, 16.16; sesquioxide of iron, 7.50; oxide of manganese, 21.54; potassa, 10.83; water, 3.0; iron, 0.50; and titanate acid, 0.2. Rubellan is an altered biotite and eukamptite one of a hydrous type.

**Biped**, a descriptive term, sometimes applied to man, but more frequently to birds. It may be used in two ways — (a) in reference to habit only (physiological), when animals use only their two hind limbs for moving along the ground — *e. g.*, man, kan-

## Birch

garoo, bird; (b) in reference to anatomy (morphology), when the typical number of four limbs is reduced to two. Thus among mammals the order of whales (*cetacea*) is marked by the absence of hind limbs; among birds the fore limbs are considerably reduced in the running birds of the ostrich sub-class, and especially in the New Zealand kiwi (*apteryx*); among reptiles, some serpents (*e. g.*, pythons), retain traces of hind legs, while all the others have lost both pairs, and a few lizards have either only hind feet (*pseudopus*, *ophiodes*), or only fore feet (*chirotes*); among amphibians, a few (*e. g.*, siren) have only fore feet; and the same is true of numerous fishes (*e. g.*, among *siluridae*), and especially of those which live to a large extent in mud.

**Biquadratic Equation**, in algebra, an equation raised to the fourth power, or where the unknown quantity of one of the terms has four dimensions. An equation of this kind, when complete, is of the form  $x^4 + Ax^3 + Bx^2 + Cx + D = 0$ , where A, B, C and D denote any known qualities whatever.

**Birch**, the English name of the trees and shrubs belonging to the botanical genus *betula*. The common birch (*betula alba*) has ovate-deltoid, acute, doubly serrate leaves. Its flowers are in catkins, which come forth in April and May. It grows best in healthy soils and in Alpine districts. The drooping or weeping birch (*B. pendula*) is a variety of this tree. It grows wild on the European continent and in Asia. The wood of the birch is tough and white. It is used for making brooms; it is often burned into charcoal; twigs are by many employed for purposes of castigation. The oil obtained from the white rind is used in tanning Russia leather. The Russians turn it to account also as a vermifuge and as a balsam in the cure of wounds. In some countries the bark of the birch is made into hats and drinking cups. The *B. nana*, or dwarf birch, grows in the Highlands of Scotland, in Lapland, etc. It is a small shrub, one or two feet high. The Laplander uses the wood for fuel, and the leaves, spread over with a reindeer's skin, for a bed. *B. lenta* is the mahogany birch, mountain mahogany, sweet birch, or cherry birch of North America. Its leaves are fragrant, and have been used as a substitute for tea. The canoe birch, of which the North American Indians constructed their portable canoes, is the *B. papyracea*.

**Birch, Samuel**, an English Orientalist, born in London, Nov. 3, 1813. He entered the British Museum as Assistant Keeper of Antiquities, in 1836, and ultimately became Keeper of the Egyptian and Assyrian Antiquities. He was especially famed for his capacity and skill in Egyptology, and was



associated with Baron Bunsen in his work on Egypt, contributing the philological portions relating to hieroglyphics. His principal works, besides numerous contributions to the transactions of learned societies, to cyclopædias, etc., include "Gallery of Antiquities" (1842); "Catalogue of Greek Vases" (1851); "Introduction to the Study of Hieroglyphics" (1857); "Ancient Pottery" (1858); "Egypt from the Earliest Times" (1875). He edited "Records of the Past," from 1873 to 1880. He had the LL. D. degree from St. Andrews and Cambridge, D. C. L. from Oxford, besides many foreign academical distinctions. He died Dec. 27, 1885.

**Birchard, Isaac James**, a Canadian educator, born in Uxbridge, Ont., Oct. 11, 1850; graduated at Toronto University, in 1880, and studied at Syracuse University. He was principal of a public school in Toronto in 1874-1880; Master of Mathematics at Brantford College Institute in 1882-1893; and, in 1900, was Master of Mathematics in the Toronto College Institute. He is a teacher of exceptional merit, best known as the author of the text-book "Plane Trigonometry for Schools and Colleges," and as the joint author of "High School Algebra" (2 vols.).

**Birch=Pfeiffer, Charlotte** (bērch-pfīfer), a German actress and dramatist (1800-1868). She joined the Court Theater Company at Munich at the age of 13 years; at 18 she had won distinction in tragic rôles. She married Christian Birch in 1825; thereafter till her death she was in active relations with the stage, either as actress or conductress. Her numerous dramatic compositions were produced on nearly every stage in Germany. They evince remarkable skill in the employment of stage effects. Her plays are, in many instances, grounded on novels; among them are "Graffenstein Castle," "The Favorites," "The Bell Ringers of Notre Dame" (Victor Hugo), "The Woman in White" (Wilkie Collins), "The Orphan of Lowood" (Charlotte Brontë), etc. Her dramatic works, numbering 70, and her novels and tales were published complete in 1862.

**Bird.** See ORNITHOLOGY.

**Bird, Charles**, an American military officer, born in Delaware, June 17, 1838. He entered the volunteer service, in 1861, as First Lieutenant, 1st Delaware Infantry; was promoted Lieutenant-Colonel, 9th Delaware Infantry, in 1864; and was commissioned Colonel of the 1st United States Veteran Infantry, Dec. 24, 1865. On March 2, 1867, he was brevetted First Lieutenant and Captain in the United States army for gallantry in the battle of Fredericksburg, Major for Spottsylvania, and Lieutenant-Colonel for Petersburg, Va. He was appointed

a Second Lieutenant, 14th United States Infantry, in 1866; promoted to Major and Quartermaster in 1895; and commissioned a Colonel of United States Volunteers for the war with Spain, in 1898.

**Bird, Frederic Mayer**, an American clergyman, born in Philadelphia, June 28, 1838; graduated at the University of Pennsylvania in 1857, and at the Union Theological Seminary in 1860. He was rector at Spotswood, N. J., in 1870-1874; Chaplain and Professor of Psychology, Christian Evidences and Rhetoric, at Lehigh University in 1881-1886; and acting chaplain there in 1893-1898. He is noted as a hymnologist, and as the collector of one of the most complete and valuable musical libraries in the United States. He edited several collections of hymns; was associate editor of "Chandler's Encyclopædia;" editor of "Lippincott's Magazine" (1893-1898). He died April 2, 1908.

**Bird, Golding**, an English physician, born in Norfolk, Dec. 9, 1814; became a Lecturer on Natural Philosophy at Guy's Hospital in 1836; Fellow of the London College of Physicians in 1845; and Lecturer on Materia Medica at the College of Physicians in 1847. He is remarkable for his early mental development, for several very able medical works, and his "Elements of Natural Philosophy" (1839). He died in Tunbridge Wells, Oct. 27, 1854.

**Bird, Robert Montgomery**, an American dramatist and novelist, born in Newcastle, Del., about 1803; studied medicine in the University of Pennsylvania, and after practicing for a year, turned his attention to literature. He was the author of three tragedies, "The Gladiator," "Oraloosa," and "The Broker of Bogota," and of the novels, "Calaver" (1834); "The Infidel" (1835); "The Hawks of Hawk Hollow;" "Shepherd Lee;" "Nick of the Woods" (1837); "Peter Pilgrim" (1838); and "Robin Day" (1839). For several years he edited the "North American Gazette." He died in Philadelphia, Jan. 22, 1854.

**Bird=Catching Spider**, a name applied to gigantic spiders of the genera *mygale* and *epeira*, more especially to the *mygale avicularia*, a native of Surinam and elsewhere which preys upon insects and small birds which it hunts for and pounces on. It is about two inches long, very hairy, and almost black; its feet when spread out occupy a surface of nearly a foot in diameter.

**Bird Cherry**, a small tree (the *prunus padus*, etc.). It has pendulous racemes of white flowers, which appear in May, and are succeeded by small, black, drupaceous, cherry-like fruits.

**Birde**, or **Byrd, William**, an English composer, born about 1538; became organ-



## Bird Lice

ist at Lincoln Cathedral in 1563, and of the Chapel Royal, London, in 1569. He is best known by his fine canon, "Non Nobis Domine," and a volume of "Sacred Songs." He died in London, July 4, 1623.

**Bird Lice**, the common name given to the small parasites so frequently seen infesting birds. Naturalists place them in the insect order *mallophaga*, in immediate proximity to the *anoplura*, which contains the human pediculi.

**Bird Lime**, a substance whitish and limy in appearance; used, as its name imports, for capturing birds. It is, in general, manufactured from the bark of the holly, though the berries of the mistletoe, and also the bark, boiled in water, beaten in a mortar, and then mashed, may also be employed for the purpose.

**Bird of Ill Omen**, a phrase often applied to a person who is regarded as unlucky; one who is in the habit of bringing ill news. The ancients thought that some birds indicated good luck, and others evil. Even to the present day many look upon owls, crows and ravens as unlucky birds; swallows and storks as lucky ones. Ravens, by their acute sense of smell, discern the savor of dying bodies (like sharks), and, under the hope of preying on them, light on chimney tops or flutter about sick rooms; hence the raven indicates death; owls screech when bad weather is at hand; and as foul weather often precedes sickness, so the owl is looked on as a funeral bird.

**Bird of Paradise**, the English designation of a family of conirostral birds—the *paradisidæ*. They are closely allied to the *corvidæ* (crows), with which, indeed, they are united by some writers. They have magnificent plumage, especially the males, who can, moreover, elevate quite a canopy of plumes behind their necks. When first discovered they were the subject of many myths. They were supposed to be perpetually on the wing, having no feet, a fable perpetuated by Linnæus in the name *apoda* or footless, given to the best known and finest species. The fact was, that the inhabitants of New Guinea, their native region, cut off the feet before selling them to white men. The fable of the phoenix is believed to have been framed from myths current about the birds of paradise.

**Bird Seed**, seed for feeding cage birds, especially the seed of *phalāris canariensis*, or canary grass.

**Bird's Eye**, the eye or eyes of a bird. In botany, the name of several plants with small, bright, usually blue, flowers. (1) A widely diffused name for *veronica chamaedrys*. (2) A name for a plant, called more fully the bird's-eye primrose. It is the *primula farinosa*. It has pale lilac flowers with a yellow eye. The whole plant is

## Bird's-Nest Orchis

powdered with a substance smelling like musk. It grows in the milder temperate climates of Europe. The American flower bearing the same common name is of a different species, being called by botanists *primula pusilla*. (3) A name sometimes given to the *adonis autumnalis*, and, indeed, to the whole genus *adonis*, more commonly designated "pheasant's eye."

**Bird's-Eye Limestone**, a division of the lower Silurian rocks of North America, apparently equivalent to the Llandeilo Beds, so called from the dark circular markings which stud many portions of its mass, and which have been referred to the impressions of a fucoid (*phytopsis cellulosus*), others regarding them as the filled-up burrows of marine worms.

**Bird's-Eye Maple**, curled maple, the wood of the sugar maple when full of little knotty spots, somewhat resembling birds' eyes, much used in cabinet work.

**Bird's-Eye View**, the representation of any scene as it would appear if seen from a considerable elevation right above.

**Bird's Foot**, a common name for several plants, especially papilionaceous plants of the genus *ornithopus*, their legumes being articulated, cylindrical, and bent in like a claw.

**Bird's-Foot Trefoil**, the popular name of *lotus corniculatus*, and one or two other creeping leguminous plants common in Great Britain. The common bird's-foot trefoil is a common British plant, and is found in most parts of Europe as well as in Asia, North Africa and Australia, and is a useful pasture plant.

**Bird's Nest**, the nest of a bird. Those of the several species vary in their minor details so as to be in most cases quite distinguishable from each other.

Edible birds' nests are nests built by the *collocalia esculenta*, and certain other species of swallows inhabiting Sumatra, Java, China, and some other parts of the East. The nests, which are deemed a luxury by the Chinese, are formed of a mucilaginous substance, secreted by the birds themselves from their salivary glands.

**Bird's-Nest Orchis**, one of the *orchideæ*, *neottia* or *listera nidus-avis* of Linnæus. The English designation is a translation of the Latin *nidus-avis*. The plant is so called from having its root composed of numerous fleshy fibers aggregated in a bird's-nest fashion. Gerard indicates the kind of nest which in his view it resembles, saying that it "hath many tangling rootes platted or crossed one over another verie intricately, which resembleth a crowe's nest made of stickes." It has dingy brown flowers growing in spikes.



**Birds of Passage**, birds which migrate with the season from a colder to a warmer, or from a warmer to a colder climate, divided into summer birds of passage and winter birds of passage. Such birds always breed in the country to which they resort in summer, *i. e.*, in the colder of their homes. Among British summer birds of passage are the cuckoo, swallow, etc., which depart in autumn for a warmer climate; while in winter woodcocks, fieldfares, redwings, with many aquatic birds, as swan geese, etc., regularly flock to Great Britain from the North. In the United States the robin is a familiar example.

**Birdwood, Herbert Mills**, an English lawyer, born in Belgaum, Bombay Presidency, May 29, 1837. He was educated at Edinburgh University; and was Dean of Arts (1868, 1881, 1888, 1890) and Syndic at the Bombay University, and Vice-Chancellor in 1891-1892. He entered the Bombay Civil Service in 1858; was made assistant collector and magistrate in 1859; assistant judge in 1862; Under Secretary to the Government, Judicial, Political and Educational Departments, and Secretary of the Legislative Council, in 1863; acting registrar of the High Court, Bombay, in 1867; District Judge for Ratnagiri, Surat and Thana, 1871-1880; Judicial Commissioner and Judge of the Sadar Court, Sind, in 1881; three times acting judge of the High Court, Bombay, 1881-1885; Puisne Judge of the High Court of Bombay in 1885-1892; and member of the Executive Council of the Governor of Bombay in 1892-1897. His publications include "Catalogue of the Flora of Matheran and Mahableshwar," "Catalogue of Bills Introduced into the Bombay Legislative Council in 1862-1865," and papers relating to the constitution of the Council, the plague in Bombay, etc.

**Bireme**, a Roman ship of war with two banks of oars. It was inferior in magnitude and strength to the trireme.

**Biren, Ernest John, Duke of Courland**, a Lithuanian of mean family, was born in 1690, and went in 1714 to St. Petersburg. Anna, Duchess Dowager of Courland, made him her favorite, and when she became Empress of Russia, intrusted to him the administration of the kingdom. On the death of the Empress he assumed the regency, by virtue of her will; but, in 1740, a conspiracy was formed against him by Marshal Munich, and he was condemned to death, which sentence was changed to banishment. Peter III. recalled him, and Catherine II. restored him to his former dignity. In 1763, Biren re-entered Mitau; and, profiting by the lessons of misfortune he had experienced, governed for the remainder of his life with mildness and justice. He died in 1772.

**Birge, Edward Asahel**, an American naturalist, born in Troy, N. Y., Sept. 7, 1851; graduated at Williams College in 1873; studied physiology and histology at Leipsic in 1880-1881. He became Instructor of Natural History in the University of Wisconsin in 1875; Professor of Zoology in 1879; and Dean of the College of Letters and Science in 1891. In 1894 he became Director of the Geological and Natural History Survey of Wisconsin. He has written many articles and papers on zoology.

**Birkbeck, George**, an English educator, born in Settle, Yorkshire, Jan. 10, 1776; educated at Edinburgh; became Professor of Natural Philosophy in the Andersonian Institution at Glasgow in 1799. In 1801-1804 he gave free courses of lectures to the mechanics of Glasgow, and was prominent in the establishment of the London Mechanics' Institute, of which, in 1823, he was made president for life. He died in London, Dec. 1, 1841.

**Birkenfeld**, a German principality belonging to Oldenburg, but surrounded by the Prussian Rhine Province, and intersected by the railway from Bingen to Saarbrück. It has an area of nearly 200 square miles, with a population of (1900) 43,409, it has been connected with Oldenburg, 300 miles distant, since 1817. The capital, Birkenfeld, has a population of 2,500.

**Birket-el-Keroon** ("lake of the horn"), an Egyptian lake in the Fayoom, about 30 miles in length by 6 in breadth. It communicates with the Nile and had connection formerly with the artificial Lake Maris, with which it has been confounded.

**Birkett, Herbert Stanley**, a Canadian physician, born in Hamilton, Ont., July 17, 1864; graduated at McGill University, in 1886. He was senior house surgeon to the Montreal General Hospital in 1886-1887, and assistant physician to the Montreal Dispensary in 1887-1889. He is a fellow of the American Laryngologist Association. In 1889 he was appointed Demonstrator of Anatomy at McGill University, and in 1900 was Laryngologist to the Montreal General Hospital, and Aurist to the Mackay Institute for Deaf Mutes.

**Birmingham**, city and county-seat of Jefferson co., Ala.; at the junction of several trunk railroads; 96 miles N. W. of Montgomery, the State capital. It is at the foot of Red Mountain, which, besides its vast limestone deposits, contains a remarkably large and accessible vein of hematite iron ore; and is also in close proximity to the Warrior, Cahaba and Coosa coal fields. These natural resources have made Birmingham the most important manufacturing city in the South since the close of the Civil War. The city has an extensive waterworks system with a reservoir on Shade's Moun-



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tain, 225 feet above the city; is provided with the Waring system of sewerage; and has an exceptional equipment of street railroads connecting it with all important suburban points. In the suburbs are Avondale, East Lake, Woodlawn, East Birmingham, North Birmingham, Elyton, Smithfield, West End, Powderly, Pratt City, Ensley, Bessemer, Gate City and Irondale, all intimately associated with the industrial life of the city, and containing an aggregate population of about 50,000.

*Business Interests.*—According to the census of 1890 there were 283 manufacturing establishments, employing \$4,553,478 capital and 3,614 persons; paying \$2,003,969 for wages and \$3,508,588 for material; and having a combined output valued at \$7,034,248. Since then the industrial development of the city has been so rapid that a statement of conditions would scarcely hold good for a month. The city and its immediate vicinity produce approximately 2,000,000 tons of iron ore, more than 1,000,000 tons of pig iron, 1,500,000 tons of coke, and over 6,000,000 tons of coal yearly. In the year ending July 1, 1899, nearly \$4,000,000 was put into new business enterprises. The Alabama Steel and Shipbuilding Company began operations with a capital of \$1,000,000; the Alabama Steel and Wire Company, with \$2,000,000, and 13 other companies contributed to the aggregate stated. About 250 new buildings were erected in the city itself, over 500 in the Ensley suburb and 250 in other suburbs. In 1899 there were 3 National and many State and private banks, and the exchanges at the United States clearing-house here aggregated in the year \$30,215,716, an increase over the total of the previous year of \$7,109,273. In March, 1900, the great steel plant of the Alabama Steel and Shipbuilding Company, in the Ensley suburb, put into operation three more furnaces, making six open hearth furnaces in blast, with four more being built. This plant, with the full complement of furnaces will have a capacity of 1,000 tons per day, nearly all of which will go to the Alabama Wire and Steel Company's plant for the manufacture of wire rods and nails. At the above date the local iron and steel firms had already sold their output for the first half of the year, and were refusing orders even at the extraordinary high prices that then prevailed.

*Public Interests.*—Birmingham is the seat of Howard College (Baptist), Northern Alabama College (Methodist Episcopal), the Colored Normal Training school, Hillman and Sisters of Charity hospitals, and the Davis and Davis and the Brown and Wilson Infirmarys; and contains a public library, about 25 churches, public school property valued at about \$200,000, a synagogue, convent, sanitarium, union railroad depot. United States government building, court

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house, opera house, and many attractive business buildings. The assessed property valuation in 1900 exceeded \$20,000,000; the bonded debt was about \$1,610,000; and the city had assets of \$2,000,000.

*History.*—Birmingham was incorporated as a city in 1871 with a population of less than 1,000. Its noticeable development began in 1880 and its remarkable progress may be said to date from 1890. In 1896 its two largest iron and steel corporations began selling pig iron for export at prices as satisfactory as those obtained on domestic orders; and since then it has had a larger development in the iron and steel industry than any city S. of Pittsburg. Pop. (1890) 26,178 (1900) 38,415; with suburbs, about 100,000; (1910) 132,685.

**Birmingham**, a city of England, on the Rea river near its confluence with the Tame, in the N. W. of Warwickshire, with suburbs extending into Staffordshire and Worcestershire; 112 miles N. W. of London, and 97 S. E. of Liverpool. It is the principal seat of the hardware manufacture in Great Britain, producing metal articles of all kinds from pins to steam engines. It manufactures firearms in great quantities, swords, jewelry, buttons, tools, steel pens, locks, lamps, bedsteads, gas fittings, sewing machines, articles of papier maché, railway carriages, etc. The quantity of solid gold and silver plate manufactured is large, and the consumption of these metals in electroplating is very great. Japanning, glass manufacturing, and glass staining or painting form important branches of industry, as also does the manufacture of chemicals. At Soho and Smethwick in the vicinity of the city are the famous works founded by Boulton and Watt, who there manufactured their first steam engines, where gas was first used, plating perfected, and numerous novel applications tried and experiments made. Among the public buildings are the town hall, a handsome building of the classic style, the free library, commenced in 1861, the central portion of which was burned down in 1879, when the irreplaceable Shakespeare library, and the collection of books, prints, etc., bearing on the antiquities of Warwickshire, were destroyed; the Midland Institute and Public Art Gallery, the council house, etc. There are statues of the Prince Consort, James Watt, Sir Robert Peel, Lord Nelson, Dr. Priestley, Rowland Hill, Sir Joshua Mason, and others. The finest ecclesiastical building is the Roman Catholic cathedral, a noble Gothic structure. The principal educational establishments are Queen's Collège, providing instruction in theology, medicine, and arts; a Roman Catholic college (Oscott); the Royal College for Medicine, Arts, Engineering and Law; the Mason Scientific College, founded by Sir Joshua Mason, 1875,



opened 1880; and the Free Grammar School, founded by Edward VI., etc. The Reform Act of 1832 made Birmingham a Parliamentary borough with two members; the act of 1867 gave it a third; while the Redistribution Act of 1885 divided it into seven divisions, each sending one member to Parliament. Birmingham is known to have existed in the reign of Alfred, in 872, and is mentioned in the Domesday Book (1086) by the name of Bermengeham. Another old name of the town is Bromwycham, a form still preserved very nearly in the popular local pronunciation, Brummagem. In 1801 the pop. was 73,670; in 1891, 478,113; in 1901, 522,182.

**Birney, David Bell**, an American military officer, born in Huntsville, Ala., May 29, 1825; son of James Gillespie Birney; studied law in Cincinnati, and, in 1848, began practice in Philadelphia. At the outbreak of the Civil War he entered the Union army; in the summer of 1861 was commissioned Colonel of the 23d Pennsylvania Volunteers; and was promoted Major-General, May 23, 1863. He distinguished himself in the battles of Yorktown, Williamsburg, Fredericksburg, Chancellorsville and Gettysburg. He died in Philadelphia, Pa., Oct. 18, 1864.

**Birney, James Gillespie**, an American statesman and publicist, born at Danville, Ky., Feb. 4, 1792. Though a Southern planter, he emancipated his slaves and became a prominent anti-slavery leader in the South, proprietor and editor of the anti-slavery journal, "The Philanthropist," etc. He was candidate of the Liberty Party for President in 1840 and 1844. He wrote "Ten Letters on Slavery and Colonization," "Addresses and Speeches," "American Churches the Bulwark of American Slavery." He died at Perth Amboy, N. J., Nov. 25, 1857.

**Birney, William**, an American lawyer, born in Madison county, Ala., May 28, 1819; was educated in Paris; took part in the Revolution of 1848; and was appointed, on public competition, Professor of English Literature in the College at Bourges, France. In 1861 he entered the United States army as a private, and was promoted through all the grades to brevet Major-General. In 1863-1865 he commanded a division. His writings include "Life and Times of James G. Birney," "Plea for Civil and Religious Liberty," etc. He died in 1907.

**Biron** (bê-rôn'), **Armand de Gontault, Baron de**, Marshal of France; born about 1524. He took a prominent part in the civil wars of Huguenot and Catholic, and served at the battles of Dreux, St. Denis and Montcontour. He negotiated the peace of St. Germain, and narrowly escaped at the massacre of St. Bartholomew. He recovered

Guienne and Languedoc from the Protestants, served in the Netherlands against the Duke of Parma, and was one of the first to recognize Henry IV. as king. He distinguished himself in various battles and was killed at the siege of Epernay, in 1592.

**Biron, Charles de Gontault, Duc de**, son of the preceding; born in 1562, was Admiral and Marshal of France, and is noted for the friendship which Henry IV. entertained for him, and for his treason toward that monarch. He early covered himself with glory at the battles of Arques and Ivry, and at the sieges of Paris and Rouen. The king loaded him with honors, saved his life at the fight of Fontaine Française, and made him ambassador to England. Biron entered into a conspiracy with Spain and Savoy against his sovereign; and the plot being revealed by Lafin, its instigator, he was beheaded in 1602.

**Biron, Duke of Courland.** See BIREN.

**Birrell, Augustine**, an English essayist; born in Wavertree, near Liverpool, Jan. 19, 1850. He graduated from Cambridge and was called to the bar. He is author of charming critical and biographical essays on literary subjects, collected in the two series of "Obiter Dicta" (1884, 2d series 1887) and "Res Judicatæ" (1892, really the third of the same series). "Men, Women and Books" (1895) is a collection of short newspaper pieces. In 1887 he published a "Life of Charlotte Brontë"; in 1897 edited Boswell's "Life of Johnson," and in 1898 published "Life of Sir Frank Lockwood."

**Birth, or Labor**, in physiology, the act by which a female of the class *mammalia* brings one of her own species into the world. When the fœtus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is extruded from its place of confinement, in order to live the life which belongs to its species, independently of the mother. The womb having reached its maximum of growth with the increasing size of the fœtus, its peculiar irritability excites in it the power of contraction; it thereby narrows the space within and pushes out the mature fœtus. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. In the womb the corporal frame of man commences existence as an embryo; after further development, appears as a fœtus; then as an immature, and finally as a mature, child. With its growth and increasing size, the membranes which envelop it enlarge, the womb also expanding to give room for it. At the end of the 39th or the beginning of the 40th week, the child has reached its perfect state and is capable of living separate from the mother; hence follows in course the birth.



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Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, labor pains. These are of two kinds: first, the preliminary pangs, which begin the labor, do not last long, are not violent, and produce the feeling of a disagreeable straining or pressure. When the pregnant female is attacked by these, she is often unable to move from her place till the pang is over; after which she is often free from pain for some hours. Then follow the true labor pains; these always last longer, return sooner, and are more violent. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges, and grows thin, and the vagina becomes loose and distensible. By this means the fœtus, as the space within the womb is gradually narrowed, descends with a turning motion toward the opening; the fluid contained in the membranes enveloping the fœtus, as the part making the greatest resistance, is forced out, and forms a bladder, which contributes much to the gradual enlargement of the opening of the womb. It is therefore injurious to delivery, if hasty or ignorant midwives break the membranes too soon. By repeated and violent throes the membranes at length burst, and discharge their contents, and some time after the head of the child appears. As the skull bones have not yet acquired their perfect form and substance, but are attached at the crown of the head only by a strong membrane, and may be brought nearer together, the head, by the pressure which it undergoes, may be somewhat diminished in size, and squeezed in a more oblong form, so as to pass through the opening of the matrix and the pelvis in which it is contained, and, finally, through the external parts of generation; and when this is done, the rest of the body soon follows.

The act of birth or delivery is accordingly, in general, not an unnatural, dangerous, and diseased state of the system, as many timid women imagine. It is a natural process of development, which is no more a disease than the cutting of the teeth, or the coming on of puberty, although like them, it may give rise to important changes in the body, and to various diseases. It is true that the process of childbirth requires a violent exertion of nature, but this is facilitated by many preparatives and helps adapted to the purpose. If the birth succeeds in the way described, it is called a natural birth. For this it is requisite that the pelvis should be properly formed, and that the opening should permit a free passage to the perfect fœtus; that the growth and size of the fœtus should be proportioned to the pelvis,

## Birth

especially that the head should have the size designed by nature, proportioned to the diameter of the pelvis; also, that there should be a proper situation of the womb in regard to the axis of the pelvis, and a proper position of the fœtus, namely, the head down, the back of the head in front, and toward the opening of the womb, so as to appear first at birth; and, finally, that the external parts of generation should be in a natural state.

An easy birth takes place without any excessive strainings, and in due season. A difficult birth proceeds naturally, but is joined with great efforts and pangs, and occupies a long time—over six or eight hours. The cause of it is sometimes the stiffness of the fibers of the mother, her advanced years, the disproportionate size of the child's head, and various other causes. Nature, however, finishes even these births; and women in labor ought not to be immediately dejected and impatient on account of these difficulties. An unnatural (or properly an irregular) birth is one in which one or more of the above-mentioned requisites to a natural birth are wanting. An artificial birth is that which is accomplished by the help of art, with instruments or the hands of the attendant. Premature birth is one which happens some weeks before the usual time, namely, after the seventh, and before the end of the ninth month. Though nature has assigned the period of 40 weeks for the full maturing of the fœtus, it sometimes attains, some weeks before this period has elapsed, such a growth that it may be preserved alive, in some cases, after its separation from the mother. That it has not reached its mature state is determined by various indications. Such a child, for instance, does not cry like full-grown infants, but only utters a faint sound, sleeps constantly, and must be kept constantly warm, otherwise its hands and feet immediately become chilled. Besides this, in a premature child, more or less, according as it is more or less premature, the skin over the whole body is red, often indeed blue, covered with a fine, long, woolly hair, especially on the sides of the face, and on the back; the fontanel of the head is large, the skull bones easily moved; the face looks old and wrinkled; the eyes are generally closed; the nails on the fingers and toes short, tender, and soft, hardly a line in length; the weight of such a child is under six, often under five pounds. The birth is called untimely when the fœtus is separated from the womb before the seventh month. Such children can be rarely kept alive; there are instances, however, of five months' children living.

Late birth is a birth after the usual period of 40 weeks. As this reckoning of the time of pregnancy to birth is founded for



Birth-Rate

Biscuit

the most part solely on the evidence of the mother, there is much room for mistake or deception. The question is one of much interest in medical jurisprudence, as the inquiry often arises whether a child born more than 40 weeks after the death of the reputed father is to be considered legitimate or not. The importance of the question, and the uncertainty of the proof, have occasioned a great variety of opinions among medical writers. Most of them doubt the truth of the mother's assertions about such a delayed birth, and give, as their reason, that nature confines herself to the fixed period of pregnancy; that grief, sickness, etc., cannot hinder the growth of the fœtus, etc. Others maintain that nature binds herself to no fixed rules; that various causes may delay the growth of the child, etc.

Abortion and miscarriage take place when a fœtus is brought forth so immature that it cannot live. They happen from the beginning of pregnancy to the seventh month. The occasions, especially in those of a susceptible or sanguine temperament, are violent shocks of body or mind by blows, falling, dancing, cramp, passions, undue excitement of any kind, etc.

**Birth-Rate**, the proportion of births in a given number of inhabitants. For several years it has been evident to students of vital statistics that the birth-rate is steadily decreasing in nearly all of the European countries, and the following table, compiled from several authoritative sources, and showing the birth-rate per 1,000 inhabitants, certainly strengthens that belief:

| COUNTRIES.       | 1865. | 1885. | 1896. |
|------------------|-------|-------|-------|
| Austria.....     | 37.7  | 38.3  | 39.0  |
| Bavaria.....     | 36.9  | 38.7  | ....  |
| Belgium.....     | 31.4  | 31.0  | 29.0  |
| England.....     | 35.4  | 33.3  | 29.9  |
| France.....      | 26.3  | 24.7  | 22.7  |
| Hungary.....     | 40.6  | 45.0  | 41.1  |
| Italy.....       | 38.3  | 37.8  | 35.1  |
| Netherlands..... | 35.9  | 34.8  | 32.0  |
| Norway.....      | 31.7  | 30.0  | 30.0  |
| Prussia.....     | 39.1  | 37.2  | 37.3  |
| Sweden.....      | 26.2  | 30.4  | 27.5  |
| Switzerland..... | 31.7  | 28.2  | 30.7  |

In the United States the birth-rate in the census year 1900 was 35.1 per 1,000.

**Birthright**, any right or privilege to which a person is entitled by birth, such as an estate descendible by law to an heir, or civil liberty under a free constitution. See PRIMOGENITURE.

**Birthroot**, a name of *trillium erectum* and other American plants of the same genus, having roots said to be astringent, tonic, and antiseptic.

**Biru**, the name of a warlike chief of South America, who flourished in the 16th century. During an exploring expedition of

Gaspar de Morales in 1515, the Spaniards encountered a chief called Biru, by whom they were repulsed. His territory extended on both sides of the river Biru or Piru. All the country S. of the Gulf of Panama was soon characterized as the Biru country. In 1526, this name was given to the empire of the Incas, now known as Peru.

**Biscay**, or **Vizcaya**, the most northerly of the Basque Provinces of Spain, is bounded N. by the Bay of Biscay, E. and S. by its sister provinces, Guipuzcoa and Alava, and W. by Santander. It has an area (very mountainous in the S.) of 849 square miles, and a population of (1900) 311,361. Chief town, Bilbao.

**Biscay, Bay of**, that portion of the Atlantic Ocean which sweeps in along the N. shores of the Spanish Peninsula in an almost straight line from Cape Ortegal to St. Jean de Luz, at the W. foot of the Pyrénées, and thence curves N. along the W. shores of France to the island of Ushant. Its extreme width is about 400 miles, and its length much about the same. The depth of water varies from 20 to 200 fathoms, being greatest along the N. shores of Spain. The whole of the S. coast is bold and rocky, and great parts of the French shores are low and sandy. The bay receives numerous unimportant streams from the mountains of Spain, and, through the rivers Loire, Charente, Gironde, and Adour, the waters of half the surface of France. Its chief ports are Santander, Bilbao, and San Sebastian, in Spain; and Bayonne, Bordeaux, Rochefort, La Rochelle and Nantes, in France. Navigation of the bay is proverbially trying to inexperienced voyagers, and is frequently rendered dangerous by the prevalence of strong winds, especially westerly ones. Rennel's current sweeps in from the ocean round the N. coast of Spain.

**Bischoff, Mount**, a post-town of Tasmania, 60 miles W. of Launceston, which owes its existence to the discovery here in 1872, by James Smith, of some of the richest tin mines in the world. Between 1884-1886 more than 20,000 tons of tin ore had been mined. The yield of pure tin from the ore is from 70 to 80 per cent. The mount takes its name from the chairman of a land company (1828). There is railway communication with Emu Bay, 45 miles distant. Pop. of mining locality, over 2,000.

**Biscuit**, in general language, thin flour cake which has been baked in the oven until it is highly dried. There are many kinds of biscuits, but the basis of all is flour mixed with water or milk. In fancy biscuits, sugar, butter, and flavoring ingredients are used. Plain biscuits are more nutritious than an equal weight of bread, but owing to their hardness and dryness, they should be more thoroughly masticated to insure their easy digestion. When exposed to moisture,



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biscuits are apt to lose their brittleness and become moldy, hence it is necessary to keep them in a dry atmosphere. Digestive biscuits consist almost entirely of bran. Charcoal biscuits contain about 10 per cent. of powdered vegetable charcoal. Meat biscuits, which are very nutritious, contain either extract of meat, or lean meat which has been dried and ground to a fine powder. Ground roasted biscuits are sometimes used to adulterate coffee.

In pottery, articles molded and baked in an oven, preparatory to the glazing and burning. In the biscuit form, pottery is bibulous, but the glaze sinks into the pores and fuses in the kiln, forming a vitreous coating to the ware.

**Bishop** (a word derived from the Greek *episcopos*, that is, overseer, through the Saxon *biscop*), in the early Christian Church, the name of every person to whom the care of a Christian congregation was intrusted. Every congregation even in country districts had at least one such overseer. The word was accordingly used in the early history of the Church in exactly the same sense as presbyter or elder. This is confirmed not only by the express statements to that effect of the oldest ecclesiastical writers, but also by the New Testament itself. In Acts xx: 17 the writer of the Acts of the Apostles says that Paul sent from Miletus to Ephesus for the "elders" of the church, and in the 28th verse he addresses these elders as "overseers" or "bishops"; and the apostles, in addressing the elders of the church, in some instances speak of themselves as presbyters or fellow-presbyters (I Pet. v: 1; II and III John 1). The identity of the original signification of the words "presbyter" and "bishop" was acknowledged by the Christian fathers St. Jerome and St. Augustine in the 5th century, and even by Pope Urban II. at the end of the 11th century, and it is not denied by many Episcopalians even at the present day. By the Council of Trent, however, the doctrine which placed presbyters and bishops originally on a footing of perfect equality in the early Church was declared as a heresy, the object of which was to deny to the bishops of the Church the priority of rank which they claimed.

Those who adhere to the Episcopalian form of Church government, and at the same time admit the original identity of presbyters and bishops, differ from the Presbyterians in their theory of the origin of the episcopal authority. The Episcopalians maintain that even before the words had a separate meaning attached to them the distinction between bishops and subordinate pastors existed in fact, and was a regular ecclesiastical institution, those who held a peculiar authority over others being appointed originally by the apostles. The Presbyterians, on the other hand, believe that the

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authority that was undoubtedly conceded to certain of the "bishops" or "presbyters" when they met to consider the affairs of the Church, was not due to any formal appointment, but merely to the mutual agreement of the assembled presbyters, and that this distinction was no more than a mark of respect paid to some member who was venerable by his age or distinguished by his piety. But, whichever of these two theories may be correct, there is no doubt of the fact that at a comparatively early period in the history of the Church a position of authority was acquired by the pastors of the Christian communities belonging to certain places, and that these came to be distinguished from the others by the name of bishops. The growth of this authority was favored by the doctrine which was started about the beginning of the 2d century with regard to the priestly dignity being a peculiarly divine institution. The more this doctrine was affirmed the higher grew the claims of the bishops. Ignatius of Antioch, who died about 115, had already declared every bishop to be a representative of Christ, and 100 years later the doctrine of the apostolical succession was developed, that is to say, the doctrine of the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. By the foundation of new churches in the larger towns which were affiliated to the original churches, and by the dependence of the presbyters in the country districts upon those having urban charges, the authority of the bishops came to be gradually extended over greater or less dioceses; and at the same time the bishops began to reserve to themselves peculiar privileges. While at first the bishops in all the more important matters were dependent on the approval of the presbyters and congregations, they appear at the Council of Nice in 325 as the sole possessors of the right of voting.

While this then was the position of the bishops in relation to the presbyters, they at first considered themselves as standing on a footing of equality in relation to each other. But as certain of the presbyters in their assemblies had acquired a priority of rank over the others, it gradually came about in the same way that the bishops of the chief cities (Jerusalem, Antioch, Corinth, Alexandria, Constantinople, Rome) obtained a similar precedence among the bishops, and received the title of metropolitan bishops; and so early as the beginning of the 4th century we find the Bishop of Rome claiming to be the head of the Church as the true successor of Peter, whom Christ Himself had pronounced to be the rock on which He would build His Church. Rome, however, was not allowed to assume this rank uncontested. Several of the other



metropolitan bishops claimed the rank for themselves, and the conflict went on till Syria, Asia Minor, and Egypt were wrested from Christendom by the Mohammedans, when the only two cities that were left to dispute the priority of rank in the Church were Rome and Constantinople. Meantime the Bishop of Rome had assumed the title *Papa* ("father," "pope"), in order to avoid even the appearance of equality with the other bishops, and in course of time his claim was recognized throughout Christendom, except in those parts which were under the more immediate supremacy of the Bishop of Constantinople; and the contest between these two great cities of the West and the East was only ended by the separation of the Greek and Roman Churches in 1053.

The practice of solemnly investing bishops with their offices dates from the 7th century. Already in the 5th century the Popes had begun to send to the newly-elected metropolitan bishops (now called archbishops) the pallium, a kind of official mantle worn by archbishops, as a token of their sanction of the choice. Two centuries later it became the custom to consecrate bishops by investing them with the ring and crosier, the former as a token of marriage with the Church, the latter as a symbol of the pastoral office. Since this investiture was what gave validity to the election of the bishops, it became the source of long-continued contests between the Popes and the temporal sovereigns in the Middle Ages. The influential position which the bishops occupied in the State caused the temporal rulers to be desirous of keeping the right of investiture in their own hands, while the Popes with equal determination claimed the right for themselves. The contest was most bitter between the Popes and the Emperors of the Romans, as they were called. It began in the 11th century, but was not settled till 1122, when it was agreed in the concordat of Worms between Pope Calixtus II. and the Emperor Henry V. that the election of bishops should take place according to the laws of the Church, under the direction of the emperor, and that the spiritual investiture (with ring and crosier) should remain in the hands of the Pope, while the bishops were to be invested with the temporal rights of their office by the emperor. This is still the fundamental law of the Roman Catholic Church with regard to investiture. The election to a bishopric is for the most part in the hands of the dean and chapter of the cathedral of the diocese; but in some cases it is a right of the territorial sovereign. In any case papal confirmation is requisite before the appointment is complete. Roman Catholic bishops in England are appointed exclusively by the Pope.

When the system of the ecclesiastical rule was matured, the almost absolute authority

which they exercised over the clergy of their dioceses; their interference in the secular concerns of the governments, to which they soon rendered themselves necessary by their superior information and their elevated rank; the administration of the Church revenues; and their extensive ecclesiastical as well as criminal jurisdiction, caused their duties as teachers and spiritual fathers to appear of less importance. Still it continued to be the bishop's duty to teach and preach in his own diocese, to watch over purity of doctrine, to see that the people were provided with the sacraments, to visit the churches in his diocese, etc. The most distinctive functions of their spiritual office remained as they still are, the ordination of the clergy, the consecration of other bishops, the confirmation of youth, the consecration of churches, etc. In the Middle Ages they attached to themselves subordinate or assistant bishops called suffragans or coadjutors, who often had intrusted to them the performance of those functions which more especially concerned the Church. The episcopal office being such as we have described it, the nobility, and even the sons of princes and kings, strove to obtain a dignity which was as honorable as it was profitable, and was not deemed incompatible with festivities and luxurious enjoyments. The splendid establishments which they were able to maintain from the large revenues derived chiefly from rich donations to their churches by pious devotees, gave, to the bishops of Germany particularly, a high degree of dignity. They became princes of the empire, and their influence on public affairs was highly important.

The Reformation lessened the number of bishops, and though in some of the Protestant countries of the N. of Europe the higher clergy have retained the title of bishop, yet they have lost the greater part of their former revenues and privileges, though in neither of these particulars have those of England any reason to complain. The English Church has left to its bishops more authority than the rest, and this is one reason why it bears the name of episcopal. To them belong ordination, confirmation, the consecration of churches, the licensing of curates, and institution to benefices. They receive their appointment from the crown. In Prussia, though the majority of the population are Protestants, the Roman Catholic bishops receive an annual allowance from the State. Some bishops in the Roman Catholic Church are nominally in charge of dioceses in countries which do not acknowledge the Christian faith. The dioceses of such bishops are said to lie *in partibus infidelium* (in parts belonging to unbelievers), and they are chiefly those that were wrested from the Christian Church by the Mohammedans.



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The bishops of the Greek Catholic Church have less authority than those of the Roman Catholic Church. They are taken from the monastic orders, and they are appointed by the archbishops.

In the United States a bishop is the highest dignitary in the Greek Catholic and Protestant Episcopal Churches. These bishops generally claim to be successors of the apostles. In the Methodist Episcopal and other evangelical Churches, the office of bishop is maintained, but with less of formal dignity and without any claim to apostolic succession. In the Roman Catholic Church growth has been sufficient in the opinion of the ruling functionaries of that communion, to warrant the establishment of the greater hierarchy, and as a consequence the office and dignity of a bishop have become secondary—the highest places being occupied by a cardinal and numerous archbishops. A new bishop is appointed by the Pope from a list of three recommended by the clergy of a vacant diocese.

**Bishop, Sir Henry Rowley**, an English composer, born in London in 1780; was trained under Bianchi, composer to the London Opera House. From 1809, when his first opera, the "Circassian Bride," was produced at Drury Lane, until his masque "The Fortunate Isles," written to celebrate Queen Victoria's marriage, he composed about 100 works for the stage—among others the music of "Guy Mannering," "The Slave," "The Miller and His Men," "Maid Marian," "The Virgin of the Sun," "Aladdin," "Hamlet," versions of operas by Rossini, Meyerbeer and others, "Waverley," "Manfred," etc. From 1810 to 1824 he acted as musical composer and director to Covent Garden Theater. He also arranged several volumes of the National melodies, and completed the arrangement of the music for Moore's "Irish Melodies," commenced by Stevenson. Shortly after the accession of Queen Victoria he was knighted. He was elected Reid Professor of Music in Edinburgh University in 1841, and in 1848 Professor of Music in the University of Oxford. He died in London, April 30, 1855.

**Bishop, Isabella Bird**, an English author and traveler, born in Yorkshire, about 1831; made her first trip abroad 1855, when she visited Prince Edward's Island and the United States, and has since circumnavigated the globe three times. In recent years she has spent much time in Japan, and in 1894-1895 made her third trip to Korea. She was in Seoul when the war broke out, 1894, and was the first person whose war correspondence reached London. She is a fellow of the Royal Geographical Society, and is constantly sending it papers on her travels. Her publications include: "The English Woman in America" (1856); "Six Months in the Sandwich Islands" (1873);

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"A Lady's Life in the Rocky Mountains" (1874); "Unbeaten Tracks in Japan" (2 vols. 1880); "Journeys in Persia and Kurdistan" (2 vols. 1892); "Among the Tibetans" (1894); "Korea and Her Neighbors" (2 vols. 1898); "The Yangtze Valley and Beyond" (1899), etc. She died in 1904.

**Bishop, John Remsen**, an American educator; born in New Brunswick, N. J., Sept. 17, 1860; was graduated at Harvard University in 1882; taught Greek and English at St. Paul's School, Concord, N. H., in 1882-1883; was principal of the Princeton Preparatory School in 1884-1887; instructor of Greek and Latin at Hughes High School, Cincinnati, in 1888-1895; and became principal of the Walnut Hills High School, Cincinnati, in 1895. He is the author of "Vergil's Georgics Edited for Sight Reading," and of numerous papers and articles on pedagogical subjects; editor of "Cicero's Orations"; an active promoter of local and national educational organizations; and a member of the American Social Science Association.

**Bishop, Louis Faugeres**, an American physician, born in New Brunswick, N. J., March 14, 1864; graduated at Rutgers College in 1885, and at the New York College of Physicians and Surgeons in 1889. He was resident physician of St. Luke's Hospital, New York, in 1889-1892, and secretary of the New York Academy of Medicine and Chairman of its Section of Medicine in 1900. His publications include "Theory and Treatment of Rheumatism," "Diagnosis and Treatment of Gout," "Important Points in the Treatment of Pneumonia," etc.

**Bishop, Seth Scott**, an American physician, born in Fond du Lac, Wis., Feb. 7, 1852; graduated at the Northwestern University, in 1876. He began practice in Chicago, and in 1900 was Professor of Otology in the Chicago Post-Graduate Medical School and Hospital; Professor of Diseases of the Nose, Throat and Ear in the Illinois Medical College; and Surgeon to the Illinois Hospital and the Post-Graduate Hospital. He was also consulting surgeon to the Mary Thompson Hospital, the Illinois Masonic Orphan's Home in Chicago, and the Silver Cross Hospital in Joliet. He was a member of the International Medical Congress, the Pan-American Medical Congress, the American Medical Association, etc. He has written "Diseases of the Ear, Nose and Throat, and Their Accessory Cavities," besides many monographs, and is one of the editors of "The Laryngoscope."

**Bishop, William Henry**, an American novelist, born in Hartford, Conn., Jan. 7, 1847. He was graduated at Yale in 1867, and became Professor of Spanish Language and Literature in its Scientific School (Sheffield), resigning in February, 1902, to



## Bishops Suffragan

spend several years in travel in Spain and elsewhere, in preparation for a list of new works in the fields of travel and fiction. He is the author of several novels, including "Detmold" (1879); "The House of a Merchant Prince" (1882); "A Pound of Cure: A Story of Monte Carlo" (1894); "Old Mexico and Her Lost Provinces" (1884); "Fish and Men in the Maine Islands"; "A House Hunter in Europe"; "Writing to Russia," a story; "The Golden Justice"; "Choy Susan and Other Stories"; "The Brown-Stone Boy and Other Queer People," and many similar works.

**Bishops Suffragan**, a class of bishops in England appointed by the crown to take the places of the early bishops *in partibus*, who were assistants to the active bishops of English sees, and who held their warrant at the pleasure of the bishops to whom they were assigned. They were distinguished from suffragan bishops in the Church of England, as every regular bishop was a suffragan of his superior or metropolitan.

**Bismarck**, city, capital of the State of North Dakota, and county-seat of Burleigh co.; on the Missouri river, and the Northern Pacific railroad; 194 miles W. of Fargo. It contains the State Capitol (which cost over \$500,000), the State Penitentiary, court-house, city hall, opera house, a State Hospital for the Insane, St. Paul Seminary, and an immense river warehouse. The river is here spanned by a bridge that cost \$1,500,000. Bismarck has improved water-works, electric lights, several flour mills, a National bank, the State Library, and an assessed property valuation of nearly \$2,000,000. The city is a supply and trade center for an extensive agricultural section, and is also a base of supplies for Indian agencies and United States military posts. Its river traffic with stations above and below it, is very heavy. Pop. (1890) 2,186; (1900) 3,319; (1910) 5,443.

**Bismarck, Herbert, Prince von**, a German statesman, born in Berlin, Dec. 28, 1849; son of Otto Eduard Leopold, Prince von Bismarck-Schönhausen. As a diplomat he ranks with the best and shrewdest of Europe. He served as Secretary to the London Embassy, and on his father's retirement he was provisionally charged with the Foreign Affairs of the Empire. In 1886 he was Secretary of State, and in 1889 the Emperor conferred on him the Order of the Red Eagle. He died in 1904.

**Bismarck-Schönhausen** (biz'mark-shén'-houz-en), **Otto Eduard Leopold, Prince von**, a German statesman, born at Schönhausen in Brandenburg, of an old family, of which various members gained a reputation both as soldiers and statesmen, April 1, 1815. He received his university education at Göttingen, Berlin, and Greifswald.

## Bismarck-Schonhausen

Before 1847 he was little heard of, but about that time he began to attract attention in the new Prussian Parliament as an Ultra Royalist. He opposed the scheme of a German Empire as proposed by the Frankfort Parliament of 1849. His diplomatic career began in 1851, when he was appointed Prussian member of the resuscitated German Diet of Frankfort. In the Diet, he gave open expression to the long felt discontent with the predominance of Austria, and demanded equal rights for Prussia. He remained at Frankfort till 1859, when he beheld in the approach of the Italian War an opportunity of freeing Prussia and Germany from the dominance of Austria. In the spring of 1862 King William, on the urgent advice of the Prince of Hohenzollern, transferred Bismarck as ambassador to Paris, in order to give him an insight into the politics of the Tuileries. During his short stay at Paris Bismarck visited London, and had interviews with the leading politicians of the time, including Lord Palmerston and Mr. Disraeli. In the autumn Bismarck was recalled, to take the portfolio of the Ministry of Foreign Affairs, and the presidency of the Cabinet. Not being able to pass the reorganization bill and the budget, he closed the Chambers (October, 1862), announcing to the Deputies that the king's government would be obliged to do without their sanction. When the "conflict era," as it was called, approached a crisis, the death of the King of Denmark reopened the Schleswig-Holstein question, and excited a fever of national German feeling, which Bismarck was adroit enough to work so as to aggrandize Prussia by the acquisition of the Elbe duchies.

The action of France in regard to the candidature of Prince Leopold of Hohenzollern for the throne of Spain gave Bismarck the opportunity of carrying into action the intensified feeling of unity among Germans. During the War of 1870-1871, Bismarck was the spokesman of Germany; he it was that in February, 1871, dictated the terms of peace to France. Having been made a Count in 1866, he was now created a prince and Chancellor of the German Empire. Following the Peace of Frankfort (May 10, 1871), the sole aim of Bismarck's policy, domestic and foreign, was to consolidate the young empire of his own creating. Thus, conceiving the unity of the nation and the authority of its government to be endangered by the Church of Rome, and its doctrines of Papal infallibility, he embarked on that long and bitter struggle with the Vatican, called the Kulturkampf, in the course of which the Imperial and Prussian Parliaments passed a series of most stringent measures (Falk or May laws) against the Catholic hierarchy. But Bismarck had underrated the resisting



power of the Roman Church, and motives of political expediency gradually led him to modify or repeal the most oppressive of the anti-papal edicts, leaving the Catholics virtual masters of the field. Otherwise, his domestic policy was marked, among other things, by a reformed coinage, a codification of law, a nationalization of the Prussian railways (as a preliminary step to Imperial State lines), fiscal reform in the direction of making the Empire self supporting (*i. e.*, independent of matricular contributions from its component States), repeated increase of the army and the regular voting of its estimates for seven years at a time (military septennate), the introduction of a protective tariff (1879), and the attempt to combat social democracy.

In 1884 Bismarck inaugurated the career of Germany as a colonizing power, a new departure which brought him into sharp but temporary conflict with the England of Gladstone. For the rest, his foreign policy mainly aimed at isolating France and rendering her incapable of forming anti-German alliances. On the other hand, he gradually combined the central powers of Europe into a peace league, aiming at counteracting the aggressiveness of Russia and France, separately or combined, on the Danube or the Rhine. The nucleus of this peace league was formed in 1879 by the Austro-German Treaty of Alliance (published in February, 1888), which Italy formally joined in 1886, and which entitles Bismarck to be called the "peacemaker" and the "peacekeeper" of Europe, a character he first publicly acquired when, as "honest broker" between Austria and Russia, he presided over the Berlin Congress in 1878. The phrase, "man of blood and iron," is based on the Iron Chancellor's own use of the words in a speech in 1862.

Bismarck's life was often threatened, and twice actually attempted — once at Berlin in 1866, just before the Bohemian campaign, by Ferdinand Cohen (or Blind), a crazy youth who aimed at making himself the instrument of popular dissatisfaction with Bismarck, as the champion of absolutism and the fancied apostle of a fratricidal war; and again in 1874 at Kissingen, by a Catholic tinsmith named Kullmann, who was unquestionably a product of Ultramontane fury engendered by the May laws.

Emperor William died on March 9, 1888. The short reign of Emperor Frederick followed and then the present Emperor ascended the throne. On March 18, 1890, Bismarck fell. The last cause of his fall has not been told. Many explanations have been given — that Bismarck objected to the labor rescripts, that he opposed the abolition of the laws against Socialists, that he would not tolerate the Emperor's direct consultation with the other Ministers or the

Parliamentary leaders. After the war with Denmark, King William had made Bismarck a Count. After the conquest of France Emperor William had named him Prince. Emperor William II. gave him the title of Duke of Lauenburg. When Bismarck's 81st birthday was celebrated in 1896, there was talk of a reconciliation between the Prince and his sovereign. The Emperor sent his photograph to Bismarck, the latter returned thanks, and little by little the way was paved for a meeting between the two men, and eventually for the State visit which the Emperor paid to Bismarck at Friedrichsruhe, where the statesman died July 30, 1898.

**Bismarck Archipelago**, the name officially given by Germany to New Britain, New Ireland, New Hanover, and several smaller adjoining islands in the South Pacific, since in 1884 they became a German dependency.

**Bismuth**, a triad metallic element, Sym. Bi; At. Wt. 210; found associated with the ores of nickel, cobalt, copper and silver, in Saxony, Austria, Peru, Australia and Bolivia. Bismuth is usually found in a metallic state, and is readily obtained from the ores containing it on account of its low fusibility (266° C.). An ore containing about 10 per cent. of bismuth associated with arsenic and cobalt is worked at Schneeberg, Saxony. The ore is broken into fine pieces and heated in sloping cast iron cylinders whose lower openings are plugged with fire clay. The metallic bismuth melts and flows to the lower ends of the cylinders, where it is collected in iron pots, containing charcoal to prevent oxidization. The residue, being lighter, floats on the top and is raked out through the upper opening. With five cylinders working in a single furnace one ton of ore is smelted in eight hours. Bismuth forms a dioxide  $\text{Bi}_2\text{O}_3$ , a trioxide  $\text{Bi}_2\text{O}_3$ , and a pentoxide  $\text{Bi}_2\text{O}_5$ . The so called tetroxide  $\text{Bi}_2\text{O}_4$  is said to be a compound of the last two oxides. Bismuth forms one chloride  $\text{BiCl}_3$ , bismuthous chloride. Bismuth salts are precipitated by  $\text{H}_2\text{S}$  from an acid solution. They may be separated from the other metals of that group thus: the precipitate of sulphides of arsenic, antimony, and tin; the residue is washed and then boiled with nitric acid, which dissolves all the sulphides except mercuric sulphide,  $\text{HgS}$ . The solution is then evaporated with sulphuric acid, the lead, if any, separates out as  $\text{PbSO}_4$ , then ammonia,  $\text{NH}_3\text{H}_2\text{O}$ , is added in excess, which precipitates the bismuth as  $\text{Bi}(\text{OH})_3$ ; the copper and cadmium are in the solution. The salts of bismuth give a white precipitate with water if  $\text{NH}_3\text{HCl}$ , ammoniac chloride, is first added to convert them into bismuth chloride, and they give a yellow precipitate with  $\text{K}_2\text{CrO}_4$ , which is insoluble



in KHO, but soluble in nitric acid. They are reduced on charcoal by the blowpipe-flame, yielding a brittle metallic bead, and give a slight yellow incrustation of oxide.

Bismuth is known by its reddish color and crystalline structure. On account of its brittleness it is unfit for use in the metallic state, by itself, except in the construction of thermo-electric piles. The use of bismuth in alloys depends on its low melting point, and its property of expanding upon solidification. It is used in type metal and in several solders. One known as Newton's fusible alloy, contains bismuth, 50 per cent; lead, 25 per cent, and tin, 25 per cent. It melts at  $94^{\circ}$  C., although the most fusible of its constituents, the tin, has a melting point of  $232^{\circ}$ . Another similar alloy has one-half its tin replaced by cadmium and melts at  $61^{\circ}$  C. Bismuth is used for pharmaceutical purposes in form of subnitrate of bismuth, carbonate of bismuth, and oxide of bismuth, which, taken internally, act as sedatives on the stomach, in dyspepsia and chronic vomiting. They have been also used in epilepsy and in diarrhœa attending phthisis. Preparations of bismuth are sometimes employed externally as cosmetics, but when a sulphuretted gas acts upon them they blacken the face.

**Bison**, the name applied to two species of ox. One of these, the European bison or aurochs (*Bos bison* or *Bison Europæus*), is now nearly extinct, being found only in the forests of Lithuania and the Caucasus. The other, or American bison (*Bison Americanus*), is found only in North America, and is remarkable for the great hump or projection over its fore shoulders, and for the length and fineness of its woolly hair. The hump, is oblong, diminishing in height posteriorly, and gives a considerable obliquity to the outline of the back. The hair over the head, neck, and fore part of the body is long and shaggy, forming a beard beneath the lower jaw, and descending below the knee (wrist) in a tuft. The hair on the summit of the head rises in a dense mass nearly to the tips of the horns, and, directly on the front, is curled and matted strongly.

Altogether the American bison, commonly called the buffalo, is of rather a formidable appearance, with his ponderous head, and its fell of thick shaggy hair, and its streaming beard, supported upon a massive neck and shoulders, whose apparent strength is more imposing from the augmentation produced by the hump and the long hair covering the anterior parts of the body. There is considerable difference between the summer and winter dress of the bison, consisting partly in the length, partly in the color of the hair. In late summer, after the new coat is acquired, from the shoulders backward the surface is covered with a short fine dark hair, smooth and soft as velvet.

Previous to this the old coat has fallen off, often leaving bare and unsightly patches. At this season the animal is fond of wallowing in mud to gain a protective covering of this material. Except the long hair on the fore parts, which is, to a certain extent, of blackish color, the color is a uniform brown, becoming of a bleached and faded hue toward the end of winter. Varieties of color are very rare among this species. The horns are usually 16 or 17 inches in length, and of a black color. The bison bulls are more easily approached and killed by hunters than the cows, not being so vigilant, though the cows were preferred both on account of their finer skins and more tender flesh. The cow is much smaller than the bull, and has not so much of the long hair on the shoulders, etc.; her horns are not so large, nor so much covered by the hair. The sexual season begins toward the end of July, and lasts till near the beginning of September. The cows calve in April; the calves seldom leave the mother until a year old; cows are sometimes seen with calves of three seasons following them. Bison beef is rather coarser in the grain than that of the domestic ox, but is considered superior in tenderness and flavor. The hump is particularly celebrated for its richness and delicacy. The tongues and marrow bones are regarded as next in excellence.

The American bison, or buffalo, was once extensively diffused over what is now the territory of the United States, except that part lying on the E. of Hudson river and Lake Champlain, and narrow strips of coast on the Atlantic and Pacific. Southward its range extended to the delta of the Mississippi and into part of Mexico, while in the N. W. it reached even as far as the Great Slave Lake. The great prairies connected with the Mississippi system formed its favorite feeding-grounds, and here it used to be seen in herds whose numbers were well-nigh incredible. We are told, for instance, of a herd encountered in 1871, which extended over an area of 25 miles in breadth by 50 miles in length, and was calculated to number not less than 4,000,000 individuals. A traveler on the Kansas Pacific railroad again declared that the train on which he was a passenger passed through a herd of buffalo for a distance of not less than 120 miles. In those days, that is about or previous to 1870, the plain might often be seen black with moving masses of buffalo, which sometimes compelled the engine drivers to bring their trains to a standstill. The animals used to congregate and perform regular migrations, which depended upon the season and the necessary supply of food, these movements being mainly from N. to S. and vice versa. All this is now a thing of the past, and the wholesale destruction of the bison is one of the most melancholy stories in the history of zoölogy. So



long as it was pursued only or mainly by the Indians there was little to fear for it, though many tribes were almost wholly dependent on these animals for food, clothing, tents, utensils, etc. Vast multitudes owing to this were slaughtered annually; but it is to be deeply regretted that the white hunters (especially after the spread of railroads) were in the habit of destroying these interesting and valuable beasts in the most wanton and unnecessary manner. It was common for such persons to shoot bison, even when they had abundance of food, for the sake of the tongue or hump alone, or even because the animals came so near as to present a fair aim. It is therefore not to be wondered that, from all causes of diminution, the bison should become less and less numerous every year till it is now practically extinct, at least in the wild state. Latterly the National Museum of the United States thought it necessary to send out an expedition to collect a few specimens in view of this contingency; and a report furnished to the museum in 1886 shows what difficulty the expedition had in fulfilling its mission in consequence of the extermination of the bison having been already so nearly effected. "It is firmly believed by good authorities," the report states, "that there are not now more than from 50 to 100 buffaloes in the whole of Montana (where this animal used to be remarkably abundant) outside of the National Park, where there are probably from 200 to 300 head."

The skins of bison, especially that of the cow, dressed in the Indian fashion, with the hair on, make admirable defenses against the cold, and may be used for blankets, etc. They are called buffalo robes. The wool of the bison has been manufactured into hats, and has also been employed in making coarse cloth. The bison or buffalo may be domesticated without much difficulty, and it has been ascertained that the animal breeds freely with the domestic or common ox, and that these half-breeds are fertile among themselves.

The Secretary of Agriculture in a report to the Senate on the extinction of the American bison says that as far as the department is aware only two small herds of wild buffalo are in existence in the United States, one of them being in Yellowstone Park, and the other in Lost Park, Col. During last fall several of the latter were killed and it is thought that now the herd does not contain more than 8 or 10 individuals, and the Yellowstone herd 25. In Canada there are a few wild buffalo in the Peace river country but they are believed to be of a different species from those which roamed the plains of the West. In the hands of private individuals there are three herds: The Corbin herd on the game preserves of the Blue Mountain Forest Association in New Hampshire and the Allard and Goodnight herds.

The Allard herd is on the Flathead Indian reservation in Montana and the Goodnight herd in Texas. Both the latter, however, are mostly cross-breeds, known as cataloes, obtained by crossing buffalo bulls with domesticated cows; and the originator of the breed says that he has succeeded in crossing the buffalo with almost all breeds of cattle, but that he considers the Galloway and the Polled Angus the best for this purpose. The Allard herd is being broken up, many having been sold within a short time, and it was suggested that the government should acquire possession of the buffaloes that are left, and place them on some reservation under competent management, where, under proper protection, they could be preserved indefinitely. It is also believed that by securing the herd and dividing it into two sections, thus preventing too close inbreeding, the absolute extermination of the species might be long delayed. At present the buffalo bids fair to become as extinct as the mastodon or other animals of prehistoric ages.

**Bissagos Islands**, a group of small volcanic islands, about 30 in all, off the W. coast of Africa, opposite the mouth of the Rio Grande. The islands are inclosed by a reef, and, with a few exceptions, are thickly wooded; many of them densely peopled. There are several fine ports, but the climate is excessively dangerous for Europeans. The principal islands belong to the Portuguese, whose governor resides at Bolama.

**Bissão** (bis-än'ō), an island and Portuguese station closer to the African coast than the Bissagos and opposite the Jeba's delta. Before the prohibition of slavery by the Portuguese government it was an important slave market.

**Bissell, Edwin Cone**, an American Congregational clergyman and writer, born at Schoharie, N. Y., March 2, 1832. Having served in the Civil War (1862-1863), he became pastor in Massachusetts and California, missionary in Austria (1873-1878). Professor in the Hartford Congregational Theological Seminary (1881-1892), and the McCormick Presbyterian Theological Seminary, Chicago (1892-1894). He published "Historic Origin of the Bible" (1873) and various other religious works, including a curious edition of "Genesis Printed in Colors, Showing the Original Sources from Which It Is Supposed to Have Been Compiled" (1892). He died in Chicago, April 9, 1894.

**Bissell, Wilson Shannon**, an American lawyer, born in New London, N. Y., Dec. 31, 1847; graduated at Yale University in 1869; and studied law in Buffalo with Lansing, Cleveland & Folsom. In 1872 he formed a partnership with Lyman K. Bass, the firm of which Grover Cleveland became a member in 1873. When Mr. Cleve-



land was elected governor of New York the firm was disbanded. Subsequently it was reorganized, and, in 1900, consisted of Bissell, Carey & Cooke. He was a delegate to several State conventions; in 1884 was a Democratic Presidential Elector; and in 1893-1895 was Postmaster-General of the United States. He died Oct. 6, 1903.

**Bissen, Wilhelm**, a Danish sculptor, born in Schleswig in 1798, and from 1823 to 1833 studied in Rome under Thorwaldsen, who, in his will, commissioned him to complete his unfinished works. In 1850 he was made Director of the Academy of Arts, Copenhagen. Among his masterpieces are the "Valkyrie," "Cupid Sharpening His Arrow," and "Moses;" his "Orestes," and a frieze 134 feet long, perished in the burning of the Christiansborg at Copenhagen (1884). He died March 10, 1868.

**Bisson, Alexandre** (bē-sôn'), a French dramatist and musical composer, born in 1848. His vaudeville, "Four Cuts with a Penknife" (1873), won for him instant celebrity. "The Deputy from Bombignac" is his masterpiece. Other comedies or operettas were "The Late Toupinel" (1890); "The Joys of Paternity" (1891); "The Pont-Biquet Family" (1892). With Théodore de Lajarte he was joint author of a "Grammar of Music" (1879) and of a "Little Encyclopædia of Music" (1881).

**Bistineau**, a navigable lake in N. W. Louisiana; 25 miles long by 2 miles wide; discharges into the Red river..

**Bistort**, the English name given to a sub-genus or subdivision of the genus *polygonum*. Two well known weeds fall under it—the *polygonum bistorta* (common bistort or snakeweed), and the *P. viviparum*, or viviparous Alpine bistort. Each has a simple stem, and a single terminal raceme of flowers. The former has flesh colored flowers, and is common; the latter has paler flowers, and is a mountain plant. It is sometimes called Alpine bistort.

**Bistoury** (from Pistoja, anciently called Pistorium, a city in Italy, 20 miles N. W. of Florence, where these knives were made at an early period), a surgical instrument used for making incisions. It has various forms—one like a lancet, a second called the straight bistoury, with the blade straight and fixed in a handle; and a third the crooked bistoury, shaped like a half moon, with the cutting edge on the inside.

**Bistre**, a pigment of a transparent brown color. To prepare it the soot left after beechwood has been burned is boiled for half an hour, two pounds of the soot to each gallon of the water. Before it has cooled, but after it has been allowed time to settle, the clearer part is poured off and then evaporated to dryness, when the residuum left behind is found to be bistre.

**Bitter, Arthur**, pseudonym of SAMUEL HABERSTICH, a Swiss poet and story writer, born in Ried near Schlosswyl, Oct. 21, 1821. Novelettes, stories, and poems proceeded from his pen for many years, all characterized by sympathy of tone and inoffensive realism, "Tales, Romances, and Poems" (1865-1866), being most pleasing. He died in Bern, Feb. 20, 1872.

**Bitter Almond**, the bitter variety of *amygdalus communis*, or common almond.

**Bitter Apple**, a name applied to the bitter gourd.

**Bitter Ash**, a tree, *simarūba amāra*, a native of the West Indies, the bark of which is used as a tonic. Others of the same genus have also the same name, *S. excelsa* of Jamaica having wood almost as bitter as quassia, and being called Jamaica quassia.

**Bitter Gourd**, a plant, *citrullus colocynthis*, called also colocynth.

**Bitter King**, the *soulamča amāra*, a tree of the quassia order peculiar to the Moluccas and Fiji Islands, the root and bark of which, bruised and macerated, are used in the East as an emetic and tonic.

**Bitter Lakes**, salt lakes on the line of the Suez canal.

**Bittern**, the English name for the birds of the genus *botaurus*, and especially for the common one, *botaurus stellaris*. The bitterns are distinguished from the herons proper, besides other characteristics, by



BITTERN.

having the feathers of the neck loose and divided, which makes it appear thicker than in reality it is. They are usually spotted or striped. The species are widely distributed, the best known being *botaurus lentigo-*



## Bittern

*nosus*, *B. stellaris*, and *B. minutus*, inhabiting the temperate portions of both hemispheres. *B. stellaris* is in some localities named the "mire drum" or the "bull of the bog," etc., in allusion to its bellowing or drumming noise about February or March, during the breeding season. It is about 2½ feet long. The general color of its plumage is dull, pale yellow, variegated with spots and bars of black. The feathers of the head are black, shot with green; the bill and legs are pale green; the middle claw is serrated on the inner edge. It is nocturnal. It frequents wooded swamps and reedy marshes. *B. minutus* is much smaller. *B. lentiginosus* is common in this country.

**Bittern**, a name given to the mother liquid obtained when sea water is evaporated to extract the salt (NaCl). Bittern contains sulphates of magnesium, potassium and sodium, also bromides. It is used as a source of bromine. Under the name of oil of salt, it is sometimes used to rub parts of the body affected with rheumatism. Bittern is also an old trade name for a mixture of quassia, *cocculus indicus*, etc., used many years ago by fraudulent brewers to give an appearance of strength to their beer.

**Bitter Nut**, a tree of North America, of the walnut order, the *carya amara*, or swamp hickory, which produces small and somewhat egg-shaped fruits, with a thin, fleshy rind; the kernel is bitter and uneatable.

**Bitter Root**, *lewisia rediviva*, a plant of Canada and part of the United States, order *mesembryaceæ*, so called from its root being bitter though edible, and indeed esteemed as an article of food by whites as well as Indians. From the root, which is long, fleshy, and tapering, grow clusters of succulent green leaves, with a fleshy stalk bearing a solitary rose colored flower rising in the center, and remaining open only in sunshine. Flower and leaves together, the plant appears above ground for only about six weeks. Californian bitter-root (*echinocystis fabacea*) and Natal bitter-root (*gerardanthus macrorrhiza*) both belong to the gourd family.

**Bitter Root Mountains**, a range of the Rocky Mountains, in Montana, deriving its name from a plant with rose colored blossoms, whose slender roots are used by the Indians for winter food. The chief summits are Lolo Peak and St. Mary's Peak.

**Bitter Root River**, a tributary of the Columbia in Montana, flowing N. into Clark's river in Missoula county; length about 110 miles. Gold has been found in this region.

**Bitter Root Valley**, on the E. of the Bitter Root Range, in Montana, is 90 miles long and 7 miles wide, enwalled by lofty

## Bituminous Coal

mountains, and abounding in farms and cornfields.

**Bitters**, a compound said to improve the appetite and assist digestion, originally prepared by infusing bitter herbs in water. Bitters are now generally prepared by steeping bitter and aromatic herbs in spirits of wine for 10 or 12 days, straining the liquor, and reducing it with water to the desired strength. The herbs generally used are gentian, quassia, wormwood, cascarilla, and orange peel. The laxness of the laws in the United States relative to the preparation and sale of medical nostrums has tended to greatly multiply the number of proprietary bitters, and there are on the market specimens which their proprietors recommend for all the ills to which flesh is heir. In many instances their constituent formulæ are much more complicated and dangerous than the comparatively simple and harmless prescription quoted above.

**Bitter Salt**, Epsom salt, sulphate of magnesia.

**Bitter Spar**, rhomb-spar, the crystallized form of dolomite or magnesian limestone.

**Bitter Sweet**, the woody nightshade, *solanum dulcamara*.

**Bitter Vetch**, a name applied to two kinds of leguminous plants, (a) *ervum ervilia*, a lentil cultivated for fodder; and (b) all the species of *orobus*, e. g., the common bitter vetch of Great Britain, *O. tuberosus*, a perennial herbaceous plant with racemes of purple flowers and sweet, edible tubers.

**Bitter Wood**, the timber of *xylopia glabra* and other species of *xylopia*, order *anonaceæ*, all noted for the extreme bitterness of the wood. The name is also given to other bitter trees, as the bitter ash.

**Bitter-Wort**, yellow gentian (*gentiana lutea*).

**Bitumen**, a mineral substance, remarkable for its inflammability and its strong, peculiar odor; generally, however, supposed to be of vegetable origin. The name, which was in use among the ancient Romans, is variously employed, sometimes to include a number of the substances called mineral resins, particularly the liquid mineral substances called naphtha and petroleum, or mineral oil, and the solid ones called mineral pitch, asphalt, mineral caoutchouc, etc.; sometimes in a more restricted sense it is applied by mineralogists only to some of these, and by some mineralogists to the solid, by others to the liquid ones. All these substances are, however, closely allied to each other.

**Bituminous Coal**, coal which burns with a yellow, smoky flame, and on distillation



gives out hydrocarbon or tar. It contains from 5 to 15, or even 16 or 17 per cent. of oxygen.

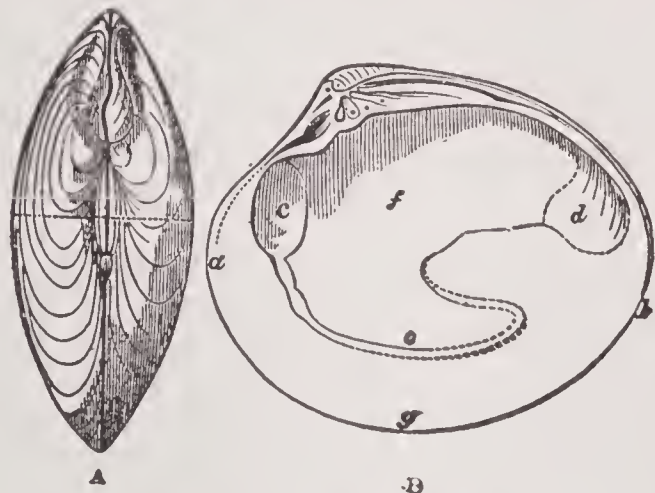
**Bituminous Limestone**, limestone impregnated with bitumen. Its color is brown or black; in structure it is sometimes lamellar, but more frequently compact, in which case it is susceptible of a fine polish. When rubbed or heated it gives out an unpleasant bituminous odor. It is found in Dalmatia so bituminous that it may be cut like soap. The walls of houses are constructed of it, and after being erected are set on fire, when the bitumen burns out and the stone becomes white; the roof is then put on, and the house afterward completed. Bituminous limestone is of different geological ages.

**Bituminous Schist**, schist impregnated with bitumen; occurs in the Lower Silurian rocks of Russia. Sir R. Murchison considered that it arose from the decomposition of the fucoids imbedded in these rocks.

**Bituminous Shale**, an argillaceous shale impregnated with bitumen, which is very common in the coal measures.

**Bitzius, Albert** (better known under the *nom de plume* of JEREMIAS GOTTHELF), a Swiss author, born in Murten, Canton of Freiburg, Oct. 4, 1797. As a pastor in retired districts, he saw the hard conditions of the poor, and in 1837 wrote "The Peasant's Mirror," a vividly realistic presentation of peasant life—the imaginary autobiography of one Jeremias Gotthelf; the immense success of the book led him to adopt the name as a pseudonym. He worked this vein with unflagging industry, "Joys and Sorrows of a Schoolmaster," "How Five Maids Came to Grief Through Brandy," "How Uli, the Servant, Was Made Happy," and numerous others, "tendency" novels, followed swiftly. He died at Lützelflüh, Bern, Oct. 22, 1854.

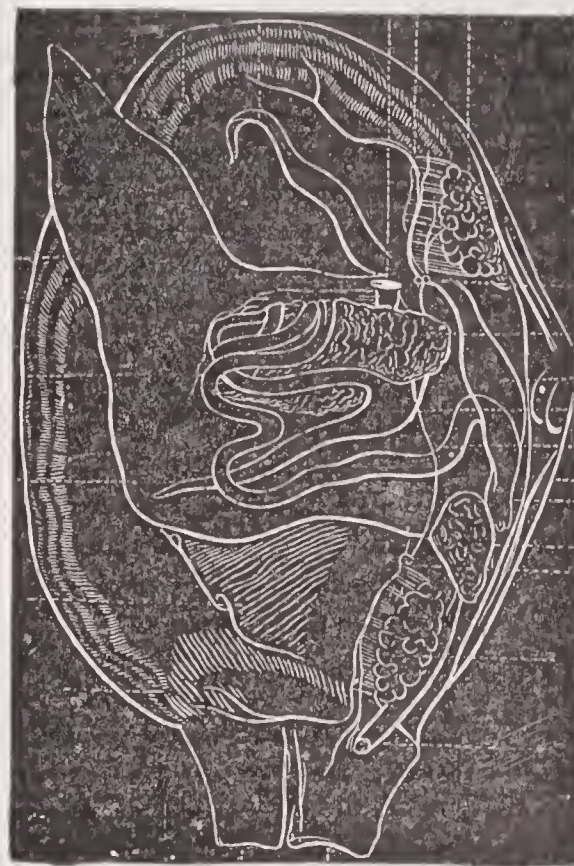
**Bivalves**, those mollusks whose coverings consist of two concave shelly plates or valves



SHELL OF A BIVALVE.

A. The line across marks the thickness. B, a, anterior extremity; b, posterior; c, d, muscular impressions, e, f, pallial impression; g, lower edge of the left valve.

united by a hinge. So long as molluscos animals, provided with shells, were considered by naturalists almost exclusively with respect to these, the order of bivalves, originally established by Aristotle, retained its place; and, indeed, the external character upon which it is founded is closely connected with some of the important structural characters according to which mollusks are now classified. A vast majority of recent bivalve shells belong to Cuvier's *testaceous* order of *ascephalous* mollusca, the *lamel-*



ANATOMY OF BIVALVE MOLLUSK.

*libranchiate* mollusca of Owen, although with them are some classed as multivalves, on account of accessory valves which they possess. There are also mollusks of the class *brachiopoda* or *palliobranchiata*, which possess bivalve shells, as the *terebratulæ*, or lamp shells, etc. The structure of the shell, however, is different in these two classes, although its general appearance is much the same. A very large proportion of the bivalve shells of the older fossiliferous rocks belong to the *brachiopoda*.

**Bivouac**, an encampment of soldiers in the open air without tents, each remaining dressed and with his weapons at hand. It was the regular practice of the French revolutionary armies, but is only desirable where great celerity of movement is required.

**Bizerta**, a fortified seaport of Tunis, the most northern town of Africa; at the extremity of a bay formed by Capes Ras-el-Zebib and El-Arid. The town is built on the shore of a lake which communicates



with the sea by a canal; and in the time of Barbarossa it was a city of great strength and magnificence. The lake is the chief source of trade, as it abounds in many valuable kinds of fish. Beside the fishery there are valuable coral, grape, olive, and pottery industries. The port is surrounded by walls and defended by two castles. Bizerta steadily declined in commercial and political importance till 1892, when the French Government began converting it into a magnificent naval port. Three years were occupied in this work, which included the opening and improvement of the lake, which is now large enough to accommodate at one time all the navies of the world, and also the construction of a canal through the Isthmus of Zarzana, connecting the lake with the Mediterranean. The French Government undertook to make the modern Bizerta a port of such strength that it should dominate the Mediterranean Sea, and already it is spoken of as the second Toulon.

**Bizet** (bē-zā'), **Alexandre Cesar Leopold** (better known as **GEORGES BIZET**), a French composer, born in Paris, Oct. 25, 1838; studied with Halévy and at the Paris Conservatory. His operas include "Vasco de Gama" (1863); "The Pearl Fishers" (1863); "The Fair Maid of Perth" (1867); "Djamileh" (1872), and "Carmen" (1875), his most famous composition. He also completed Halévy's opera "Noë." He died near Paris, June 3, 1875.

**Bjarne, Brynjolf**, a pseudonym of **HENRIK IBSEN** (q. v.).

**Bjelbog** (byel'bog), in Slavonic mythology the pale or white god, as opposed to Tchernibog, the black god, or god of darkness.

**Bjerregaard, Henrik Anker** (byer'e-gär), a Norwegian dramatic poet, born at Ringsaker, in 1792. His position in his country's literature is very influential, the plays, "Magnus Barefoot's Sons" and "A Mountain Adventure," being national models. A volume of "Poems" (1829) also displays genius. He died in 1842.

**Björnson, Björnstjerne** (byern'son), a Norwegian novelist, poet, and dramatist, born at Kvikne, Norway, Dec. 8, 1832. He published his first story, "Synnöve Solbakken," in 1857, and that, with "Arne" (1858) and "A Lively Fellow" (1860), established his reputation as a novelist. "Halte Hulda," "Between Battles" (1858); and "Sigurd Slembe" (1862), are among his plays. Of his novels and romances since 1866 the most notable are "The Bridal March," "Magnhild," "The Fisher Maiden," and "Captain Mansana." His principal

dramatic works are "Mary Stuart" (1864); "The Editors," "A Bankruptcy," "Leonarda" (1879); "A Glove" (1889). He published "Poems and Songs" in 1870; died in 1910.

**Björnstjerne, Magnus Frederick Ferdinand** (byern'stern-ä), **Count**, a Swedish statesman, born in 1779.

Having entered the Swedish army and risen to be Colonel, he went with the Swedish troops to Germany in 1813 and took part in the battles of Grossbeeren, Dennewitz, the passage of the Elbe, the storming of Dessau, and the battle of Leipsic. He also received the surrender of Lübeck and of Maestricht. After the capitulation of Paris he fought in Holstein and in Norway, at length concluding with Prince Christian Frederick at Moss the convention uniting Norway and Sweden. In 1826 he was made a Count, and in 1828 Plenipotentiary to Great Britain, where he remained till 1846. He published works on "British Rule in the East Indies," on the "Theogony, Philosophy, and Cosmogony of the Hindus," etc. He died in 1847.

**Blacas** (blä-kä'), **Pierre Louis Jean Casimir, Duc de**, a French statesman, born in Aups, Var, Jan. 12, 1771; cabinet minister in the time of Louis XVIII., and a confidential adviser of the Bourbons; twice Minister to Naples; Ambassador to Rome to negotiate the *concordat* of 1817; went into exile upon the banishment of Charles X.; and offered the King his fortune, which was not accepted. He was so faithful to the Bourbons as to be unpopular with the people. He was a large collector of antiquities and founded the Egyptian Museum at Paris. He died in Austria, Nov. 17, 1839.

**Black**, the negation of all color, the opposite of white. There are several black pigments, such as ivory black, made from burned ivory or bones; lamp black, from the smoke of resinous substance; Spanish black, or cork black, from burned cork, etc.

**Black, Adam**, a Scotch publisher, born in Edinburgh, Feb. 20, 1784. In 1808 he began business as a bookseller, and later with his nephew, Charles B. Black, established a publishing house in Edinburgh. Their most famous publications were "En-



BJÖRNSTJERNE BJÖRNSSON.



## Black

cyclopædia Britannica," and the "Waverly Novels." Adam Black was twice Lord Provost of Edinburgh and in 1856-1865 represented that city in Parliament. He declined the honor of knighthood, and a statue was erected in Edinburgh in recognition of his public services, in 1877. He died Jan. 24, 1874.

**Black, Frank Swett**, an American lawyer, born in Limington, Me., March 8, 1853; graduated at Dartmouth College in 1875; was editor of the "Journal" in Johnstown, N. Y. He studied law at Troy in the office of Robertson & Foster, and was admitted to the bar in 1879. He won much popularity by his activity in prosecuting the men who murdered Robert Ross in the election riots in Troy in 1892. In 1895-1897, he was a member of Congress, and in 1897-1899 Governor of New York.

**Black, Jeremiah Sullivan**, an American lawyer, born in Glades, Pa., Jan. 10, 1810; studied law, and was admitted to the bar in 1831. In 1857 he was appointed Attorney-General of the United States by President Buchanan, and in 1860-1861 was United States Secretary of State. On the accession of President Lincoln he retired from public life. He died in York, Pa., Aug. 19, 1883.

**Black, John**, a Scotch editor, born near Duns, Berwickshire, in 1783. He was left an orphan when 12 years old, and educated himself. After filling posts in the offices of a Duns writer and an Edinburgh accountant, he went to London in 1810. There he became a Parliamentary reporter for the "Morning Chronicle," of which he was made editor in 1817. Among the contributors to his paper were Charles Dickens and James Mill. In 1843 he retired from the editorship. He was author of a "Life of Tasso, with an Historical and Critical Account of His Writings," and also translated works from the German, French, and Italian. He died in Snodland, June 15, 1855.

**Black, John Charles**, an American lawyer, soldier, and statesman, born in Lexington, Miss., Jan. 27, 1839; graduated at Wabash College, Crawfordsville; entered the Union army in 1861 as Colonel of the 37th Illinois Volunteers; was severely wounded in the service; and was brevetted Brigadier-General. After the war he was elected Congressman-at-large from Illinois; was appointed Commissioner of Pensions by President Cleveland during the latter's first term, and United States District Attorney for the Northern District of Illinois during his second term; and became a United States Civil Service Commissioner in 1903. He is noted as an orator.

**Black, Joseph**, a French chemist, born in Bordeaux, of Scottish parents, in 1728; entered Glasgow University and studied chemistry under Dr. Cullen. In 1754 he

## Black Art

was made an M. D. at Edinburgh, his thesis being on the nature of the causticity of lime and the alkalies, which he demonstrated to be due to the absence of the carbonic acid present in limestone, etc. In 1756 he extended and republished this thesis, and was appointed Professor of Medicine and Lecturer on Chemistry at Glasgow in succession to Dr. Cullen, whom he succeeded also in the Edinburgh chair in 1766. The discovery of carbonic acid is of interest not only as having preceded that of the other gases made by Priestley, Cavendish, and others, but as having preceded in its method the explanation given by Lavoisier of the part played by oxygen in combustion. His fame, however, chiefly rests on his theory of latent heat, 1757 to 1763. He died in 1799.

**Black, William**, a Scottish novelist, born in Glasgow in November, 1841. He received his education at private schools. In 1874 he abandoned the career of journalism, which he had successfully pursued, visited the United States in 1876, and, returning to London, devoted himself anew to literature.

In addition to an interesting story, his novels contain fine descriptions of scenery. They are very popular, and include "Love or Marriage" (1867); "In Silk Attire" (1869); "A Daughter of Heth" (1871); "The Strange Adventures of a



WILLIAM BLACK.

Phaeton" (1872); "A Princess of Thule" (1873); "Three Feathers" (1875); "Madcap Violet" (1876); "Macleod of Dare" (1878); "White Wings: a Yachting Romance" (1880); "Yolande" (1883); "Judith Shakespeare" (1884); "White Heather" (1885); "The Strange Adventures of a House-Boat" (1888); "The New Prince Fortunatus" (1890); "Wolfenberg" (1892); "Highland Cousins" (1894); "Briseis" (1896); "Wild Eelin" (1898); besides others. He has also written a "Life of Goldsmith" (1879). He died in Brighton, England, Dec. 10, 1898.

**Black Art**, exorcism, the alleged ability to expel evil spirits from haunted houses or from persons bewitched; necromancy, or anything similar. The reason why it was called black was that proficients in it were supposed to be in league with the powers of darkness. A more scientific explanation



## Black Ash

would be that such an art is called black because it flourishes best amid physical and intellectual darkness.

**Black Ash**, a mixture of 25 per cent. of caustic soda with calcium sulphide, quicklime, and unburnt coal, obtained in the process of making sodium carbonate. The mixture of sodium sulphate, chalk, and powdered coal is fused in a furnace, gases escape, and the residue is the black ash, which is lixiviated with warm water, and the solution, evaporated to dryness, yields soda ash, an impure sodium carbonate.

**Black Assize**, in English history, an assize held at Oxford in 1557, when the High Sheriff and 300 other persons died of infectious disease caught from the prisoners. It was called also the fatal assize.

**Black Band**, a valuable kind of clay iron-stone occurring in beds in the coal measures, and containing 10 or 15 or even 30 per cent. of coaly matter. Most of the Scotch iron is obtained from it.

**Black Beetle**, a popular name for the cockroach.

**Black Belt**, an agricultural region of Alabama; 70 miles wide, extending entirely across the State, between 33° and 31° 40'; so called from the fact that the negroes greatly predominate in numbers, raising vast quantities of cotton from the richest of lands. It includes 17 counties, with over 500,000 inhabitants.

**Blackberry** (*rubus fruticosus*), a plant common in the northern portions of the United States and in most parts of Europe, and also in Northern Central Asia, having prickly stems, which somewhat resemble those of the raspberry. The flowers do not appear till the summer is considerably advanced, and the fruit ripens toward the end of it, continuing to be produced till the frosts of winter set in. Jelly and jam are made from the berries, and a very delicate wine. The blackberry is rarely cultivated, perhaps because it is in most districts so abundant in a wild state; but it seems to deserve attention at least as much as the raspberry, and might probably be as much improved by cultivation. One or two varieties, such as the Lawton, show the possibilities. A slight rail on each side of a row of brambles, to restrain the straggling stems, affords the necessary security for neatness and order, and the care bestowed is repaid by abundance of fruit.

**Black Bird**, a well known British bird, the *turdus merula*. Other English names sometimes given to it are the ring ousel, the merle, the garden ousel, or simply the ousel. A book name is also the black thrush. The male is black, with the bill yellow; the female is deep brown above, lighter beneath, the throat and foreneck pale brown with

## Blackburn

darker streaks; the young, dusky brown above with dull yellowish streaks, while beneath they have dusky spots. Length, including tail, 10 inches; expansion of wings, 15 inches. There are several varieties, one of them white. The blackbird is a permanent resident in England. It feeds in winter on snails (breaking their shells by dashing them against a stone), and also on earthworms and berries. It pairs in February or March. Its nest is bulky, and is composed externally of stalks of grasses, twigs, etc. Internally there is a lining of mud, and inside of this again fibrous roots, stalks of grasses, and decayed leaves. It lays four, five, or six (generally five) eggs, larger than those of the thrush. They are pale bluish green with darker markings. The song of the blackbird is much admired. There is no bird in the United States precisely similar to the European bird here described. There are two American species, however, that somewhat resemble it, the red winged blackbird (*argelaius phœniceus*) and the crow blackbird (*quiseulus versicolor*).

**Black Boy**, a name for the grass trees (*xanthorrhœa*) of Australia yielding a gum or resin called black boy resin or akaroid resin.

**Blackburn**, a town and parliamentary borough of England, 21 miles N. N. W. from Manchester. It is pleasantly situated in a sheltered valley, and has rapidly improved since 1850, the town hall, exchange, and other buildings being of recent erection. It has a free grammar school, founded by Queen Elizabeth in 1557, a free school for girls, founded in 1765, and many other public schools; and a free library, a public park of 50 acres, etc. Blackburn is one of the chief seats of the cotton manufacture, there being upward of 140 mills as well as works for making cotton machinery and steam engines. The cottons made in the town and vicinity have an annual value of about £5,000,000. Pop. (1901) 127,527.

**Blackburn, Henry**, an English journalist and art critic, born at Portsea, Feb. 15, 1830. He was educated at King's College, London. Besides contributions to newspapers and magazines, he has written "Life in Algeria" (1864); "Art in the Mountains: the Story of the Passion Play in Bavaria" (1870); "Breton Folk" (1879), etc.

**Blackburn, Joseph Clay Styles**, an American lawyer, born in Woodford county, Ky., Oct. 1, 1838; was graduated at Center College, Danville, Ky., in 1857. He was admitted to the bar in 1859, and practiced in Chicago. During the Civil War he served in the Confederate army, and after the war resumed practice in Kentucky. In 1871 he was elected to the Kentucky Legis-



## Blackburn

lature, and in 1874 to Congress; and was a United States Senator in 1885-1897 and 1901-1907. During the presidential campaign of 1896 he was a leader in the free coinage silver movement.

**Blackburn, Luke Pryor**, an American physician, born in Fayette county, Ky., June 16, 1816; was graduated at Transylvania University, Lexington, Ky., in 1834, and began practicing in that city. When cholera broke out in the town of Versailles he went there and gave his services free during the epidemic. In 1846 he went to Natchez, Miss., and in 1848, when yellow fever appeared in New Orleans, as health officer of Natchez, he originated the first quarantine against New Orleans that had ever been known in the Mississippi valley. During the Civil War he was a surgeon on the staff of General Price. In 1875, when yellow fever broke out in Memphis, he hastened to the city and organized a corps of physicians and nurses, and in 1878 gave his services to the yellow fever sufferers at Hickman, Ky. He was elected Governor of Kentucky in 1879. He founded the Blackburn Sanitarium for Nervous and Mental Diseases in 1884. He died in Frankfort, Ky., Sept. 14, 1887.

**Blackburn, William Maxwell**, an American Presbyterian clergyman and educator, born at Carlisle, Ind., Dec. 30, 1828. He became President of the University of North Dakota in 1884 and of Pierre University, South Dakota, in 1885, and President-Emeritus of the last (now Huron College) in 1898. Chief works: "St. Patrick and the Early Irish Church"; "Admiral Coligny and the Rise of the Huguenots"; "History of the Christian Church," etc.; and the "Uncle Alick" series of juvenile stories. He died in 1900.

**Black Cap** (*sylvia atricapilla*), a European passerine bird of the warbler family, six inches long, upper part of the head black, upper parts of the body dark gray with a greenish tinge, under parts more or less silvery white. The female has its hood of a dull rust color. The black cap is met with in England from April to September. Its nest is built near the ground; the eggs, from five to six, are reddish-brown, mottled with a deeper color. It ranks next to the nightingale for sweetness of song. The American black cap is a species of tit-mouse (*parus atricapillus*), so called from the coloring of the head.

**Blackcock**, a name for the male of the black grouse or black game, called also the heathcock (*tetrao tetrix*). The female is called the gray hen, and the young are poults. The blackcock, as its name imports, is black, having, however, white on the wing coverts and under the tail, the two forks of which are directed outward. It is about as

## Black Draught

large as a domestic fowl. It is found in some abundance in Scotland and less plentifully in England. The eggs are from 6 to 10 in number, of a yellowish gray color, blotched with reddish brown. The close time is from Dec. 10th, to Aug. 20th, except in the New Forest, Somerset and Devonshire, where it is from Dec. 10th to Sept. 1st.

**Black Death, The**, one of the most memorable of the epidemics of the Middle Ages, was a great pestilence in the 14th century; which devastated Asia, Europe and Africa. It was an Oriental plague, marked by inflammatory boils and tumors of the glands, such as break out in no other febrile disease. On account of these boils, and from the black spots (indicative of putrid decomposition) which appeared upon the skin, it has been generally called the black death. The symptoms were many, though all were not found in every case. Tumors and abscesses were found on the arms and thighs of those affected, and smaller boils on all parts of the body; black spots broke out on all parts of the skin, either single, united, or confluent. Symptoms of cephalic affection were frequent; many patients became stupefied and fell into a deep sleep, losing also their speech from palsy of the tongue; others remained sleepless without rest. The fauces and tongue were black, and as if suffused with blood. No beverage would assuage the burning thirst. In England the plague first broke out in the county of Dorset, whence it advanced through the counties of Devon and Somerset to Bristol, and thence reached Gloucester, Oxford, and London. From England the contagion was carried by a ship to Norway, where the plague broke out in its most frightful form.

The whole period of time during which the black death raged with destructive violence in Europe was (with the exception of Russia, where it did not break out until 1351) from 1347 to 1350; from this latter date to 1383 there were various pestilences, bad enough, indeed, but not as violent as the black death. Ireland was much less heavily visited than England, and the disease seems scarcely to have reached the mountainous regions of that land; and Scotland, too, would perhaps have remained free from it had not the Scotch availed themselves of the discomfiture of the English to make an irruption into England, which terminated in the destruction of their army by the plague and the sword and the extension of the pestilence through those who escaped over the whole country. It may be assumed that Europe lost by the black death some 25,000,000 of people, or about one-fourth of her entire population. See BUBONIC PLAGUE.

**Black Draught**, sulphate of magnesia and infusion of senna, with aromatics to make it palatable.



## Black Earth

**Black Earth** (*techernozem* of Russian geologists), the name given to a deposit which covers vast areas in South Russia, extending over the steppes and low lying plateaus that border on the Black Sea, and the depressed area to the N. of the Caspian, with a breadth from N. to S. of from 200 or 300 to nearly 700 miles. It closely resembles the loess of Central Europe in texture and structure, for it is fine grained, and is usually devoid of stratification. It varies in color, however, from dark brown to black, and in thickness from a foot or two up to 6 or 7 yards, occasionally reaching, it is said, even to 60 feet. It is composed chiefly of siliceous sand (about 70 per cent.), alumina and other ingredients (23 per cent.), and organic matter (about 7 per cent.). But the composition is variable, the organic matter sometimes exceeding 10 per cent. It appears to be unfossiliferous. It bears the same relation to the glacial accumulations of Russia that the loess of the Rhine, the Danube, etc., does to those of Central Europe, and is probably the fine grained silt derived from the torrents and flooded rivers that escaped from the melting snows and glaciers of the glacial period. According to some geologists, however, it may owe its origin to the action of the wind. It is supposed by them to be simply an accumulation of wind blown dust—the finely sifted material being fixed by the abundant grasses of those steppe regions.

**Blackfeet Indians**, a tribe of American Indians, partly inhabiting the United States, partly Canada, from the Yellowstone to Hudson Bay.

**Blackfish** (*tautōga americāna*), a fish caught on the coast of the United States, especially in the vicinity of Long Island, whence large supplies are obtained for the New York market. Its back and sides are of a bluish or crow black; the under parts, especially in the males, are white. It is plump in appearance, and much esteemed for the table, varying in size from 2 to 12 pounds. Another fish, the *centrolōphus morio*, found in the Mediterranean and on the coasts of Western Europe, is also called blackfish. It belongs to the mackerel family. In Scotland the term is applied to foul or newly-spawned fish. In the United States two species of small whale of the genus *globiocephālus* also have this name.

**Black Flags**, an organization of Chinese rebels who established themselves in the Red River valley in Tonquin, after the suppression of the Taiping Rebellion in Southern China (1850–1854). From their warlike character and desperate deeds they were called Black Flags as distinguished from the peaceable Yellow Flags. They assisted the Tonquinese and Chinese in opposing the French wars (1873, 1882, and 1885), with signal results. Their principal object was

## Blackheath

plunder. They were responsible for the appalling massacre, in 1884, of French missionaries and native Christians, to the number of 10,000.

**Black Forest**, a great forest, part of the *hereynia silva* of the Roman period. It is situated in Baden and Württemberg, near the source of the Danube.

**Black Friars**, friars of the Dominican order. See DOMINICAN.

**Black Friday**, the Friday, Sept. 24, 1869, when the attempt of Jay Gould and James Fisk, Jr., to create a corner in the gold market by buying all the gold in the banks of New York city, amounting to \$15,000,000, culminated. For several days the value of gold had risen steadily, and the speculators aimed to carry it from 144 to 200. Friday the whole city was in a ferment, the banks were rapidly selling, gold was at 162½, and still rising. Men became insane, and everywhere the wildest excitement raged, for it seemed probable that the business houses must be closed, from ignorance of the prices to be charged for their goods. But in the midst of the panic it was reported that Secretary Boutwell of the United States Treasury had thrown \$4,000,000 on the market, and at once gold fell, the excitement ceased, leaving Gould and Fisk the winners of \$11,000,000. The day noticed above is what is generally referred to as Black Friday in the United States, but the term was first used in England, being applied in the first instance to the Friday on which the news reached London, Dec. 6, 1745, that the young Pretender, Charles Edward, had arrived at Derby, creating a terrible panic; and finally to May 11, 1866, when the failure of Overend, Gurney & Co., London, the day before, was followed by a widespread financial ruin.

**Blackguard**, a term used in the 16th century for the lowest menials of a noble house, the scullions who cleaned pots and pans. It was also used of the hangers-on of an army, camp followers, then a rabble, vagabonds.

**Black Gum** (*nyssa multiflōra*, order *cornaceæ*), an American tree, yielding a close grained, useful wood; fruit a drupe of blue black color, whence it seems to get its name of black: it has no gum about it. It is called also pepperidge, and has been introduced into Europe as an ornamental tree.

**Black Hawk**, a famous chief of the Sac and Fox Indians, born in 1767. He joined the British in 1812, and opposing the removal W. of his tribe, fought against the United States in 1831–1832. He died in 1838. There are "Lives" by Patterson and Snelling.

**Blackheath**, a village and heath, in Kent, England, about 6 miles S. E. of London



## Black Hills

Bridge. The heath contains about 70 acres within its present limits, and is much resorted to by pleasure parties. It has been the scene of many remarkable events, such as the insurrectionary gatherings of Wat Tyler and Jack Cade and the exploits of various highwaymen.

**Black Hills**, a mountainous region in the S. W. of South Dakota, extending into the E. part of Wyoming; long.  $103^{\circ}$  to  $105^{\circ}$ . It was purchased from the Indians in 1876, for whom it had been one of the finest hunting grounds in the West. In 1877-1878 thousands of miners went there, and in 1880 there had already sprung into existence three towns, Deadwood, Central City, and Leadville. Around these lay also groups of smaller towns and villages. From 1880 the gold mines yielded about \$4,000,000 annually, and the silver mines about \$3,000,000 annually. The region is also rich in copper, lead, iron and mica. Thrifty farmers have settled there, and many of them have good farms and fine improvements. Good schoolhouses have also been built in different settlements. See SOUTH DAKOTA.

**Black Hole of Calcutta**, a small chamber, 20 feet square, in the old fort of Calcutta, in which, after their capture by Surajah Dowlah, the whole garrison of 146 men were confined during the night of June 21, 1756. Only 23 survived. The spot is now marked by a monument.

**Blackie, John Stuart**, a Scottish author, born in Glasgow in July, 1809; received his education in Edinburgh, Göttingen, Berlin and Rome; was Professor of Greek in Edinburgh University from 1852 till 1882, and continued to write and lecture till his death. He was one of the most important men of his day; promoted educational reform, and championed Scottish nationality. He advocated preserving the Gaelic language, and by his own efforts founded a Celtic chair in Edinburgh University. His books include translations from the Greek and German; moral and religious and other philosophy; "Lays of the Highlands and Islands" (1872); "Self-Culture" (1874); "Language and Literature of the Scottish Highlands" (1875); "Altavona: Fact and Fiction from My Life in the Highlands" (1882); "Wisdom of Goethe" (1883); "Life of Burns" (1888); and "Essays on Subjects of Moral and Social Interest" (1890). He died in Edinburgh, March 2, 1895.

**Blacking**, for boots and shoes, etc., usually contains for its principal ingredients oil, vinegar, ivory or bone black, sugar or molasses, strong sulphuric acid, and sometimes caoutchouc and gum arabic. It is used either liquid or in the form of paste, the only difference being that in making the paste a portion of the vinegar is withheld.

## Black Letter Day

**Black Knight, The**, a name given by romantic writers to various heroic characters. In Scott's "Ivanhoe" Richard Cœur de Lion masquerades as the Black Knight. The Knight Esplandian, son of Amadis of Gaul and Oriana, is also so called. In the Arthurian legend the Black Knight, Sir Peregrin, was one of the four brothers who kept the passage of Castle Dangerous.

**Black Lead, Graphite, or Plumbago**, a mineral consisting chiefly of carbon, but containing also more or less of alumina, silica, lime, iron, etc., to the extent of 1 to 47 per cent., apparently mixed rather than chemically combined. Black lead is the popular name, and that by which it is generally known in the arts, though no lead enters into the composition of the mineral; graphite is that generally preferred by mineralogists. It sometimes occurs crystallized in flat hexagonal tables; but generally massive, and more or less radiated, foliated, sealy, or compact. It is of a grayish black color, with a somewhat metallic luster, and a black and shining streak, and is perfectly opaque. It is greasy to the touch, and is a perfect conductor of electricity. It occurs in beds and masses, laminæ or scales in the schistose rocks (gneiss, mica schist, clay slate, etc.), and is sometimes in such abundance as to give its name to the schist (graphite schist) in which it appears. It occurs also now and again in fissures in granite, or in scattered scales in various other igneous rocks, as in syenite in Norway, in porphyry in the Harz, etc. Thick, vein-like masses of black lead are met with in Siberia, Spain, Canada, New Brunswick, United States (mines at Ticonderoga, N. Y., supplying almost the whole output), Ceylon, and elsewhere; the once extensive supplies of Borrowdale in Cumberland are now exhausted. It is far more incombustible than even anthracite (or blind coal), burning with much difficulty even before the blowpipe, on which account it is much used for the manufacture of crucibles or melting-pots, which withstand a great heat. These are not, however, made of mere black lead, but of black lead in powder, mixed with half its weight of clay. Black lead is employed for making pencils. It is also extensively employed to give a black gloss to iron grates, railings, etc., and to diminish the friction of belts, machinery, and rifle cartridges.

**Blackleg**, a swindler, especially in cards and races. So called from gamecocks, whose legs are always black.

**Black Letter**, the Gothic or German type. So called because of its black appearance.

**Black Letter Day**, an unlucky day; one to be recalled with regret. The Romans



## Black List

marked their unlucky days with a piece of black chareoal, and their lucky ones with white chalk.

**Black List**, a list of bankrupts or other parties whose names are officially known as failing to meet pecuniary engagements. The term is also applied to a list of employes who have been discharged by a firm or corporation and against whom some objection is made and reported to other firms or corporations to prevent them obtaining employment. Blacklisting is made a punishable offense by the laws of some States.

**Blackmail**, a certain rate of money, corn, cattle or the like, anciently paid, in the N. of England and in Scotland, to certain men who were allied to robbers, to be protected by them from pillage. It was carried to such an extent as to become the subject of legislation. Blackmail was levied in the districts bordering the Highlands of Scotland till the middle of the 18th century. In the United States, the word is applied to money extorted from persons under threat of exposure in print for an alleged offense; hush-money.

**Black Maria**, a popular name in the United States applied to the covered wagon, generally painted black, used for the conveyance of prisoners; properly, a prison van.

**Black Monday.** (1) A name for Easter Monday, in remembrance of the dreadful experiences of the army of Edward III., before Paris, on Easter Monday, April 14, 1360. Many soldiers and horses perished from the extreme cold. (2) The 27th of



SIR RICHARD BLACKMORE.

Feb., 1865, a memorable day in Melbourne, Australia, when a destructive sirocco prevailed in the surrounding country.

**Blackmore, Sir Richard**, an English physician and poet, born in Wiltshire, about 1650. Besides medical works,

Scripture paraphrases, and satirical verse, he wrote in Popian couplets "Prince Arthur, a Heroic Poem" (1695), and a voluminous religious epic, "The Creation" (1712), very successful and much praised then, but not now read. He died in 1729.

**Blackmore, Richard Doddridge**, an English novelist, born in Longworth, Berk-

## Black River

shire, June 9, 1825. He graduated from Oxford in 1847, was called to the bar in 1852, but devoted himself to literature. Among his novels are "Lorna Doone" (London, 1869, by far the most celebrated, having reached dozens of editions, some of them magnificent, extra illustrated ones); "Clara Vaughan" (1864); "The Maid of Sker" (1872); "Alice Lorraine" (1875); "Cripps, the Carrier" (1876); "Erema" (1877); "Mary Anerley" (1880); "Cris-towell" (1882); "Sir Thomas Upmore" (1884); "Springhaven" (1887); "Kit and Kitty" (1889); "Perlyeross" (1894); "Slain by the Doones" (1895); and "Daniel" (1897). He also published a version of Vergil's "Georgics." He died in London, Jan. 21, 1900.

**Black Mountains**, the group which contains the highest summits of the Appalachian system, Clingman's Peak being 6,701 feet, Guyot's Peak, 6,661.

**Blackpool**, a much frequented watering place of England, on the coast of Lancashire, between the estuaries of the Ribble and Wyre. It consists of lofty houses ranging along the shore for about 3 miles, with an excellent promenade and carriage drive; has libraries and news rooms, two handsome promenade piers, a large aquarium, fine winter gardens, etc. Pop. (1891) 23,846.

**Black Prince**, the son of Edward III. See EDWARD.

**Black Quarter**, a kind of apoplectic disease which attacks cattle, indicated by lameness of the fore foot, one of the limbs swelling, and after death being suffused with black blood, which also is found throughout the body.

**Black Republic**, a name applied to the Republic of Haiti, which is under the dominion of the African race.

**Black Republicans**, in the United States, a name applied to members of the Republican Party by the Pro-Slavery Party, because they resisted the introduction of slavery into any State where it was not already recognized.

**Black River**, the name of several rivers in the United States: (1) An affluent of the Arkansas river, in Arkansas, 400 miles long. It is navigable to Poplar Bluff, 311 miles; (2) a river in New York, rising in the Adirondaeks, and emptying into Lake Ontario near Watertown, length 200 miles; (3) a river in Wisconsin, flowing S. W., and emptying into the Mississippi river near LaCrosse; length 200 miles; (4) a river rising in the S. E. of Missouri, flowing nearly S., and entering the White river, of which it is the chief tributary, at Jacksonport, Ark.; length, 350 miles, of which 100 miles are navigable.



## Black Rock Desert

**Black Rock Desert**, a tract of nearly 1,000 square miles, N. of Pyramid Lake, in Nevada. In summer it is a barren level of alkali and in winter covered in places with shallow water. Called also "Mud Lakes."

**Black Rod**, in England, the usher belonging to the Order of the Garter, so called from the black rod which he carries. His full title is Gentleman Usher of the Black Rod, and his deputy is styled the Yeoman Usher. They are the official messengers of the House of Lords; and either the Gentleman or the Yeoman Usher summons the Commons to the House of Lords when the royal assent is given to bills; and also executes orders for the commitment of parties guilty of breach of privilege and contempt.

**Black Rood of Scotland**, a cross of gold in the form of a casket, alleged to contain a piece of the true Cross. It was brought to Scotland in the 11th century by Margaret, Queen of Malcolm III.; was bequeathed as an heirloom, and regarded as a sacred relic. It was delivered to Edward I. in 1291, but restored to Scotland after the Peace of Northampton in 1328. It was finally taken in battle by the English in 1346, and hung in the Cathedral of Durham until the Reformation, when it disappeared.

**Black Saturday**, the 4th of Aug., 1621; so called in Scotland because a violent storm occurred at the very moment the Parliament was sitting to enforce episcopacy on the people.

**Black Sea** (ancient Pontus Euxinus), a sea situated between Europe and Asia, and mainly bounded by the Russian and Turkish dominions, being connected with the Mediterranean by the Bosphorus, Sea of Marmora, and Dardanelles, and by the Strait of Kertsch with the Sea of Azov, which is, in fact, only a bay of the Black Sea; area of the Black Sea and the Sea of Azov about 175,000 square miles, with a depth in the center of more than 150 fathoms and few shoals along its shores. The water is not so clear as that of the Mediterranean, and is less salt on account of the many large rivers which fall into it—the Danube, Dniester, Dnieper, Don, etc. Though not tidal, there are strong currents. The tempests on it are very violent, as the land which confines its agitated waters gives to them a kind of whirling motion, and in the winter it is scarcely navigable. During January and February the shores from Odessa to the Crimea are ice bound. It contains few islands, and those of small extent. The most important ports are those of Odessa, Kherson, Eupatoria, Sebastopol, Batum, Trebizond, Samsun, Sinope, and Varna. The fisheries are of some value. After the capture of Constantinople the

## Blackstone

Turks excluded all but their own ships from the Black Sea until 1774, when, by the Treaty of Kainarji, they ceded to Russia the right also to trade in it. The same right was accorded to Austria in 1784, and by the Peace of Amiens to Great Britain and France in 1802. The preponderance thereafter gained by Russia was one of the causes of the Crimean War, in which she was compelled to cede her right to keep armed vessels in it, the sea being declared neutral by the Treaty of Paris, 1856. In 1871, however, when France could not attend, owing to the Franco-Prussian War, the sea was, deneutralized by a conference of the European Powers at London in response to the Russian protest.

**Black Sheep**, (*Kârâ-Koin-loo*), a tribe of Turkomans, so called from their standard. This tribe was extirpated by the White Sheep.

A black sheep: a disgrace to the family; a *mauvais sujet*; a workman who will not join in a strike. Black sheep are looked on with dislike by shepherds, and are not so valuable as white ones.

**Black Snake** (*coluber constrictor*), a common snake in North America, reaching a length of 5 or 6 feet, and so agile and swift as to have been named the racer, with no poison fangs, and, therefore, comparatively harmless. It feeds on small quadrupeds, birds, and the like, and is especially useful in killing rats.

**Blackstone, Sir William**, an English jurist, born in London July 10, 1723; educated at the Charter House and Pembroke College, Oxford. In 1743 he was elected fellow of All-Souls College, Oxford, and in 1746 was called to the bar; but, having attended the Westminster law courts for seven years without success, he retired to Oxford. Here he gave lectures on law, which suggested to Mr. Viner the idea of founding a professorship at Oxford for the study of the common law; and Blackstone was, in 1758, chosen the first Vinerian Professor. In 1759 he published a new edition of the "Great Charter and Charter of the Forest;" and, during the same year, resumed his attendance at Westminster Hall with abundant success. In 1761 he was elected



SIR WILLIAM BLACKSTONE.



## Black Tin

M. P. for Hindon, made King's Counsel and Solicitor-General to the Queen. He was also appointed Principal of New Inn Hall; which office, with the Vinerian Professorship, he soon resigned. In 1765 he published the first volume of his famous "Commentaries on the Laws of England," the other three volumes being produced at intervals during the next four years. Its merits as an exposition made it for a long period the principal text-book of English law. He died Feb. 14, 1780.

**Black Tin**, tin ore when dressed, stamped, and washed ready for smelting, forming a black powder.

**Black Vomit.** See YELLOW FEVER.

**Black Walnut**, a valuable timber tree (*juglans nigra*) of the United States and its fruit. The great size often reached by this tree, the richness of the dark brown wood, the unique beauty of the grain sometimes found in burls, knots, feathers and in the curl of the roots, all conspire to make this the most choice and high priced of all our native woods.

About 1870 walnut was extensively used in the manufacture of fine furniture and finishings in the United States, but afterward manufacturers drew attention to the beauty of darkly stained quartered oak and the use of the rarer wood greatly declined, to become popular again in 1900. During this interval the search for fine black walnut logs went on systematically, though quietly, the trade attracting little attention, though the volume of lumber handled was very large. Though found to some extent in the Atlantic States from Massachusetts southward, the great source of supply has been the central portions of the Mississippi valley. The walnut is at home in the rich alluvial bottom lands of the Western streams and in the stony limestone soils of the hills and mountains, and in such localities the buyers have left few trees unsurveyed. During the interval of unpopularity the great bulk of this timber was exported to Europe.

**Black Warrior**, a river of Alabama, formed by the confluence of the Locust and Mulberry forks; flows into the Tombigbee near Demopolis; navigable in its lower course to Tuscaloosa; 300 miles long.

**Blackwell, Mrs. Antoinette Louisa (Brown)**, an American woman suffragist and Unitarian minister, born at Henrietta, N. Y., May 20, 1825. A graduate of Oberlin (1847), she "preached on her own orders," at first in Congregational churches, becoming at length a champion of women's rights. She married Samuel C., a brother of Dr. Elizabeth Blackwell (1856). She has written "Shadows of Our Social System" (1855); "The Island Neighbors" (1871),

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a novel of American life; "Sexes Throughout Nature" (1875), etc.

**Blackwell, Elizabeth**, an American physician and medical and ethical writer, born at Bristol, England, 1821. She is the first woman who ever obtained the degree of M. D. in the United States (1849), beginning practice in New York (1851). With her sister, Emily, she opened the New York Infirmary for Women and Children (1854), organizing in connection with it the Women's Medical College (1867). In 1868 she became professor in a woman's medical college that she had assisted in organizing in London. She was author of "Laws of Life" (1852); "Counsel to Parents on the Moral Education of Their Children" (1879); "Pioneer Work in Opening the Medical Profession to Women," etc. She died June 1, 1910.

**Blackwell, Lucy Stone**, an American woman suffragist, born in West Brookfield, Mass., Aug. 13, 1818; was graduated at Oberlin College in 1847; became a lecturer on woman suffrage, and a contributor to the press. In 1855 she married Henry B. Blackwell, a merchant of Cincinnati. She died in Dorchester, Mass., Oct. 20, 1893.

**Blackwell's Island**, an island belonging to the city of New York, in the East river, containing about 120 acres. On it are the penitentiary, almshouse, lunatic asylum for females, workhouse, blind asylum, hospital for incurables, and a convalescent hospital. Nearly all of these buildings were erected from granite quarried on the island, and by convict labor, the style of architecture being of a turreted and battlemented design of the feudal character. The island is bordered by a heavy granite sea wall, also built by the convicts, and a large amount of farming and gardening is carried on by inmates of the penitentiary.

**Blackwood, or Indian Rosewood**, a leguminous tree of Hindustan (*dalbergia latifolia*), the timber of which is highly valued and much used in the manufacture of fine furniture. The Australian blackwood is the *acacia melanoxylon*.

**Blackwood, William**, a Scotch publisher, born at Edinburgh, Nov. 20, 1776. He started as a bookseller in 1804, and soon became also a publisher. The first number of "Blackwood's Magazine" appeared April 1, 1817, and it has always been conducted in the Tory interest. He secured as contributors most of the leading writers belonging to the Tory party, among them Sir Walter Scott, Lockhart, Hogg, Professor Wilson, De Quincey, Dr. Moir (Delta), Thomas Aird, Dr. Maginn, John Galt, and others. The work of editor he performed himself. After his death the business, which had developed into a large publishing concern, was carried on by his



## Bladder

sons, and the magazine still keeps its place among the leading periodicals. More recent contributors to it were Bulwer-Lytton, Professor Aytoun, Landor, Charles Lever, Sir Archibald Alison, Sir Theodore Martin, Mrs. Oliphant, W. W. Story, Frederick Locker, Lord Neaves, George Henry Lewes, and George Eliot. He died Sept. 16, 1834.

**Bladder**, a membranous bag in man and the higher animals, designed for the reception of the urine, as it is secreted by the kidneys. This, being the most important structure of the kind in the frame, is called, by way of prominence, the bladder; any other one is distinguished from it by a word prefixed, as the gall bladder. The bladder of an ox, a sheep, etc., when dried may be inflated with air, and used as a float for nets, or for other purposes. Sometimes its buoyancy is taken advantage of to keep those learning to swim from sinking while as yet they are unable to support themselves unaided in the water.

**Bladder Nut**, the English name of *staphylea*, the typical genus of the order of plants called *staphyleaceæ* (bladder nuts). The name is derived from the inflated capsules. They have five stamens and two styles. The common bladder nut (*staphylea pinnata*) is indigenous in Eastern Europe. The three leaved bladder nut, *staphylea trifolia*, is found in this country. Bladder nuts is Lindley's English name for an order of plants, the *staphyleaceæ*.

**Bladder Wort**, the English name of *utricularia*, a genus of scrophulariaceous plants. Both the English and the scientific appellations refer to the fact that the leaves bear at their margins small bladders.

**Blaeu, Blaeuw, or Blauw** (blou), a Dutch family celebrated as publishers of maps and books. WILLIAM (1571-1638) established the business at Amsterdam, constructed celestial and terrestrial globes, and published "New Atlas" (6 vols.), and "View of Cities and Monuments." His son, JOHN (died 1673), published the "Great Atlas" (11 vols.), and various topographical plates and views of towns. The works of this family are still highly valued.

**Blaikie, William**, an American athlete and writer on physical training, born at York, N. Y., in 1843. He became a lawyer in New York, and wrote "How to Get Strong" (2d ed. 1880); "Sound Bodies for Our Boys and Girls" (1883). He died Dec. 6, 1904.

**Blaikie, William Garden**, a Scotch clergyman, born in Aberdeen, in 1837; was graduated at the University of Aberdeen; ordained a minister of the Established Church in 1842; joined the Free Church in 1843; and was appointed Professor of Apologetics and Pastoral Theology in New College, Edinburgh, in 1868. He was a

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delegate to the Presbyterian General Assembly of the United States in 1870; took a leading part in the formation of the Alliance of the Reformed Churches; and was editor of the "Free Church Magazine" in 1849-1853, the "North British Review" in 1860-1863, the "Sunday Magazine" in 1871-1874, and the "Catholic Presbyterian" in 1879-1883. His writings include "Bible History in Connection with General History" (1859); "Bible Geography" (1860); "Glimpses of the Inner Life of David Livingstone" (1880); "Public Ministry and Pastoral Methods of Our Lord" (1883); "Leaders in Modern Philanthropy" (1884); etc. He died in North Berwick, Scotland, June 11, 1899.

**Blaine, James Gillespie**, an American statesman, born in West Brownsville, Pa., Jan. 31, 1830. He graduated at Washington College, Pa., in 1847. In 1854 he removed to Augusta, Me., and engaged in journalism. He was one of the founders of the Republican Party, and in 1856 was a delegate to the first Republican National Convention, which nominated Frémont for the Presidency. In 1858 he was elected to the Legislature of Maine, and in 1862 to the House of Representatives of the National Congress. He became Speaker of the House in 1869, and held that office



JAMES GILLESPIE BLAINE.

for six years; was a member of the Senate from 1876 to 1881; was twice Secretary of State (1881-1882 and 1889-1892). He was defeated for the Presidency in 1884, by Grover Cleveland. Besides his numerous speeches and writings on the public questions of his day, his best known work is his "Twenty Years in Congress" (2 vols., 1884-1886), a historical production of great and permanent value. He died in Washington, D. C., Jan. 27, 1893.

**Blainville, Henri Marie Ducrotay de** (blan-vēl'), a French naturalist, born in 1777. After attending a military school, and also studying art, his interest in Cuvier's lectures led him to the study of medicine and natural history. Cuvier chose him for his assistant in the College of France and the Museum of Natural History,



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and in 1812 secured for him the chair of Anatomy and Zoology in the Faculty of Sciences at Paris. In 1825 he was admitted to the Academy of Sciences; in 1829 he became professor in the Museum of Natural History, lecturing on the mollusca, zoophytes, and worms; and in 1832 he succeeded Cuvier in the chair of Comparative Anatomy there. His chief works are "Animal Organism, or Principles of Comparative Anatomy," "Manual of Mollusks and Shell Fish," "Manual of Actinology" and "Osteology," a work on the vertebrate skeleton. He died in 1850.

**Blair, Austin**, an American lawyer, born in Caroline, N. Y., Feb. 8, 1818; graduated at Union College in 1839; studied law in Oswego, N. Y., and removed to Jackson, Mich., where he was admitted to the bar in 1842. He was elected to the Legislature in 1846; became conspicuous in the convention which established the Republican party in Michigan; and was elected Governor of Michigan in 1860, becoming one of the War Governors. In 1866-1870 he was a member of Congress. He died in Jackson, Mich., Aug. 6, 1894.

**Blair, Francis Preston**, an American journalist and politician, born in Abingdon, Va., April 12, 1791; in early life was a Jacksonian Democrat. He edited the "Washington Globe" from 1830 to 1845. Through his anti-slavery sentiments became one of the founders of the Republican Party, but in later years returned to the Democratic faith. He died at Silver Spring, Md., Oct. 18, 1876.

**Blair, Francis Preston, Jr.**, an American military officer and legislator, born in Lexington, Ky., Feb. 20, 1821; son of the preceding. He was a Representative in Congress from Missouri in 1857-1859 and 1861-1863; became a Major-General in the Union army in the Civil War, taking an active part in the Vicksburg campaign and Sherman's march to the sea; was an unsuccessful Democratic candidate for Vice-President in 1868, and United States Senator in 1870-1873. He died in St. Louis, July 5, 1875.

**Blair, Henry William**, an American legislator, born in Campton, N. H., Dec. 6, 1834; received an academic education; was admitted to the bar in 1859; served through the Civil War, becoming Lieutenant-Colonel of the 15th New Hampshire Volunteers, and being twice wounded. After serving in both branches of the State Legislature he was a member of Congress in 1875-1879 and 1893-1895, and a United States Senator in 1879-1891. He is the author of what was known as the "Blair Common School Bill," designed to distribute a certain amount of Federal money for educational purposes among the various

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States in proportion to the number of illiterates. He was a strong opponent of Chinese immigration, and, when he was appointed and confirmed United States Minister to China, that government objected to receiving him. He has been an active worker in the cause of temperance and other reforms.

**Blair, Hugh**, a Scotch clergyman and educational writer, born in Edinburgh, in 1718; was noted for the eloquence of his sermons, and also for "Lectures on Rhetoric" (1783), which attained great popularity, "Blair's Rhetoric" being familiar to all students. He died in 1800.

**Blair, John Insley**, an American philanthropist, born in Belvidere, N. J., Aug. 22, 1802; was in early life a merchant and banker; subsequently becoming the individual owner of more miles of railroad property than any other man in the world. He acquired a very large fortune; loaned the Federal Government more than \$1,000,000 in the early part of the Civil War; built and endowed at a cost of more than \$600,000, the Presbyterian Academy in Blairstown, N. J.; rebuilt Grinnell College, Iowa; erected Blair Hall and made other gifts to Princeton University; was equally liberal to Lafayette College; and had erected more than 100 churches in different parts of the West, besides laying out many towns and villages on the lines of his numerous railroads. He died in Blairstown, N. J., Dec. 2, 1899.

**Blair, Montgomery**, an American lawyer, born in Franklin county, Ky., May 10, 1813; was graduated at the United States Military Academy in 1835; resigned from the army in 1836; admitted to the bar in 1839; began practice in St. Louis. He was Judge of the Court of Common Pleas in 1843-1849; removed to Maryland in 1852; was United States Solicitor in the Court of Claims in 1855-1858. He acted as counsel for the plaintiff in the widely known Dred Scott case. In 1861-1864 he was Postmaster-General. In 1876-1877 he acted with the Democratic Party in opposing Mr. Hayes' title to the office of President. He died in Silver Springs, Md., July 27, 1883.

**Blair, Robert**, a Scotch author, born in Edinburgh in 1699; was ordained in 1731 minister of Athelstaneford, where he spent the remainder of his life. His "Grave" was first printed in 1743, and is now esteemed as one of the standard classics of English poetical literature. He died in 1746.

**Blake, Edward**, a Canadian and British statesman, born in Ontario, Canada, Oct. 13, 1833. He was educated at Upper Canada College and Toronto University; was called to the bar in 1856, and engaged in practice in



Toronto, where he soon rose to eminence as an equity lawyer. He entered public life in 1867 as member both of the Ontario Legislative Assembly and the Dominion House of Commons, as dual representation was then permitted. He became premier of the first Liberal government of Ontario in 1871-72, but resigned to enter the federal arena at Ottawa. Upon the accession to power of the Liberals in Dominion politics in 1873, Blake became a supporter of the premier, Hon. Alexander Mackenzie, and was minister of justice in 1875-77. Resigning in the latter year on account of ill health, he was appointed to the less onerous office of president of the council in 1877-78. After the defeat of the Mackenzie administration in 1878, Blake was acknowledged to be the ablest man in the Liberal party, and

was elected leader in 1880. In several general elections between 1878 and 1891 he was unable to oust the Conservative premier, Sir John A. Macdonald, who had the faithful and often unscrupulous support of the



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manufacturers in his protectionist policy. Wearied with these attempts, Blake resigned the Liberal leadership in 1891. He had already declined the highest judicial appointments, including those of chancellor of Ontario, chief justice of Ontario, and chief justice of the Supreme Court of Canada. A new field was opened to him in connection with the Irish agitation for home rule, with which he had long sympathized. He accepted the invitation of the Anti-Parnellite faction of Irish Nationalists, and was elected as the member for South Longford in the House of Commons in London. His legal arguments and political speeches were of a very high intellectual quality, and although his tenure of office was brief, his character and career were none the less important in making for a high standard of public life in Canada.

**Blake, Eli Whitney**, an American inventor, born in Westboro, Mass., Jan. 27, 1795; graduated at Yale University in 1816. He began business with his uncle, Eli Whitney, in the manufacture of firearms; and in 1834 founded, near New

Haven, Conn., the pioneer factory for the manufacture of domestic hardware. In 1857 he invented the widely known stone and ore crusher called the Blake crusher, which introduced a new era in road making and mining industries, and is used throughout the world. He died in New Haven, Conn., Aug. 17, 1886.

**Blake, Lillie (Devereux)**, an American advocate of woman's rights, and novelist; born at Raleigh, N. C., April 12, 1835. Her first husband, Frank G. Quay Umsted, died in 1859; in 1866 she married Grenfill Blake, who died in 1896. She wrote and spoke much on woman suffrage and associated subjects, and her novels bear on this theme. She has written "Southwold" (1859); "Rockford" (1863); "Fettered for Life" (new ed. 1885); "Woman's Place To-Day" (1883), a reply to Dr. Morgan Dix's "Lenten Lectures on Women," which attracted attention; etc. In 1900 she established the National Legislative League.

**Blake, Mary Elizabeth (McGrath)**, an American poet and writer of travels, born in Ireland in 1840. In verse she wrote "Poems" (1884; 2nd ed. 1890); "Youth in Twelve Centuries" (1886), etc. Of her travels may be named "On the Wing" (1883); "A Summer Holiday in Europe" (1889). She died in Boston, Mass., Feb. 26, 1907.

**Blake, Robert**, a British naval officer, born at Bridgewater in 1599. He was elected member for Bridgewater in the Parliament of 1640. This being soon dissolved he lost his election for the next, and sought to advance the Parliamentary cause in a military capacity in the war which then broke out. He soon distinguished himself, and in 1649 was sent to command the fleet with Colonels Deane and Popham. He attempted to block up Prince Rupert in Kinsale, but the Prince, contriving to get his fleet out, escaped to Lisbon, whither Blake followed him. Being refused permission to attack him in the Tagus by the King of Portugal, he took several rich prizes from the Portuguese, and followed Rupert to Malaga, where, without asking permission of Spain, he attacked him and nearly destroyed the whole of his fleet. His greatest achievements were, however, in the Dutch War which broke out in 1652. On May 19 he was attacked in the Downs by Van Tromp with a fleet of 45 sail, the force of Blake amounting only to 23, but Van Tromp was obliged to retreat. On May 29 he was again attacked by Van Tromp, whose fleet was now increased to 80 sail. Blake had a very inferior force, and after every possible exertion was obliged to retreat into the Thames. In February following he put to sea with 60 sail, and soon after met the Dutch Admiral, who had 70 sail and 300 merchantmen under convoy. During



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three days a running fight up the Channel was maintained with obstinate valor on both sides, the result of which was the loss of 11 men-of-war and 30 merchant ships by the Dutch, while that of the English was only one man-of-war. In this action Blake was severely wounded. On June 3 he again engaged Van Tromp and forced the Dutch to retire, with considerable loss, into their own harbors. In November, 1654, he was sent with a strong fleet to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished the castles of Goletta and Porto Ferino, at Tunis, because the Dey refused to deliver up the British captives. In April, 1657, he sailed with 24 ships to Santa Cruz, in Teneriffe; and, notwithstanding the strength of the place, burned the ships of a Spanish plate fleet which had taken shelter there, and, by a fortunate change of wind, came out without loss. He died Aug. 17, 1657, and was buried in Westminster Abbey, whence his body was removed at the Restoration and buried in St. Margaret's churchyard. Consult: Gardiner, "History of the Commonwealth and Protectorate" (1894-1901), and the biographies by Dixon (1852) and Johnson (1792).

**Blake, William**, an English poet and artist, born in London, Nov. 28, 1757; learned to draw; became a noted illustrator and engraver; had a printshop in London; and exhibited at the Royal Academy. His imagination was strange, powerful, grotesque, and poetic; and his belief was that his poems and drawings were communica-



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tions from the spirit world. His "Poetical Sketches" (London, 1783); "Songs of Innocence" (1789), and "Songs of Experience" (1794), contain pastoral and lyrical poems of great beauty. His "Prophetic Books," including "Book of Thel" (1789); "Marriage of Heaven and Hell" (1790); "Book of Urizen" (1794); "Book of Los" (1795); "Book of Ahania" (1795); "Jerusalem" (1804), and "Milton" (1804), are famous. His greatest artistic work is in "Inventions to the Book of Job" (1826). He died in London, Aug. 12, 1827. There is a complete edition by Ellis and Yeats (1893).

## Blanc

**Blake, William Phipps**, an American mineralogist, born in New York city, June 1, 1826; was graduated at the Yale Scientific School in 1852. He became geologist and mineralogist to the United States Railroad Expedition in 1853; was mining engineer in connection with explorations in Japan, China, and Alaska in 1861-1863; was appointed professor of geology and mineralogy in the College of California in 1864; and in 1894 became director of the School of Mines in the University of Arizona and also territorial geologist. His works include "Geological Reconnaissance in California," "Silver Ores and Silver Mines," "Iron and Steel," "Ceramic Art and Glass," "Life of Captain Jonathan Mix."

**Blakeley, Johnston**, an American naval officer, born near Seaford, Ireland, October, 1781; entered the United States navy as a midshipman in 1800; commanded the "Enterprise" in the early part of the War of 1812; and was captain of the "Wasp" when she captured the English "Reindeer" in June, 1814. Soon after this he sailed with the "Wasp" on another cruise, but the vessel was lost at sea with all on board.

**Blakelock, Ralph Albert**, an American painter, born in New York city, Oct. 15, 1847; was graduated from the College of the City of New York in 1869; was self-educated in art. His paintings include "Ta-vo-kok-i; or, the Circle Dance of the Kavavite Indians," "Cloverdale, Cal.," "Moonlight," "The Indian Fisherman," "A Landscape," "On the Face of the Quiet Waters," "Cumule."

**Blakey, Robert**, an English writer, born in Morpeth, May 18, 1795; bought the Newcastle "Liberator" in 1838, and got himself into trouble with the Government on account of certain alleged seditious articles which he published. In 1848 he became professor of logic and metaphysics at Queen's College, Belfast. Among his works are "Treatise on the Divine and Human Wills," "History of Moral Science," "Historical Sketch of Logic," "Temporal Benefits of Christianity," and "The Angler's Song Book." He died in Belfast, Oct. 26, 1878.

**Blanc, Mont.** See MONT BLANC.

**Blanc, Anthony** (blänk), an American clergyman, born in Sury, France, Oct. 11, 1792; was ordained to the Roman Catholic priesthood in 1816; went to Annapolis, Md., in 1817; was appointed Bishop of New Orleans in 1835; and became Archbishop there in 1850. He died in New Orleans, June 20, 1860.

**Blanc, Jean Joseph Louis** (blän'), a French socialist and historian; born in Madrid, where his father was inspector-general of finance under King Joseph, Oct. 29, 1811. After finishing his school education he went to study in Paris. For



two years he was a private tutor at Arras, and in 1834 returned to Paris, where he contributed to various political papers, and where in 1839 he founded the "*Revue du Progrès*," in which he first brought out his chief work on socialism, the "*Organization of Industry*," which, in 1840, appeared in a separate form. The book denounces the principle of competitive industry, and proposes the establishment of social workshops, composed of workmen of good character, and subsidized by the State. These workshops, conducted on the coöperative principle, and on the basis of an equitable remuneration for all engaged in them, would, he thought, in the process of time absorb all the industry of France. Next, in 1841-1844, Blanc published an historical work, entitled "*History of Ten Years (1830-1840)*," which produced a deadly effect on the Orleans dynasty. This was followed by the first volume of a "*History of the French Revolution*," in which the author's aim was to describe from his own point of view not only the incidents of the first revolution, but the social history of the 18th century. On the breaking out of the Revolution of February, 1848, Blanc had an opportunity of playing a most important part. His great popularity with the working classes led to his being appointed a member of the Provisional Government, and he was placed at the head of the great commission for discussing the problem of labor, which had its sittings in the Palace of the Luxembourg. At the same time, Marie, Minister of Public Works, began to establish the so-called national workshops, which, however, were in no sense an attempt to carry out the views of Blanc. Blanc was accused, without reason, of a share in the disturbances of the summer of 1848, and escaped to London, where he spent many years. During his exile, he devoted himself to political and historical literature. He finished his "*History of the French Revolution*," and carried on a large correspondence for the French journals, a selection from which was published in the bright and charming "*Letters on England*." On the fall of the empire, Blanc returned to France, and was elected to the National Assembly in 1871. After 1876 he was member of the Chamber of Deputies. In both these bodies he voted and acted with the Extreme Left, but without exercising any great influence on the course of events. He died at Cannes, Dec. 6, 1882.

**Blanc, Marie Thérèse** (THÉRÈSE BENTZON), a French novelist and littérateur, born at Seine-Port, Sept. 21, 1840. She has been for many years on the editorial staff of the "*Revue des Deux Mondes*," to which she has contributed notable translations and reviews of many American, Eng-

lish, and German authors. Her literary essays on these contemporaneous writers were collected in "*Foreign Literature and Customs*" (1882) and "*Recent American Novelists*" (1885). Her first work to attract attention was "*A Divorce*" (1871), published in the "*Journal des Débats*." Two other novels, "*A Remorse*" (1879), and "*Tony*" (1889), were crowned by the French Academy. Other stories are "*Georgette*" and "*Jacqueline*" (1893). The fruit of her first visit to the United States was "*Condition of Woman in the United States*" (1895).

**Blanc, Paul Joseph**, a French genre painter; studied under Bin and Cabanel. He won the Grand Prize of Rome in 1867; the first class medal of the Paris Salon in 1872; the decoration of the Legion of Honor in 1878; and the first class medal in the Paris Exposition of 1889. One of his best known works is a decorative composition depicting the consecration, baptism, and triumph of Clovis.

**Blanchard, Edward Laman**, an English dramatist and novelist, born in London in 1820. His novels, "*Temple Bar*" and "*A Man Without a Destiny*," evinced no special talent for story telling; on the other hand, he composed for Drury Lane Theater about 100 "Christmas Pantomimes" in the vein of grotesque burlesque, among them "*Sinbad the Sailor*," which were received with unbounded popular favor. He died in 1889.

**Blanchard, Émile** (blänsh-är'), a French naturalist, born in Paris, March 6, 1819; especially renowned as an entomologist. He was the author of many scientific works, including "*Researches into the Organization of Worms*" (1837); "*Natural History of Orthopterous and Neuropterous Insects*" (1837-1840); "*History of Insects, etc.*" (1843-1845).

**Blanchard, Jonathan**, an American educator, born in Rockingham, Vt., Jan. 19, 1811; graduated at Lane Theological Seminary in 1832; and was ordained a Presbyterian minister in 1838. He was American Vice-President of the World's Anti-Slavery Convention in London in 1843; and in 1846 became President of Knox College at Galesburg, Ill. He was President of Wheaton College, Ill., in 1880-1882; and, on resigning, was chosen president-emeritus, and subsequently gave most of his time to editing the "*Christian Cynosure*." He died in Wheaton, Ill., May 14, 1892.

**Blanchard, Thomas**, an American inventor, born in Sutton, Mass., June 24, 1788. His inventions include a machine for turning and finishing gun barrels by one operation; a lathe for turning irregular forms; a device for cutting, pointing, and heading tacks by one operation; another for cutting and folding envelopes; a steam



wagon, built before the day of the railroad; a process for bending heavy timber; and a steamboat to ascend rapids or rivers with heavy currents. He died in Boston, April 16, 1864.

**Blanche, August Théodor** (blänsh), a Swedish dramatist and novelist, born in Stockholm, Sept. 17, 1811. His comedies and farces—more particularly “Jenny, or the Steamboat Trip,” “The Doctor,” “The Rich Uncle,” and “The Foundling”—have made all Sweden laugh; while his realistic fictions—among them “The Specter,” “Tales of a Cabman,” and “Sons of North and South”—are eagerly read. He died in Stockholm, Nov. 30, 1868.

**Blanche of Bourbon**, a French princess, daughter of Pierre, Duc de Bourbon; born about 1338. She was abandoned by her husband, Pedro the Cruel, of Castile, by whom she was charged with infidelity and imprisoned. It was thought that she was poisoned. Her death produced a profound impression, and has often been celebrated in verse. She died in Medina Sidonia, Spain, in 1361.

**Blanche of Castile**, Queen of Louis VIII. of France, was daughter of Alfonso IX., King of Castile, and was born in 1187. She was married to Louis in 1200, was crowned with him in 1223, and, on his death three years later, became Regent during the minority of her son, Louis IX., displaying great energy and address as a ruler. She opposed the departure of Louis for the crusade, but accompanied him to Cluni, and carried on the government in his stead. His long absence, and the rumor of his intention to settle in the Holy Land, caused her great sorrow, and she died in 1252.

**Blanching**, or **Etiolation**, a process of culture resorted to by gardeners, to prevent certain secretions which, in ordinary circumstances, take place in the leaves of plants, and to render them more pleasant and wholesome for food. Artificial blanching is managed (1) by earthing up the leaves and succulent stems of plants, such as celery, asparagus, etc. For this purpose celery is planted in trenches, and earth is gradually drawn in round the stems as they advance in growth. (2) By tying together the leaves with strings of matting, as is sometimes done with lettuce, endive, etc. (3) By overlaying, which can be done with tiles, slates, pieces of board, or utensils made for the purpose. The most common is the blanching pot, used to exclude the light from seakale, rhubarb, and some other culinary vegetables, in which the green color is to be avoided. The common blanching pot is of earthenware, in a sugar loaf form, which is used in France for blanching lettuce, and in the Pyrenees for blanching

celery, etc. Though so simple and easy, blanching is of great importance in gardening. Without it such a plant as seakale is uneatable, if not poisonous; with it the common dandelion has become a wholesome and even medicinal article of salad.

**Blanc=Mange**, in cookery, a name of different preparations of the consistency of a jelly, variously composed of dissolved isinglass, arrow root, maize flour, etc., with milk and flavoring substances.

**Blanc, Mont.** See MONT BLANC.

**Blanco, Antonio Guzman**, a Venezuelan military officer, born in Caracas, Feb. 29, 1828. He became prominent in the Federalist revolts, 1859–1863, and when his party triumphed, was made first Vice-President in 1863 under Falcon, who was deposed in the Revolution of 1868. Blanco led a successful counter revolution in 1870, became President, and retained the office till 1882. In 1893 he was appointed Minister to France, where he resided till his death, July 29, 1899.

**Blanco, Jose Felix**, a Venezuelan historian, born in Mariana de Caracas, Sept. 24, 1782. At different times he acted in the capacity of priest, soldier, and statesman. He was one of the leaders in the Revolution at Caracas, April 19, 1810, and was the first editor of the great historical work, “Documentos para la historia de la vida publica del Libertador,” etc. He died in Caracas, Jan. 8, 1872.

**Blanco, Pedro**, a Bolivian statesman, born in Cochabamba, Oct. 19, 1795. He joined the Spanish army in 1812, but soon deserted to the patriots, and served with them till the end of the Revolution. In 1828 he became a general, and in the same year, when Sucre fell, was made President of Bolivia, but was superseded in the Revolution of Dec. 31, 1828. He was shot in Sucre, in January, 1829.

**Blanco, Ramon y Arenas, Marquis de Pena Plata**, Captain-General of the Spanish army in Cuba during the Spanish-American War; was born at San Sebastian, Spain, in 1833, and began his military career at the age of 22, entering the army in 1855 as a Lieutenant; was promoted to a captain in 1858, and won the rank of Lieutenant-Colonel in the war with San Domingo. When the Spaniards were driven from the island Blanco went to the Philippines as governor of Mindanao. When he returned to Spain he was assigned to the Army of the North, and in the war with the Carlists made a brilliant record. He successfully stormed Pena Plata, for which achievement he was created a Marquis of that name. He succeeded General Weyler in command of the army in Cuba. His career has been marked by deeds of blood



and violence. When in command at the Philippines he ordered 169 prisoners to be thrown into a dungeon, where they were left for two days. When the guard opened the door, they were all dead from asphyxiation. In the second Cuban insurrection 1,500 defenseless prisoners were slaughtered by his orders. At Cavité the Spanish captured several native leaders, and, by Blanco's instructions, after being tortured, the unhappy wretches were disemboweled and their bleeding bodies hung on the gates of the city. The Spanish Government permitted him to resign his post in Cuba before the day set for the American occupation. He died April 4, 1906.

**Blanco Encalada, Manuel**, a Spanish-American military officer, born in Buenos Ayres, Sept. 5, 1790; distinguished himself in the Chilean War of Independence. He was chosen President of Chile in July, 1826, but soon resigned, and was made General of the army. He unsuccessfully invaded Peru in 1837, and was not allowed to retire till he had signed a treaty of peace. Chile annulled this treaty, and he was court-martialed, but freed. In 1847 he was Intendant of Valparaiso, and in 1853-1858 Minister to France. He died in Santiago, Chile, Sept. 5, 1875.

**Blanco. Cape**, a remarkable headland on the W. coast of Africa, in 20° 47' N. lat., and 16° 58' W. long., the extremity of a rocky ridge which projects from the Sahara in a westerly direction, and then bending southward forms a commodious harbor called the Great Bay. Cape Blanco was first discovered by the Portuguese in 1441. Cape Blanco (*i. e.*, White Cape) is also the name of several less important headlands in Spain, Greece, America, and the Philippines.

**Bland, Richard Parks**, an American legislator, born near Hartford, Ky., Aug. 19, 1835; received an academical education, and, between 1855 and 1865, practiced law in Missouri, California, and Nevada, and was engaged for some time in mining. In 1865 he settled in Rolla, Mo., and practiced there till 1865, when he removed to Lebanon in the same State. He was a member of Congress in 1873-1895 and from 1897 till his death. In 1896 he was a conspicuous candidate for the Presidential nomination in the Democratic National Convention, but on the fourth ballot his name was withdrawn, and the vote of his State was cast for William J. Bryan. Mr. Bland was best known as the leader in the Lower House of Congress of the Free-Silver movement, and the author of the Bland Silver Bill. At the time of his death he was a member of the Committees on Coinage, Weights and Measures, and Expenditures on Public Buildings. He died in Lebanon, Mo., June 15, 1899. See **BLAND SILVER BILL**.

**Bland, Theodoric**, an American military officer, born in Prince George county, Va., in 1742; studied medicine in the University of Edinburgh, and for a time practiced in England. He returned home in 1764, and was active in his profession until the outbreak of the Revolutionary War, when he sided with the colonists, and became Captain of the First Troop of Virginia cavalry. In 1777 he joined the main army as a Lieutenant-Colonel, and later became a Colonel. He distinguished himself at the battle of Brandywine, and was placed in command of the prisoners taken at Saratoga, who were marched to Charlottesville, Va. In 1780-1783 he was a member of the Continental Congress, and was a Representative from Virginia to the 1st Federal Congress in 1789. He died in New York city, June 1, 1790.

**Bland Silver Bill**, one of the most notable measures of American Congressional history. The original bill, as introduced by Representative Bland and passed by the House late in 1877, provided simply for the free and unlimited coinage of silver by all the mints of the United States. This programme represented the full policy of the Silver men. The silver dollar had been demonetized by the act of 1873, and its coinage had been wholly abandoned. The Bimetallists desired to restore it to perfect equality with gold as a standard of value, and the original Bland bill, permitting owners of silver bullion to have their commodity coined into dollars by the mints, was intended as the means to accomplish that object. But the Senate amended the measure materially. The free coinage clause was stricken out, and, as a concession to the Silver men, it was directed that the Secretary of the Treasury should purchase monthly not less than \$2,000,000 and not more than \$4,000,000 worth of silver bullion, at the market price of the metal, and coin it into standard silver dollars, which should be unlimited legal tender for all debts. The amended bill was reported by Senator Allison, Chairman of the Finance Committee, and hence received the name of the Bland-Allison Act. It was vetoed by President Hayes, but passed over his veto, Feb. 28, 1878, by 196 to 73 in the House, and 46 to 19 in the Senate. The silver purchase clause in this act was repealed by the Sherman Act of 1890.

**Blanket**, a coarse, heavy, loosely woven, woolen stuff, usually napped and sometimes twilled, used for covering one when in bed. Being a bad conductor of heat it prevents the warmth generated by the body from passing off, and thus becoming lost. The word is also applied to anything fitted to intercept vision, the allusion being to the fact that a blanket was formerly used as a curtain in front of the stage: it was so



in Shakespeare's time. In printing, a blanket is a piece of woolen felt or prepared rubber placed between the inner and outer tympan, to form an elastic interposit between the face of the type and the rotating cylinder or descending platen.

**Blank Verse**, verse which is void of rhyme; any kind of verse in which there is not rhyme, blanced or omitted. The verse of the Greeks and Romans—at least such of it as has come down to us—is without rhyme. The Goths are said to have introduced rhyme from the East into the languages of modern Europe, and in the Middle Ages it came to be commonly employed in poetical composition, both in the Latin and vernacular tongues, by most of the nations of Europe. About the 15th century, when the passion for imitating classical models became general, attempts were made in Italy, France, and other countries, to reject rhyme as a barbarous innovation. The first attempt at blank verse in English appears to have been a translation of the first and fourth books of the "*Æneid*" by the Earl of Surrey, who was executed in 1547. Its suitability for the drama was at once felt, and it was in general use in dramatic composition before Shakespeare began to write, which is supposed to have been about 1591. It was, however, almost entirely confined to the drama down to the appearance of "*Paradise Lost*," by Milton, in 1667. Since Milton's time, blank verse has come into use in various kinds of poetry besides the dramatic; but it is principally in the heroic meter of 10 syllables that blank verse is used, and, indeed, by some the term is restricted to that kind of meter. As an example of blank verse:

Of man's | first dis | obe | dience, and | the fruit  
Of that | forbid | den tree | whose mor | tal taste  
Brought sin | into | the world, | and all | our woe.

Frequently, in dramatic blank verse, a supernumerary syllable occurs at the end of the line, as—

To be, | or not | to be, | that is | the ques | tion.

In blank verse, the poet is less encumbered than in any other species of versification; and, hence, it is particularly adapted for subjects calling forth sublime and noble emotions.

**Blanqui, Jerome Adolphe** (blăn-kē), a French economist, was born at Nice, in 1798, and began the study of philology at Paris, where he became acquainted with J. B. Say, who induced him to turn his attention to political economy. In 1833, on the death of Say, he was appointed Professor of Industrial Economy in the Conservatoire des Arts et Métiers, and became one of the editors of the "*Dictionnaire de l'Industrie*." In 1838 he became a member of the Academy of Moral and Political

Science. Subsequently he traveled in several countries to study their economic condition. As a political economist, Blanqui was a follower of Say, and in favor of free trade, and he recognized the social difficulties of his time. In method, he is ingenious; in style, transparent and lively. His most important work is the "*Histoire de l'Economie Politique en Europe*" (1838). He died in Paris, Jan. 28, 1854.

**Blanqui, Louis Auguste**, a French revolutionist, born in Nice, in 1805; brother of the preceding, made himself conspicuous chiefly by his passionate advocacy of the most extreme political opinions, for which he suffered with the pride of a martyr. He was one of the foremost fighters in all the French revolutions of the 19th century. In 1830 he was decorated for his valor at the barricades. In 1848 he figured as the chief organizer of the popular movement under the Provisional Government. He took the lead also in the revolutionary *attentat* of May 15, the aim of which was to overthrow the Constituent Assembly. At the head of an excited mob, he demanded of the French representatives the resuscitation of the Polish nationality, while one of his friends pronounced the dissolution of the Assembly. For his share in these disturbances he was rewarded with 10 years' imprisonment in Belleisle. In 1861 Blanqui was sentenced to another four years' imprisonment. After the downfall of the second empire in 1870, Blanqui resumed his revolutionary activity, and, in 1871, took a prominent part in forming the Commune. Being too unwell to endure transportation to New Caledonia, he was condemned to imprisonment for life, from which he was released in 1879. He died Jan. 1, 1881, having spent nearly half his life in prison.

**Blapsidæ**, a family of nocturnal black beetles, whose wings are generally obsolete and their elytra soldered together. They frequent gloomy, damp places, and when seized discharge, in self-defense, a liquid of a peculiar, penetrating odor. *Blaps mortisaga*, or churchyard beetle, is the most familiar British specimen.

**Blarney**, a village in Ireland, 4 miles N. W. of the city of Cork, with Blarney Castle in its vicinity. A stone called the Blarney Stone, near the top of the castle, is said to confer on those who kiss it the peculiar kind of persuasive eloquence alleged to be characteristic of the natives of Ireland. The groves of Blarney are extensive and interesting, and beneath the castle there are also some curious natural caves.

**Blashfield, Edwin Howland**, an American artist, born in New York city, Dec. 16, 1848; studied in Paris under Léon Bonnat; and began exhibiting in the Paris Salon in 1874. He returned to the United



## Blasphemy

States in 1881, and has since distinguished himself by the execution of large decorative works. Among his noteworthy productions in this line are one of the domes of the Manufacturers' Building in the World's Columbian Exposition, the great Central Dome of the Library of Congress, and the new apartment of the Appellate Court in New York City; besides ceiling and panel work in the residences of C. P. Huntington, W. K. Vanderbilt, and George W. C. Drexel, and in the Astoria ballroom and several club-houses in New York City.

**Blasphemy**, slander or even well-merited blame, applied to a person or in condemnation of a thing; also the utterance of injuries, highly insulting, calumnious, or slanderous language against a person in high authority, especially against a king, who may be looked on as, in certain respects, the vicegerent of God. In the United States blasphemy, while not erected into a special crime by legislative enactment is punishable in all of the older States of the Union, under the acts against profanity and indecent language, disorderly conduct, etc.

The word is particularly applied to any profane language toward God; highly irreverent, contemptuous, abusive, or reproachful words, addressed to, or spoken or written regarding God; or an arrogating of His prerogatives. In theology, blasphemy against the Holy Ghost means the sin of attributing to Satanic agency the miracles which were obviously from God.

**Blast Furnace**, a structure built of refractory material, in which metallic ores are smelted in contact with fuel and flux, the combustion of the fuel being accelerated by air under pressure. The materials are fed in at the top of the furnace, and after the ores are reduced, the metal, or in some cases, the matte, and the resulting slag are tapped in a molten state at or near the bottom; as a rule, the slags, being of less specific gravity than the metal, float upon it.

The sizes of blast furnaces vary from a few feet to over 100 feet in height, a horizontal section through the structure showing either circular or rectangular interiors, the circular form being adopted for the larger sizes, while those of smaller height are often made rectangular to permit of introducing a number of tuyeres with air nozzles into a narrow hearth.

A typical vertical section of a blast furnace consists of a cylindrical or rectangular hearth or crucible, into which the air is admitted, under pressure, through tuyeres. On this hearth is superposed an inverted frustum of a cone forming the boshes, and on this inverted cone a right frustum of a cone, forming the shaft, is superposed. The shafts are inclosed by shells of sheet

## Blast Furnace

steel or by crinolines formed of bands and beams, and carried on columns. The boshes are usually secured by bands and the crucibles by sheet metal jackets. The materials are charged into the shaft so that layers of fuel alternate with layers of ore and flux, the taper of the shaft being sufficient to permit of expansion as the materials are heated, and facilitate their delivery to the hopper formed by the boshes, where reduction of the ores takes place. The reduced ore, meeting the burning fuel near the tuyeres, is melted, and the liquid slag and metal drop into the hearth or crucible (the cinder or slag floating on the liquid metal), from which they are tapped out from time to time. By heating the blast before it enters the tuyeres, combustion is accelerated, and the furnaces produce increased quantities of metal with reduced fuel consumption per unit of product.

The large blast furnaces smelt ores of iron or manganese, or of iron and manganese, and are from 40 to 106 feet in height, a cross section at the top of the boshes showing a circle from 10 feet to 23 feet in diameter. The blast is heated to 1,000°, and sometimes to 1,200° or 1,400° F., and is forced into the crucibles or hearth through from 6 to 20 tuyeres, at pressures from 5 to 15, and, at times, exceeding 20 pounds per square inch. The blast furnaces smelting silver or copper ores seldom exceed 30 feet in height, the horizontal section being rectangular, and the blast pressure but a fraction of a pound. A modern blast furnace will produce from 300 to 600 tons of pig iron daily, requiring from 1,000 to 2,000 tons of ore, fuel and flux to be fed into it. The cost for construction and equipment of one of these modern furnaces, with its necessary railroad tracks, storage-room and bins for receiving the raw material, the mechanism for elevating it to the top of the stack, with sufficient blowing engines, boilers, hot blast stoves, etc., ranges from \$400,000 to \$800,000.

As a rule, blast furnaces smelting other ores than those of iron have the top of the furnace stack open, while in those producing iron, the top is usually sealed by a bell closing against a hopper, to distribute the stock in the wide throat of the furnace and to control the gases which are the result of the smelting operation, so as to employ the calorific value of these gases for heating the blast or for generating steam in boilers to operate machinery. The practicability of using these gases in engines, where the gas, in exploding, gives impetus to a piston, has also been demonstrated. The blast is heated in hot blast stoves, generally cylinders from 14 to 25 feet in diameter and from 50 to 115 feet high, filled with checker work of fire brick. These stoves are placed in series; the gas being



## Blast Furnace

admitted to and burned in a stove raises the temperature of the masonry, after which the gas is shut off and the blast forced through the highly heated checkers. By alternating a series of stoves on gas or blast, at intervals of one or two hours, a nearly uniform temperature is maintained.

The blast, after passing through the hot blast stoves, is conveyed in iron or steel conduits, lined with fire brick, to tuyeres, set in the walls of the crucible. These tuyeres are formed of an inner and outer shell with closed ends, water circulating between the two shells. The tuyeres are mostly made of bronze or copper and are set in larger tuyere blocks (also water cooled) of iron or bronze. Nozzles connect the lined air conduits to the tuyeres. The cooling water required by a modern blast furnace amounts to millions of gallons daily. A large furnace requires a boiler equipment of from 3,000 to 3,500 horse power for its blowing, pumping and elevating machinery, electric plant, etc.

Blast furnaces are numerous in the United States, Great Britain, Germany, France, Belgium, Spain, Russia, Austria-Hungary, and Sweden; and they also exist in Italy, India, China, Japan, and Canada; it is worthy of note that in the latter two countries they are multiplying rapidly. Data as to the numbers of these is not at hand, but the following statement of the pig iron production of various countries, excluding the United States, gives an approximate idea of the principal centers of the activity:

| Country                    | Year | Metric Tons |
|----------------------------|------|-------------|
| Germany and Luxemburg..... | 1905 | 10,987,623  |
| Great Britain.....         | 1905 | 9,746,221   |
| France.....                | 1905 | 3,077,000   |
| Russia.....                | 1905 | 2,125,000   |
| Austria-Hungary.....       | 1905 | 1,372,300   |
| Belgium.....               | 1905 | 1,310,290   |
| Sweden.....                | 1905 | 531,200     |
| Canada.....                | 1905 | 475,491     |
| Spain.....                 | 1905 | 383,100     |
| Italy.....                 | 1905 | 31,300      |

It is impossible to give the total number of blast furnaces in the United States, for the reason that the numbers of those used for producing copper, silver, etc., are not collated, but lists of the furnaces employed in reducing iron ores are carefully reported by the American Iron and Steel Association. There were on May 1, 1907, 345 furnaces active in the United States. The aggregate pig iron production of 340 of those blast furnaces which were active during 1906 amounted to the grand total of 25,307,191 long tons. The State of Pennsylvania, in 1906, had 132 furnaces in blast, which produced 11,247,869 tons. It was followed by Ohio, with 57 furnaces, contributing 5,327,133 tons; Illinois, with 22 furnaces, producing 2,156,866 tons; Alabama, with 31 furnaces, producing 1,674,848 tons. Vir-

## Blastoderm

ginia's 14 active furnaces furnished 483,525 tons; the 13 in Tennessee, 426,874 tons. See articles under STEEL.

JOHN BIRKINBINE.

**Blasting**, the operation of breaking up masses of stone or rock *in situ* by means of gunpowder or other explosive. In ordinary operations, holes are bored into the rock of from one to six inches in diameter, by means of a steel pointed drill, by striking it with hammers or allowing it to fall from a height. After the hole is bored to the requisite depth it is cleaned out, the explosive is introduced, the hole is tamped or filled up with broken stone, clay or sand, and the charge exploded by means of a fuse or by electricity. In larger operations mines or shafts of considerable diameter take the place of the holes above described. Shafts are sunk from the top of the rock to various depths, sometimes upward of 60 feet. This shaft joins a heading, or gallery, driven in from the face, if possible along a natural joint; and from this point other galleries are driven some distance in various directions, with headings at intervals, returning toward the face of the rock and terminating in chambers for the charges. Enormous charges are frequently made use of, upward of 20 tons of gunpowder having been fired in a single blast. One of the greatest blasting operations ever attempted was the removal of the reefs in the East river, near New York, known as Hell Gate. An entrance shaft was sunk on the Long Island shore, from which the reef projected. From this shaft nearly 20 tunnels were bored in all directions, extending from 200 to 240 feet, and connected by lateral galleries. Upward of 52,000 pounds of dynamite, rend rock, and powder were used, and millions of tons of rock were dislodged. Numerous important improvements have been made in blasting by the substitution of rock boring machines for hand labor. Of such machines, in which the jumper or drill is repeatedly driven against the rock by compressed air or steam, being also made to rotate slightly at each blow, there are many varieties.

**Blastoderm**, an embryological term applied to the layer or layers of cells arising from the germinal disk, or the portion of a partially segmenting egg which undergoes division. In ova where there is a large quantity of nutritive material or yolk, as in fish or bird, the whole ovum cannot divide, and only a small (germinal) disk of formative protoplasm does so. The cells resulting from the division of this area become afterward disposed in the ordinary germinal layers, and are in their earlier stages, as they grow round the yolk, and become in their area of origin the seat of embryonic development, called the blastoderm.



**Blavatsky, Helene Petrovna**, a noted theosophist; born in Yekaterinoslay, Russia, in 1831; founded the Theosophical Society in New York in 1875, and wrote "Isis Unveiled" (1876); "The Secret Doctrine" (1888); "Key to Theosophy" (1889), etc. She died in London, May 8, 1891.

**Blazonry**, the art of describing a coat of arms in such a way that an accurate drawing may be made from the verbal statements given. To do this a knowledge of the points of the shield is particularly necessary. Mention should be made of the tincture or tinctures of the field; of the charges which are laid immediately upon it, with their forms and tinctures; which is the principal ordinary, or, if there is none, then which covers the fess point; the charges on each side of the principal one; the charges on the central one, the bordure—with its charges; the canton and chief, with all charges on them; and, finally, the differences or marks of the cadency and the baronet's badge.

**Bleaching**, the art of whitening linen, wool, cotton, silk, wax, also the materials of which paper is made, and other things. It is shown by experience that organic bodies, after being deprived of life, and becoming solid and dry, lose their color and become white by the influence of the air and the sunlight. Upon this fact the manner of bleaching which was formerly in use is grounded—namely, boiling the goods alternately in alkali and soap, scouring, and then exposing them to the air and sunshine, termed *crofting*. Under this tedious system light fabrics required from six to eight weeks for their completion, while heavy goods often took the whole summer. The use of chlorine as a bleaching agent was first proposed by Berthollet in 1785, and shortly afterward introduced into Great Britain, where it was first used simply dissolved in water, afterward dissolved in alkali, and then in the form of bleaching powder, commonly called chloride of lime, the manufacture of which was suggested by Mr. Tennant, of St. Rollox, Glasgow, in 1798. At first he passed the chlorine into milk of lime, and thus obtained the solution known as bleach liquor. In 1799 he took out a patent for absorbing chlorine by dry lime, and thus obtained bleaching powder. Bleaching powder has little bleaching action till the chlorine is liberated by the action of an acid. The best bleaching powder contains about 36 per cent. of available chlorine; that is, chlorine which is liberated by acid.

In the bleaching of cotton cloth, the pieces, after being singed, by passing them over a red-hot plate or a semi-cylinder of iron or copper, are steeped in lukewarm water or old lyes, till they are completely soaked, which loosens any paste or filth got during weaving; they are then well washed

through the dash wheel, and put through the hydro-extractor or drying machine. If the cotton is in the hank, this process of steeping and washing is not required.

The mechanical operations of the bleaching house vary considerably, according to the quality of the goods and the facility for mechanical appliances. In the chemical operations of whitening the cloth there is little variation, further than that heavy fabrics require longer time and more frequent repetition of the processes. The first operation, after steeping and washing, is boiling. The boiling liquor is made by adding a quantity of water to slaked lime, and when the grosser particles of the lime have settled to the bottom of the vessel, the milky liquor is put into the boiler, or it may be filtered through a cloth. Some bleachers use along with the lime a little carbonate of soda; the quantity of lime varies from 4 pounds to 8 pounds for every 100 pounds of cotton, and from 1 pound to 2 pounds of soda ash, where this is used. The boilers used for boiling the goods are called *kiers*, and many kinds are used, the boiling liquid being made to shower over the goods and percolate down through them. This is effected by having a false bottom or frame fitted inside the boiler at about one-third of its depth from the bottom, upon which the goods are laid. The space between the false bottom and real bottom of the boiler is filled with the liquor or lye, connected with which is a pipe leading to the top of the boiler. When the heat is applied, either by steam or fire, and the liquor begins to boil, it is forced up through this pipe, which is made to shower its contents over the surface of the goods. This boiling is continued, according to the quality of the goods, from 6 to 12 hours. The goods are now removed from the boiler and washed in water; they are then passed through dilute hydrochloric acid, again washed, and boiled for 12 hours with dilute caustic soda, after which they are passed into a solution of bleaching powder contained in a large stone or wooden trough or cistern, where they are left for from two to four hours.

The bleaching solution is prepared by first dissolving a quantity of bleaching powder in water in a large cask and allowing the whole to settle; a quantity of the clear liquor is then drawn from the cask and put into the large bleaching cisterns, which have been previously nearly filled with water. To ascertain the necessary quantity of this strong bleaching liquor to be added to the troughs or cisterns, a certain measure of sulphate of indigo is taken in a graduated vessel, termed a test glass, and then, according to the number of graduated measures of the bleaching solution required to decolor the sulphate of indigo, the strength of the bleaching liquor is regulated.



## Bleaching

These test glasses and sulphate of indigo are carefully prepared for the purpose.

Instead of dash wheels, a more improved method of cleaning and washing is adopted by some bleachers previous to boiling the goods. They are all sewed together, end to end, making one line of the whole. This line of pieces is drawn along by machinery between rollers and squeezers, with a plentiful supply of water, and having been thus thoroughly washed and cleaned, is at last laid out by a mechanical contrivance into the bleaching trough. The goods are allowed to steep in the bleaching liquor from two to four hours; they are then lifted and washed, either by the dash wheel or rollers, as before, and are then laid in a sour, made by adding about one pint of hydrochloric or sulphuric acid to every four gallons of water. After steeping in the sour for four hours, the goods are again washed, as before, and are subjected to another boiling for eight hours; but this time the lye is caustic soda or potash, generally the former, which is made caustic by boiling together a quantity of soda ash and slaked lime, and allowing the sediment to settle, and using only the clear solution. About 8 pounds of soda ash suffice for 100 pounds of goods. After the boiling, the goods are again washed and steeped in the bleaching liquor for eight hours, and again washed and soured—the sour in this case being always made with sulphuric acid. Light fabrics require no further treatment; but heavy fabrics need a clearing process, which is a repetition of the last course, the liquors being generally, however, a little weaker, and the processes shorter. Cotton, in the hank, undergoes the same operations, except in the washings, which are performed by hand, not with the wheel. The goods being bleached and dried by the extractor, are now prepared for the operations of finishing. For this purpose they are stretched by women to their breadth, and the folds, as much as possible, taken out by beating them; then they are stitched together by the ends with a sailor's needle, and being thus prepared for the mangle the cloth is now starched, common wheat flour and a portion of porcelain clay being employed. It is then subjected to the action of the stiffening machine, and having been thus impregnated with starch, the superfluous portion of which is pressed out as it passes through the rollers above, the goods are then hung upon rails in an apartment called the stove, heated by two furnaces, from which flues are led through the room. The heat thus generated is sometimes so great that the workmen, in hanging up the cloth, are obliged to throw off most of their clothes. When the goods are dried thoroughly, they are taken from the stove and carried to the damping machine, where they are subjected to the action of a shower of water. When the cloth comes from

## Bledsoe

the damping machine, it may be seen covered with wet spots, the greater portion, however, being dry; but after remaining some time it becomes uniformly damp. The goods are now passed through the calender; they are then regularly folded and put into a Bramah press, with a sheet of pasteboard between each, and, being sufficiently pressed, they are then finished for the market.

The process has been greatly shortened by the introduction of the Mather-Thompson process (1884). In this process an important feature is the use of the steamer kier, in which the goods are submitted to the action of low-pressure steam. The material is passed through soda lye, squeezed, and washed; then through boiling caustic soda, squeezed, and run into a steamer kier, where it is boiled for four hours under a pressure of four pounds, washed with hot water, and then passed continuously through a series of vats containing water, bleaching powder solution, carbonic acid gas, water, alkaline solution, water, bleaching powder, carbonic acid gas, water, hydrochloric acid.

The bleaching of linen is conducted after a similar manner to that of cotton; but there is much more coloring matter in the former than in the latter, and it is therefore found necessary in the bleaching of linen to repeat the boiling in lye and the steeping in chloride of lime three or four times. An electrolytic method of bleaching (the Hermite process) has recently been introduced. The chlorine for bleaching is liberated by the action of an electric current on solutions of calcium or magnesium chloride.

Wool and silk cannot be bleached with chlorine, so sulphur dioxide, usually prepared by burning sulphur, is used instead. In the case of wool, the material is well washed with water and scoured with alkaline solutions to remove fatty matters. It is then exposed, while still wet, to the action of sulphur dioxide in a brick chamber for six or eight hours—or it may be soaked for several hours in a solution of sulphurous acid—after which it is well washed. Silk is treated with dilute acid, then worked in a soap bath for about 20 minutes to remove the gummy matter present, after which it is rinsed, tied up in bags of cotton, and boiled for from one to three hours in water, and rinsed in dilute alkali and finally in water. The bleaching is effected by stoving in sulphur dioxide, exactly as in the case of wool. In place of sulphur dioxide, hydrogen peroxide is coming into use for both wool and silk bleaching.

**Bledsoe, Albert Taylor**, an American clergyman and writer; born in Frankfort, Ky., Nov. 9, 1809. He was Assistant Secretary of War of the Southern Confederacy, and both an Episcopal and a Methodist minister. Besides editing the "Southern



Review" and contributing frequently to leading literary, scientific, and theological periodicals, he wrote "Examination of Edwards on the Will" (1845); "Theodicy" (new ed. 1853); "Philosophy of Mathematics" (1868), etc. He died in Alexandria, Va., Dec. 1, 1877.

**Bleeding, or Hemorrhage**, one of the most serious accidents which can happen to an animal, and constitutes the most anxious complication in surgical operations. As there is but a limited quantity of blood in the body (corresponding to about one-tenth of its weight), and as the sudden escape of a large portion of it is sufficient to cause death, every one should be instructed as to the measures which experience has shown to be the most efficient for preventing a dangerous loss of blood. Bleeding may be either from a wounded artery or vein, or from a raw surface, and it may be in the form of a general oozing from the surface of a sore or a mucous membrane. These varieties are here considered separately.

Arterial bleeding is recognized by the florid redness of the blood, and by its issuing from the cut vessel by jerks. There are exceptions to this, however. When an artery has been tied, and bleeding occurs from below the ligature, the flow of blood is continuous, and of a dark color.

The principal means of relief are: Immediate pressure, which may be applied by pressing the finger tip on the place whence the blood is seen to flow. This may be kept up by pads of lint, or a coin of convenient size wrapped in cloth, and secured with a bandage to the part. Pressure on the artery above, or as it comes to the cut part. This requires some knowledge of anatomy, but not more than any intelligent person may easily acquire. Thus, pressure on the inside of the upper arm, about midway between its front and back, will press the brachial artery against the bone, and arrest any bleeding from wounds of the forearm and hand. Pressure on the middle of the groin with a thumb placed crosswise will control the stream of blood in the femoral artery, so that none can escape from any wound of the lower limb below where the pressure is made. This pressure with the finger or thumb is very difficult to maintain with an adequate amount of firmness and continuity: hence it is well to substitute the handle of a door key wrapped in cloth, for the direct pressure of the finger tip, which rapidly becomes relaxed by fatigue. Pressure on the course of the vessel may be very efficiently effected by tying a handkerchief round the limb above where it is injured, and then inserting a stick, and twisting it sufficiently tight. Pressure on the main vessel leading to a limb is only a temporary method of stop-

ping bleeding, since it is not only very painful to the patient, but fraught with danger to the limb, which may mortify if it be too long continued. In a healthy man such pressure may be continued for five or six hours with impunity in case of urgent necessity, but a longer suppression of the circulation would almost certainly be followed by partial or complete death of the limb. Actual cautery, or hot iron, is occasionally useful in bleeding from a bone, or at some points where pressure cannot be efficiently applied. It is the oldest method of stopping bleeding, and until the 18th century was much in use; but its abuse, and the natural horror felt for it by both patient and surgeon, have almost banished it from the list of surgical hemostatics. If used, the iron should be at a dull red heat, pressed for an instant in firm contact with the bleeding vessel. It causes shriveling of the artery, and if the latter be small, it effectually stops the bleeding. Ligature, or tying the artery, is a very old method of arresting hemorrhage, and certainly the best. It was not used generally, however, in operations until improved anatomical knowledge and more efficient tourniquets allowed surgeons the time necessary for its application. Another method was introduced by the late Sir James Y. Simpson, of Edinburgh and was termed by him *acupressure*, or pressure from a long needle or pin inserted from without, so as to press the artery between it and the tissues. The pins are removed after 24 or 48 hours.

Venous bleeding is recognized by the dark color of the blood, and its continuous flow. Pressure is generally found sufficient to arrest it, and it should be applied directly over the wounded part. In this case, pressure higher up the limb only does harm, by retarding the return flow of the circulation. Oozing from cut surfaces partakes more of the characters of venous than of arterial bleeding, as there is no vessel sufficiently large to demand the application of a ligature. The actual cautery or cold may be used, or one of the many styptics — *e. g.*, perchloride of iron — may be especially recommended; it may be applied on lint or a sponge; or local astringents, such as alum and tannin, may be employed; there are also the puff ball, mushroom, agaric, and matico leaves, cobwebs, felt, etc., which act mechanically, and owe their reputation chiefly to the pressure used in their application. The best remedy for this type of bleeding is the application of a steady stream of very hot water to the injured surface.

In bleeding, of whatever kind, the posture of the patient is a matter of great importance. The recumbent position is associated with a diminished force of the circulation, and should, therefore, be adopted in



## Bleibtreu

all serious cases. If the bleeding occur in one of the limbs, the raising of the injured part is in itself often sufficient to cut short the loss of blood, and this postural treatment should in all cases be employed in addition to the special local remedies above described. Bleeding from internal organs, as the stomach or the lungs, is a very serious symptom, and must be immediately and carefully treated whenever it occurs. In any such case, the patient should be placed in the recumbent position in a cool, airy room, the dress loosened to allow of cooling of the surfaces of the body, and the application of cold, further effected by placing wet cloths over the chest and renewing them as soon as they become warm from contact with the body. All these remedies have the effect of slowing and reducing the strength of the circulation, and the patient, therefore, loses blood less rapidly. A tablespoonful of turpentine mixed with a little milk should be administered by the mouth at once, and another tablespoonful should be added to a jug full of boiling water, and the patient caused to inhale the vapor from it. This acts directly on the blood vessels, tending to close them at the bleeding point. Keep the patient very quiet, and summon medical aid as speedily as possible.

**Bleibtreu, Karl August** (blīb'troi), a German poet and novelist, born at Berlin, Jan. 13, 1859. He is one of the foremost representatives of the youngest German school in literature, and a pronounced realist. All his views are radical, as shown by the very titles of his works, *e. g.*, "Revolution in Literature" (1885); "Literature's Struggle for Life." He also wrote "Dies Irae," "Napoleon at Leipsic," "Cromwell at Marston Moor." His dramas are "Lord Byron" (1888); "The Day of Judgment," "The Queen's Necklace," etc.

**Blemyes, or Blemmyes**, an ancient people of Ethiopia. According to Strabo and the early Latin writers they were nomadic, wandering about Nubia and Upper Egypt. It was the fable that they were without heads, having the eyes and mouth in the breast, perhaps from the circumstance that they depressed their heads between their shoulders and wore their hair long, making the neck seem very short.

**Blende**, a native sulphide of zinc ( $\text{ZnS}$ ). Composition: Sulphur, 32.12–33.82; zinc, 44.67–67.46; sometimes with small amounts of iron and cadmium. It occurs in regular tetrahedra, dodecahedra, and other monometric forms; it is found also fibrous, columnar, radiated, plumose, massive, foliated, granular, etc. Its color is either white, yellow, or brown black. Varieties of it exist in many places in this country; in Derbyshire, Cumberland, and Cornwall,

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England; as well as on the continent of Europe, etc. One variety is called by the miners blackjack. Blende is called also sphalerite. Dana divides it into (1) ordinary (containing blende or shalerite, little or no iron); (2) ferriferous (containing 10 or more per cent. of iron); (3) cadmi-ferous (containing cadmium).

In mining, the word is applied to the above mentioned blackjack, treated by roasting and destructive distillation in combination with charcoal in a vessel from which the air is excluded. By access of air the metal burns and passes off in vapor which condenses as the white oxide, which is collected and forms a pigment known as zinc white.

**Blenheim**, a village situated in the circle of the Upper Danube, in Bavaria, on the Danube. Here was fought, Aug. 13, 1704, the famous battle of Blenheim (or, as it is more commonly called on the European Continent, the battle of Höchstädt, from another village of this name in the vicinity), in which Marlborough and Prince Eugene, commanding the allied forces of England and the German empire, gained a brilliant victory over the French and Bavarians. The latter armies were drawn into the engagement under the most unfavorable circumstances. Both these armies were posted, under the command of Tallard, Marsin, and the Elector of Bavaria himself, between the village of Blenheim and that of Kinzingen, behind the Nebelbach, a small stream emptying into the Danube, which was on their right flank. They amounted to 56,000 men, while the forces of Marlborough and Eugene were about 52,000. The first had thrown their troops chiefly into the two villages, which they considered as points of support for their wings, though they were at too great a distance in front of their main position. A large proportion of cavalry was in the center, since each army, the Bavarian as well as the French, had their horse on their wings, and in this way those of two wings must necessarily join each other. Both the commanders would undoubtedly have perceived and corrected this mistake, as Tallard had in Blenheim alone 27 battalions of infantry; but they expected so little to be attacked, that when the line of the allies began to move, Aug. 13, at two o'clock in the morning, they supposed them to be marching off. The greatest part of their cavalry was sent to forage. Even at seven o'clock, when the heads of the eight columns with which Eugene and Marlborough advanced toward the Nebelbach were to be seen, Tallard thought the whole a stratagem intended to cover the retreat; but he soon saw his error. The dispersed troops were recalled in the greatest hurry, and the cannon were drawn up in line. The French and Bavarians made



every exertion to prevent the passage of the enemy over the Nebelbach, and the capture of the two villages, the conquest of which was considered by Marlborough and Eugene as decisive. Their line of attack was uncommonly long, about  $4\frac{1}{2}$  miles. Marlborough, in order to secure his right wing, attacked Blenheim, but without success; he then changed his plan, and threw himself with his principal forces into the wide interval between the right wing and the center of the enemy, leaving only as many troops before Blenheim as were necessary to check the body which occupied this position. At five o'clock in the afternoon he succeeded, after great efforts, in passing the Nebelbach, by which his victory was decided. Tallard himself was among the prisoners; his son was killed. The consequences of the battle were decisive. Bavaria, as Marlborough had anticipated, fell into the power of Austria. Fortune deserted Louis XIV., as it did Napoleon after the battle of Leipsic, and though he was able to continue the war for almost 10 years longer, it was owing to the dissensions among the allies themselves, who contended about the best use of the victory till the opportunity to use it was lost.

**Blenheim**, the name of the demesne bestowed by national gratitude on the Duke of Marlborough; is situated in the parish of Woodstock, and county of Oxford. The estate of Woodstock, which had for many centuries belonged to the crown, having been conferred by Queen Anne on that great commander for his eminent services, Parliament granted the sum of £500,000 to erect a suitable family seat. The building was intrusted to Sir John Vanbrugh, and called Blenheim, from the village where the duke gained his great victory. The grand serjeantry by which the manor is held, consists in the presentation at Windsor Castle on each anniversary of that event, by the Duke of Marlborough and his descendants, of a flag embroidered with *fleurs-de-lis*. In this park once stood the royal palace of Woodstock, where Alfred is said to have resided, and which was the favorite residence of Henry II., who erected a house in the park for his favorite mistress, Rosamond Clifford, whence the well-known legend of Woodstock bower, Queen Eleanor, and the Fair Rosamond. Here the same monarch received the homage of Malcolm, King of Scotland, and Rhys, Prince of Wales. Edward III. was also much attached to this palace, in which his eldest son, the illustrious Black Prince, was born, as well as his youngest son, Thomas, Duke of Gloucester, usually called Thomas of Woodstock, from that event. Richard II. likewise kept his court here, at which time the poet Chaucer resided at Woodstock, in a house which stood near the present entrance to the park. When alarmed by the conspir-

acy of Sir Thomas Wyatt, Queen Mary placed her sister the princess, afterward Queen Elizabeth, in the palace at Woodstock, under the superintendence of Sir Henry Bedenfield. During the civil wars of the 17th century it was for some time defended for the king; but it ultimately surrendered, and was much injured and dilapidated by the Parliamentarians. The gate-house remained, and was tenanted as late as the reign of William III., and existed until the commencement of the 18th century, when the whole was removed.

The usual approach to Blenheim from Woodstock is through a triumphal arch or portal, from which the advance to the mansion is very fine. In front of the building stands a sculptured column 130 feet high, surmounted by a statue of the duke, whose victories and achievements are recorded on tablets round the base. The front of the house measures 348 feet from wing to wing, and although architectural critics find many faults in detail, the general effect is in the highest degree noble and commanding. The interior is also extremely magnificent; the hall, which is supported by Corinthian pillars, is 67 feet high; and the ceiling was painted by Sir James Thornhill, the design representing Victory crowning the duke. The gallery and bow-window room abound in portraits by the most eminent masters, both foreign and English. On the tapestry of the latter are figured the various battles gained by the same great general, and more especially that of Blenheim. The salon is a noble and spacious apartment, which communicates with the hall, and occupies the entire breadth of the center. The lower part is lined with marble, and six of its compartments are decorated with pictures by La Guerre, representing the inhabitants of the different nations of the world in appropriate costume. On the ceiling is a representation by the same artist, of the victorious duke arrested in his career by Peace and Time. The remaining principal subjects of admiration are the library, the theater, the state drawing-room, the blue and green drawing-room, the grand cabinet, the dining-room, etc. Many of the treasures of Blenheim have latterly been sold, including the splendid "Ansidei Madonna" of Raphael, acquired by the National Gallery for £70,000. In the chapel, which forms one of the wings, is a fine marble monument by Rysbrack, to the great duke and his almost equally celebrated duchess, Sarah. The gardens and grounds, which are exceedingly spacious, were laid out by Brown, who contrived to make a most admirable use of the small river Glyme in the formation of a lake, or piece of water, which is justly deemed one of the greatest beauties of the place. It is crossed by arches. At the grand approach is a magnificent bridge, the span of the center arch of which is 101 feet.



**Blennerhasset, Harman**, an Englishman of Irish descent, noted for his connection with Aaron Burr's conspiracy, born in Hampshire, Oct. 8, 1764 or 1765; was educated at Trinity College, Dublin; studied law; and came to the United States in 1797. In the following year he built a beautiful residence on a little island in the Ohio river, below Parkersburg, where Aaron Burr, after his fortunes were broken and he did not feel safe in New York, was received as a guest. Burr proposed his scheme for taking Mexico, where, in case of success, Burr was to be Emperor and Blennerhasset a duke and ambassador to England. Large sums were expended to fit out the expedition, and when Burr was arrested, and Blennerhasset as a suspected person with him, creditors seized the island and home, and Blennerhasset found himself bankrupt. After this, all projects failed with him. In his last years he was supported by the charity of a relative. He died on the island of Guernsey, Feb. 1, 1831. His wife was a daughter of Governor Agnew of the Isle of Man, and the author of many poems, including "The Deserted Isle," "The Widow and the Rock," etc. After her husband's death she petitioned Congress for a reparation of her losses, but died before any action was taken. Their son, Joseph Lewis Blennerhasset, was a lawyer in Missouri.

**Blennius**, a genus of spiny-finned fishes, the typical one of the family *Blenniidae*. The species are small, agile fishes of no economic value, often left behind in pools by the retreating tide. They have long dorsal and large pectoral fins, while their heads are often furnished with tentacles.

**Blere** (blā-rā'), a French town, in the Department of Indre-et-Loire, on the Cher, 15 miles E. S. E. of Tours. In the vicinity is the Château Chénonceaux, built in the time of Francis I., and still in excellent preservation. It was given by Henry II. to his mistress, Diana de Poitiers, who was dispossessed on the death of Henry by Catherine de' Medici. In the latter part of the 18th century, it was frequented by Fontenelle, Voltaire, Rousseau, and all the wits of the time.

**Blesbok**, a hartbeest of a general purplish color (*Alcelaphus albifrons*). See HARTBEEST.

**Blessed Thistle**, The English name of several thistles. (1) *Cnicus benedictus*, formerly called *C. centaurea benedicta*. It was once believed to destroy intestinal worms, to cure fevers, the plague, and even the most stubborn ulcers and cancers, an opinion for which there seems to have been no foundation whatever. (2) *Carduus benedictus* ["United States Pharmacopœia"],

the blessed thistle of modern medicine, in which it has an honorable place as a tonic and diaphoretic. (3) *Carthamus lanatus* is also thus called in some localities.

**Blessington, Margaret, Countess of**, an Irish author, born near Clonmel, Sept. 1, 1789. She was the daughter of Edmund Power, an improvident man of good family, and at the age of 15 was married to a Captain Farmer, who died in 1817; and a few months after his death his widow married Charles John Gardiner, Earl of Blessington. In 1822 they went abroad, and continued to reside on the Continent till the Earl's death in 1829, when Lady Blessington took up her abode in Gore House, Kensington. Her residence became the fashionable resort for all the celebrities of the time; and that notwithstanding a doubtful connection which she formed with Count D'Orsay, with whom she lived till her death. She contributed to the "New Monthly Magazine," "Conversations with Lord Byron;" wrote numerous novels, including "The Belle of a Season," "The Two Friends," "Strathern," and the "Victims of Society;" and acted as editor for several years of "Heath's Book of Beauty," the "Keepsake," and the "Gems of Beauty." She died in Paris, June 4, 1849.

**Blewfields**. See BLUEFIELDS.

**Blicher, Steen Steensen** (blich'er), a Danish poet and novelist, born in Viborg in 1782. His first work was a translation of "Ossian" (2 vols., 1807-1809), and his first original poems appeared in 1814, but attracted little notice. He quickly won a national reputation with his novels, and in 1842 appeared his masterpiece of novel writing, "The Knitting Room," a collection of short stories in the Jutland dialect. He died in 1848.

**Bligh, William** (bli), the commander of the English ship "Bounty" when the crew mutinied in the South Seas and carried her off, was born at Plymouth in 1753. The "Bounty" had been fitted out for the purpose of procuring plants of the bread fruit tree, and introducing these into the West Indies. Bligh left Tahiti in 1789, and was proceeding on his voyage for Jamaica when he was seized, and with 18 men supposed to be well affected to him, forced into the launch, sparingly provisioned, and cast adrift not far from the island of Tofoa (Tonga Islands), in lat. 19° S. and long. 184° E. By admirable skill and perseverance, though not without enduring fearful hardships, they managed to reach the island of Timor in 41 days, after running nearly 4,000 miles. Bligh, with 12 of his companions, arrived in England in 1790, while the mutineers settled on Pitcairn Island, where their descendants still exist. Bligh became Governor of New South



## Blighia

Wales in 1806, but his harsh and despotic conduct caused him to be deposed and sent back to England. He afterward rose to be Admiral, and died in London in 1817.

**Blighia** (named after Captain Bligh), a genus of plants belonging to the order *Sapindaceæ* (soapworts). *B. sapida* is the ash-leaved akee tree. Blighia is now considered only a synonym of *Cupania*.

**Blight**, a diseased state of cultivated plants, especially cereals and grasses. The term has been very vaguely and variously used, having, in fact, been applied by agriculturists to almost every disease of plants in turn, however caused, especially when the plant dies before reaching maturity.

**Blimbing**, the Indian name of the fruit of *Averrhoa bilimbi*, a small tree, family *Oxalidaceæ*, called also cucumber tree, the fruit being acid and resembling a small cucumber. The carambola is of this genus.

**Blind, Karl** (blēnd), a German author and revolutionist, born at Mannheim, Sept. 4, 1826; studied law at Heidelberg. For his share in the risings in South Germany in 1848 he was sentenced to eight years' imprisonment, but while being taken to Mainz was liberated by the populace. After the reaction had again triumphed over the Continent, Blind found an asylum first in Belgium, and afterward in England, where he took an active part in Democratic propaganda. An enthusiastic advocate of German freedom and unity, he promoted the Schleswig-Holstein movement. As an author he wrote much on politics, history and mythology, including lives of Ledru-Rollin, Deák, Freiligrath; also volumes and magazine articles on such subjects as "Fire Burial," "Yggdrasil," "Water Tales," "Shetlandic and Welsh Folklore," "The Siegfried Tale," and "The New Conflict in Germany." He died in 1907.

**Blind, Mathilde**, a German-English poet, born in Mannheim, March 21, 1847; went to England in 1849, and won fame by her writings, "The Prophecy of St. Oran, and Other Poems" (London, 1881); "Life of George Eliot" (1883); "Madame Roland" (1886); "The Heather on Fire," a tale (1886); "Ascent of Man" (1889); "Dramas in Miniature" (1892); "Songs and Sonnets" (1893), and "Birds of Passage" (1895). She died in London, Nov. 26, 1896.

**Blind, The.** Strictly speaking, the blind are those destitute of sight. As more popularly accepted, the term includes as well those whose vision is so defective that it cannot perform its normal function. As understood among the educational institutions for the blind established throughout the country, the term includes persons

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whose sight is so defective as not to permit of their education on equal terms with normal children in the ordinary public schools. Blindness may occur both before and after birth, but post-natal blindness is much more prevalent than ante-natal. In fact, cases of ante-natal blindness are rare. Hereditary blindness is infrequent, but cases occur as the result of the intermarriage of near relations, and of the marriage of serofulous or syphilitic parents. Cases of congenital blindness are said to be less frequent than those of congenital deafness, although why this should be seems hard for the layman to understand. Generally, in cases of post-natal blindness, the defect is caused by medical neglect, disease or accident. In recent years statutes have been enacted in a number of States for the better safeguarding of the eyes of newly born babes, and already it is getting to be a mooted question among the educators of the blind whether blindness is not actually decreasing among the young. It is very generally believed that blindness is in some degree balanced by a greater acuteness in the other senses, but this conclusion is not supported by the observation of the writer or by the testimony of others competent to testify. Only after years of careful training and patient practice is the sense of touch brought to the high degree of usefulness noticeable among the blind. The appearance of greater acuteness in this sense is caused by the acquired ability to develop concepts from it. In the matter of hearing they have no material advantage, although there can be no doubt that they are more alert for sounds than their more fortunate brethren. Their senses of taste and smell are not infrequently blunted, and, in some instances, almost destroyed.

The first public asylum for the blind was established in Paris by Louis IX., better known as "Saint Louis," about the middle of the thirteenth century. This institution, called "L'Hospice des Quinze-Vingts," was for the benefit of soldiers whose eyes had been impaired during the campaigns in Egypt. Later a number of sporadic attempts were made to ameliorate the condition of the blind, but the first of any educational importance was that of Valentine Haüy, a French philanthropist, who, in 1784, made the beginnings of an institution especially directed toward their education. Gradually the possibility of educating the blind into comparatively normal beings began to be realized elsewhere, and institutions of a restricted educational character, but with an educational aim, were established in the other countries of Europe, prominent among which were those in Amsterdam, Berlin, Brussels, Copenhagen, Dresden, Edinburgh, Liverpool, London and Vienna. Such institutions have become more and more educa-



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tional in character until now they may better be termed schools than asylums. In this country, New York, Boston and Pennsylvania established institutions for the blind in the early thirties. The beneficial effects of the work done by these schools was soon recognized, and other institutions were established from time to time, until now we have educational institutions for the blind in almost all the States of the Union. Some of these, as for instance, the New York Institution in New York City, and the Maryland School for the Blind at Baltimore, are legally private corporations, and although they receive money from the State, they are free from State control in their management. Some are purely State institutions, managed by the political body as other public utilities are. Others are controlled partially by the State, the property being held by a corporation, upon the directorate of which the State has a certain representation. The results that have been accomplished by these schools are well exemplified by some statistics taken in the State of Massachusetts in 1902, and published in the twenty-first number of the "Labor Bulletin" of the Commonwealth of Massachusetts. According to the figures given, there were at that time 3,983 blind persons in the State. Of these, 2,267 were males and 1,716 females. Of the males, 1,240, or 55 per cent., and of the females, 540, or 31 per cent., were entirely self-supporting; or, in other words, 45 per cent. of the blind population of the State of Massachusetts, including the aged and infirm, were self-supporting, and of the remaining 55 per cent. only 18 per cent. were found to be dependent on charity. Such figures speak worlds for the American system of education, which looks to broad intellectual and moral culture, health and physical development, love of industry and independence, rather than to mere mechanical acquirements. An eminent authority has said: "The institutions of America are not asylums, but in the truest sense of the word educational establishments in which the blind, without regard to their future, receive a thorough education. The blind in the United States are socially far above those of any other country; large numbers of them become eminent scholars and musicians, and even their blind workmen enjoy a degree of comfort unknown in England or on the Continent."

The devices for imparting knowledge to the blind differ from those used with persons endowed with sight. Those used by the blind must necessarily be adapted to the sense of touch. To this end several systems of raised or embossed letters have been designed for them, the number of which makes it remarkable that the blind have not long ago found themselves in the condition of the workmen on the Tower of Babel. The

## Blind

systems of printing in most common use are the old Line Letter, the Moon System, the Braille, the modified or American Braille and the New York Point System. Of all these, the last two present the strongest claims for recognition, and are destined to outlive the others. They may be written as well as read by the blind. They both consist of an arrangement of dots raised from the surface of the paper by the pressure of a pointed instrument on the opposite side. In the Braille systems the dots are in three lines, while in the New York Point System they are in two, and at the same time the combinations for the formation of letters and words are simpler. The latter system is purely an American product, having been invented and largely established through the efforts of Mr. William B. Wait, for many years the principal of the New York Institution for the Blind. The principal publishing house for the blind is in Louisville, Kentucky. It receives from the general Government an annual subsidy of ten thousand dollars. By it many publications have been issued, comprising books for academic use, books for general reading, even including many of light character, and books for students in music. By means of the stereograph, also invented by Mr. Wait, the various schools are enabled to prepare the metal plates for printing in embossed characters such books as they desire. Recently, "The Standard Intermediate School Dictionary of the English Language" has been transposed into the point system for the use of the blind. The magnitude of such a work will readily be understood when it is said that such a book, which in ordinary ink print comprises but one volume, in the most compact of the embossed or raised systems requires eighteen volumes. Notwithstanding the comparatively great cost of such books, they have been placed in circulation by a number of the libraries in the large towns, among which may be prominently mentioned the Congressional Library at Washington, and the Enoch Pratt Free Library at Baltimore. Dr. Bernard C. Steiner, the librarian of the latter institution, recently reported that he had upon his shelves more than 227 books printed in embossed type. In Maryland the State Library Commission has arranged that the blind throughout the State, as well as those of Baltimore City, may have the use of these books.

In conclusion, it may be interesting to give some of the statistics from the census of 1900, which Mr. King, the chief statistician, has been kind enough to furnish. There were found to be in the United States 35,645 totally blind and 29,118 partially blind persons. Of these, 37,054 were males and 27,709 were females; 56,535 were whites and 7,646 were blacks; 18,232 were not more than thirty years old, while 46,531 were



## Blind Fish

older than thirty years. The greatest number of blind persons were between seventy and seventy-nine years old. More than 40,000 of the entire number became blind after they were twenty years old.

G. C. MORRISON.

**Blind Fish**, the name of several species of fish, family *amblyopsidæ*, inhabiting the American cave streams. They are all small, the largest not exceeding five inches. In the typical species (*amblyopsis spelæus*) of the Mammoth Cave of Kentucky, the eyes are reduced to a useless rudiment hidden under the skin, the body is translucent and colorless, and the head and body are covered with numerous rows of sensitive papillæ, which form very delicate organs of touch.

**Blind Worm** (so called from the small size of its eyes), the English name of a reptile, the *anguis fragilis*, formerly considered a serpent, but now classed with the most aberrant of the lizards. It is more commonly called the slow worm. It is not venomous. It feeds on slugs.

**Bliss, Cornelius Newton**, an American merchant, born in Fall River, Mass., Jan. 26, 1833; was educated in New Orleans; entered his stepfather's counting room there; engaged in the commission business in Boston, and became head of the dry goods commission house of Bliss, Fabyan & Co., New York city, in 1881. He was a member of the Pan-American Conference; Chairman of the New York Republican State Committee in 1877-1878; and Treasurer of the National Republican Committee in 1892 and 1896; declined to be a candidate for Governor of New York in 1885 and 1891; and was Secretary of the Interior Department in President McKinley's cabinet in 1897-1898.

**Bliss, Daniel**, an American missionary, born in Georgia, Vt., Aug. 17, 1823; was graduated at Amherst College in 1852, and at the Andover Theological Seminary in 1855; was ordained a Congregational minister, Oct. 17, 1855; engaged in missionary work in Syria in 1855-1862; and in 1866 became President of the Syrian Protestant College of Beyrout. His publications include "Mental Philosophy" and "National Philosophy," both in Arabic.

**Bliss, Edwin Elisha**, an American missionary, born in Putney, Vt., April 12, 1817; graduated at Amherst College in 1837, and at Andover Theological Seminary in 1842; was ordained as a missionary in 1843, and joined the American Mission in Turkey, being stationed at Trebizond, 1843-1852; Marsovan, Armenia, 1852-1856; and at Constantinople after 1856. In addition to the ordinary work of a missionary he edited, 1865-1892, the "Messenger," published at Constantinople in the Turkish and

## Bliss

Armenian languages, and compiled a number of text books, notably the "Bible Handbook," in Armenian. He died in Constantinople, Turkey, Dec. 29, 1892.

**Bliss, Frederick Jones**, an American explorer, born in Mt. Lebanon, Syria, Jan. 23, 1859; son of Daniel Bliss; was graduated at Amherst College in 1880, and at the Union Theological Seminary in New York in 1887; was principal of the preparatory department of the Syrian Protestant College of Beyrout for three years; was appointed Explorer to the Palestine Exploration Fund in 1890, and is best known for his excavations and finds in Jerusalem in 1894-1897. Here he unearthed an ancient city wall with towers, beside streets, drains, stairways, churches and other structures. He has published "Mounds of Many Cities," "Excavations at Jerusalem," etc.

**Bliss, George**, an American lawyer, born in Springfield, Mass., May 3, 1830; was graduated at Harvard College in 1851; studied for two years in Berlin and Paris, and, after his return, read law principally at the Harvard Law School. He established himself for practice in New York city. In 1859-1860 he was private secretary to Governor Morgan; in 1861 was appointed to his staff; in 1862, became Paymaster-General of New York; and in that and the following year organized three regiments of United States colored infantry under instructions from the Secretary of War. In 1866 he was appointed attorney for the Metropolitan Boards of Excise and Health; in 1872, United States Attorney for the Southern District of New York, and in 1881, a special assistant to the United States Attorney-General for the prosecution of the Star Route postal cases. He drafted the New York charter of 1873; drew up the New York Consolidation Act, and was author of the first tenement house act for the city. He published three editions of the "Law of Life Insurance" and four editions of the "Annotated Code of Civil Procedure." He died near Wakefield, R. I., Sept. 2, 1897.

**Bliss, Porter Cornelius**, an American diplomatist, born in Erie county, N. Y., Dec. 28, 1838; was educated at Hamilton and Yale Colleges; became private secretary to James Watson Webb, United States Minister to Brazil; explored the Gran Chaco for the Argentine Government; compiled the various Indian dialects and investigated the antiquities of that region; and, in 1866, became private secretary to Charles A. Washburn, United States Minister to Paraguay. He was commissioned by President Lopez to write a history of Paraguay, and while doing so war broke out between that country and Brazil, and he was imprisoned and tortured on sus-



picion of being a Brazilian spy. It required the presence of an American squadron to effect his release. In 1870-1874 he was Secretary of the United States Legation in Mexico, and during that time made several archæological explorations, and wrote on the opportunities of American enterprise in that country. In 1874-1878 he was an associate editor of "Johnson's Universal Cyclopædia," and in 1879 went to South America as a correspondent of the New York "Herald." He died in New York, Feb. 2, 1885.

**Bliss, William Dwight Porter**, an American clergyman, born in Constantinople, Turkey, in 1856; was graduated at Amherst College in 1878, and the Hartford Theological College in 1882; was ordained a Congregational clergyman; became an Episcopal priest in 1887; organized the first Christian Socialist Society in the United States in 1889, and was President of the National Reform League. He edited "The Dawn" (1889-1896); "The American Fabian" (1895-1896), and the "Encyclopædia of Social Reform," and published "Handbook of Socialism."

**Blister**, a topical application, which, when applied to the skin, raises the cuticle in the form of a vesicle, filled with serous fluid, and so produces a counter irritation. The Spanish fly blister operates with most certainty and expedition, and is commonly used for this purpose, as well as mustard, hartshorn, etc.

**Blister Fly**, the name for any fly, using that term to designate any flying insect, which is employed in blistering. The more common blister flies are beetles, and they are in consequence sometimes called blister beetles. That most frequently employed by medical men for raising blisters on the skin is the *lytta vesicatoria*, formerly called *cantharis vesicatorius*. It feeds on the ash. It is indigenous in the South of Europe, and being, among other places, imported from Spain, is often called the Spanish fly.

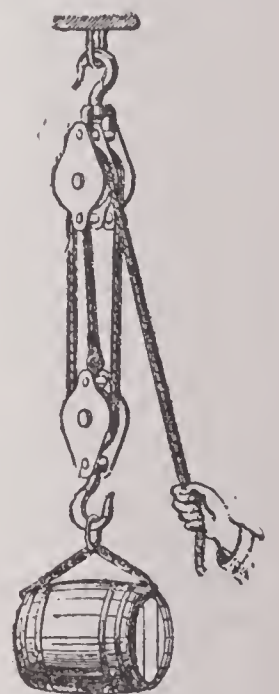
**Blister Steel**, steel of blistered appearance formed by roasting bar iron in contact with carbon in a cementing furnace. Two subsequent processes convert it into shear steel and cast steel.

**Blizzard**, a modern American word whose origin is in doubt. As applied to a severe snow storm the word came into general use in the American newspapers during the bitterly cold winter of 1880-1881, although some papers claim its use as early as the '70's. It is employed in the Western States to describe a peculiarly fierce and cold wind, accompanied by a very fine, blinding snow which suffocates as well as freezes men and animals exposed to it. These storms come up very suddenly and overtake the traveler without premonition. The sky becomes

darkened, and the snow is driven by a terrible wind which comes with a deafening roar. One of the most severe of these storms recorded in the West was that of January, 1888, which extended from Dakota to Texas. The thermometer in some places fell from 74° above to 28° below zero, and in Dakota to 40° below. The number of deaths amounted to 235. Children were frozen on their way home from school, and farmers in their fields, and travelers were suffocated by the fine snow. The blizzard which will long be remembered in the Eastern States began March 11, 1888, and raged until the 14th, New York and Philadelphia being the cities most affected. The wind at one time blew at the rate of 46 miles an hour. The streets and roads were blocked, railroad trains snowed up for days, telegraphic communication cut off, and many lives were lost.

**Bloch, Marcus Elieser** (blöch), a Bavarian ichthyologist, born in Anspach, in 1723. He settled in medical practice in Berlin, where his life was uneventful, and where he died, Aug. 6, 1799. He is chiefly remembered for his great work, the "Allgemeine Naturgeschichte der Fische" (12 vols., Berlin, 1782-1795, with 432 colored plates), long the most comprehensive work on ichthyology, and still valuable, especially for its illustrations.

**Block**, a pulley, or a system of pulleys rotating on a pintle mounted in its frame or shell with its band and strap. The pin or pintle of a block of pulleys is the axis or axle. It passes through the bushing of the shell and the coak of the sheave, and is generally of iron. The sheave or wheel is generally of lignumvitæ or of iron, and has around its circumference a groove for the rope, called the gorge. It has a bushing, called a coak, around the pintle hole. The space between the sheave and its block, through which the rope runs, is called the swallow or channel. It answers to the throat of some other machines; the pass in a rolling mill. The shell, pulley frame, or body of the block is made of a tough wood, or sometimes of iron; it has one or two grooves, called scores, cut on each end to retain the strap which goes around it. The shell is hollow inside to receive the sheave or sheaves, and has a hole through its center to receive the sheave pin, called the pintle; this is lined with bronze or gun metal, called a bouching or bushing.



BLOCK AND TACKLE.



## Blockade

When the shell is made of one piece, it is called a mortise block; when more than one are employed, it is termed a made block. The side plates of the shell are checks. The strap, strop, iron binding, grommet or cringle, is a loop of iron or rope, encircling the block, and affords the means of fastening it in its place. The hook of iron strapped blocks is frequently made to work in a swivel, so that the several parts of the rope forming the tackle may not become foul or twisted around each other. There are many kinds of blocks, as a pulley block, a fiddle block, a fish block, a fly block, a heart block, a hook block, etc. A block and tackle is the block and the rope rove through it, for hoisting or obtaining a purchase.

**Blockade**, the act of surrounding a city with a hostile army, or, if it be on the sea coast, of placing a hostile army around its landward side, and ships of war in front of its sea defenses, so as, if possible, to prevent supplies of food and ammunition from entering it by land or water. The object of such an investment is to compel a place too strong or too well defended to be at once captured by assault, to surrender on account of famine. The investment of a place by sea is to prevent any ships from entering or leaving its harbor. The practice seems to have been introduced by the Dutch about A. D. 1584.

To break the blockade is to forcibly enter a blockaded port, if not even to compel the naval force investing it to withdraw. To raise a blockade is to desist from blockading a place or to compel the investing force to do so. To run a blockade is to surreptitiously enter or leave a blockaded port at the risk of being captured.

As a blockade seriously interferes with the ordinary commercial right of trading with every place, international law carefully limits its operation, the principle adopted being this: that belligerents are not entitled to do anything likely to incommode neutrals more than it benefits themselves. Neutrals are, therefore, entitled to disregard a blockade except it be effective, that is, unless the town be invested by a fleet sufficient to prevent the ingress and the exit of vessels. When on Nov. 21, 1806, the Berlin decree of Napoleon I. declared the whole British Islands in a state of blockade, that blockade, being ludicrously ineffective, was illegal; so also, though to a somewhat less extent, were the British orders in council of Nov. 11 and 21, 1807, which placed France and all its tributary States in a state of blockade. The retaliatory Napoleonic Milan decree of Dec. 27, 1807, extending the previously announced blockade to the British dominions in all quarters, labored to a still greater extent under the same defect. More effective,

## Block System

as being more limited in area, were the blockades of the Elbe by Great Britain in 1803, that of the Baltic by Denmark in 1848-1849 and 1864, that of the ports of the Confederate States of America by President Lincoln on April 19, 1861, and that of the Cuban ports by the United States in 1898. A blockade should be formally declared before it is enforced, permission being granted to neutral vessels then to depart, carrying with them any cargo which they may already have on board; when it terminates, its cessation should also be formally declared. Any one running a blockade does so at his own peril; one's own government cannot by international law protect him from forfeiting his vessel with its cargo and his liberty, if he be captured by the blockading fleet.

**Block Books**, before, and for a short time after, the invention of printing, books printed from wooden blocks each the size of a page and having the matter to be reproduced, whether text or picture, cut in relief on the surface.

**Block House**, a fortified edifice of one or more stories, constructed chiefly of blocks or hewn timber. Block houses are supplied with loopholes for musketry and sometimes with embrasures for cannon, and when of more than one story the upper ones are made to overhang those below, and are furnished with machicolations or loopholes in the overhung floor, so that a perpendicular fire can be directed against the enemy in close attack. Block houses are often of great advantage, and in wooded localities readily constructed.

**Block Island**, an island in the Atlantic off the coast of Rhode Island, to which it belongs; named from Adrian Block, a Dutch navigator who discovered it in 1616. There is a lighthouse at its S. E. extremity visible 21 miles. The island forms the township of New Shoreham, esteemed as a summer resort.

**Block Printing**, the method of printing from wooden blocks (producing block books), as is still done in calico printing and in making wall paper. See PRINTING.

**Block System**, in railroad parlance, the division of a railroad into a certain number of telegraphic districts, the distance between which is determined by the amount of traffic, each block station having signaling instruments by which the signal man can communicate with the operator on each side of him. When a train enters any block a semaphore signal is lowered, and no train is allowed to follow until the one in front has reached the end of the block, when the signal is raised and at the same time lowered for the block ahead, etc. The block systems used in Europe and in the United



## Blocks of Five

States generally employ mechanical and electrical devices for lowering and raising the signal.

**Blocks of Five**, a political expression in the United States, that originated in the presidential campaign of 1888. A letter purporting to have been written by the treasurer of the Republican National Committee to the Chairman of the Indiana State Committee, recommended securing "floaters in blocks of five." This was construed to mean the bribery of voters at wholesale rates. The Democratic managers circulated the letter as widely as possible, before election. Proceedings for libel were afterward begun but never brought to trial.

**Blodgett, Lorin**, an American physicist, born near Jamestown, N. Y., May 25, 1823; was educated at Hobart College; appointed Assistant Professor at the Smithsonian Institution, Washington, D. C., in charge of researches on climatology, in 1851; was employed on the Pacific Railroad Survey for the War Department in 1852-1856; and was engaged in the United States Treasury Department in 1863-1877. He was also editor of the "North American" of Philadelphia, and secretary of the board of trade of that city from 1858-1864. He is credited with having laid the foundation of American climatology. His publications include "The Climatology of the United States" (1857), a work that met high favor both in the United States and Europe; "Commercial and Financial Resources of the United States;" and about 150 volumes of reports and statistics. He died in Philadelphia, Pa., March 24, 1901.

**Blodgett, Samuel**, an American inventor; born in Woburn, Mass., April 1, 1724. He took part in the French and Indian War; was a member of the expedition against Louisburg, in 1745; and subsequently became a judge of the Court of Common Pleas, in Hillsboro county, N. H. He was the inventor of an apparatus by which he recovered a valuable cargo from a sunken ship near Plymouth, Mass., in 1783. His success led him to go to Europe for similar enterprises. He met with no encouragement in Spain, and in England proposed to raise the "Royal George," which went down off Spithead with 600 persons on board, but his proposition was not accepted. In 1793 he began the construction of the canal around Amoskeag Falls in the Merrimac which now bears his name, but did not live to complete the work. He died in Haverhill, Mass., Sept. 1, 1807.

**Blodgett, Henry Williams**, an American jurist, born in Amherst, Mass., July 21, 1821; was educated at Amherst Academy; studied surveying and engineering; was admitted to the bar in 1844; and settled in Waukegan, Ill., to practice, in the following

## Blois

year. He served in the Lower House of the Legislature in 1852-1854, and in the State Senate in 1859-1865; and was United States District Judge for the Northern District of Illinois from 1869 till 1893, when he retired. He was appointed one of the counsel on the part of the United States before the Arbitration Tribunal on the Bering Sea fur seal controversy between the United States and Great Britain, in 1892. He died Feb. 9, 1905.

**Bloede, Gertrude** (blè'dè), a German-American poet and novelist, better known as STUART STERNE, born in Saxony, Germany, 1845. She has written in verse "Angelo" (new ed. 1879), "Giorgio and Other Poems" (1881), etc.; and "The Story of Two Lives," a novel.

**Bloemfontein** (blèm-fon'tin), city and capital of the former Orange Free State (name changed by the British, May 29, 1900, to Orange River Colony), South Africa; on the Modder river, 200 miles W. by N. of Durban, the base of British operations in the war against the Boers. It occupies an elevated site; is connected with Natal and Cape Colony by telegraph; and is the seat of an Anglican bishopric, and a college. In the war between Great Britain and the South African and Orange Free State Republics in 1899-1900 it was the seat of important military operations. In June, 1899, a conference was held here between President Krüger of the South African Republic and Sir Alfred Milner, the British Commissioner of Cape Colony, with a view of averting war. After the appointment of Lord Roberts to the supreme command of the British forces operating against the Boers, he led an expedition against the city and forced its surrender on March 13, 1900, President Steyn escaping capture. Soon afterward the part of the republic occupied by the British was formally placed under British administration.

**Blois** (blwä), the capital of the French Department of Loire-et-Cher, 99 miles S. S. W. of Paris, on the Loire. It consists of an upper town, a lower town, and several suburbs, with one of which it communicates by a stone bridge of 11 arches. The old castle, which has played an important part in French history, was restored by the Government in 1845. The main entrance is by a fine Gothic portal opening into a quadrangle, on the E. side of which is a pillared cloister, on the N. a pile of buildings in the Renaissance style, on the W. some unfinished buildings, and on the S. is the ancient part begun by the Dukes of Orleans. There is also a cathedral of late date, the Church of St. Nicholas (12th century), a bishop's palace, Roman aqueduct, etc. The castle was long occupied by the counts of the name; and became a favorite residence of



## Blommaert

the kings of France. Louis XII. was born, Francis I., Henry II., Charles IX., and Henry III. held their courts in it.

**Blommaert, Philipp** (blom'märt), a Flemish poet, historian and dramatist, born in Ghent, Aug. 27, 1809. His great ambition was to make his native Flemish tongue a literary language, and to unify the people who wrote and spoke it. His works include "History of the Belgian Lowlanders," a specimen of stately prose; "Theophilus," a poem; and "Old Flemish Ballads." He died in Ghent, Aug. 14, 1871.

**Blond, Jacques Christophe le**, a German miniature painter and originator of color printing, born in Frankfort-on-the-Main, in 1670. He spent the most of his life and all his means in comparatively unsuccessful experiments in printing engravings in color, and in attempts to reproduce the cartoons of Raphael in tapestry. He died in Paris, in 1741.

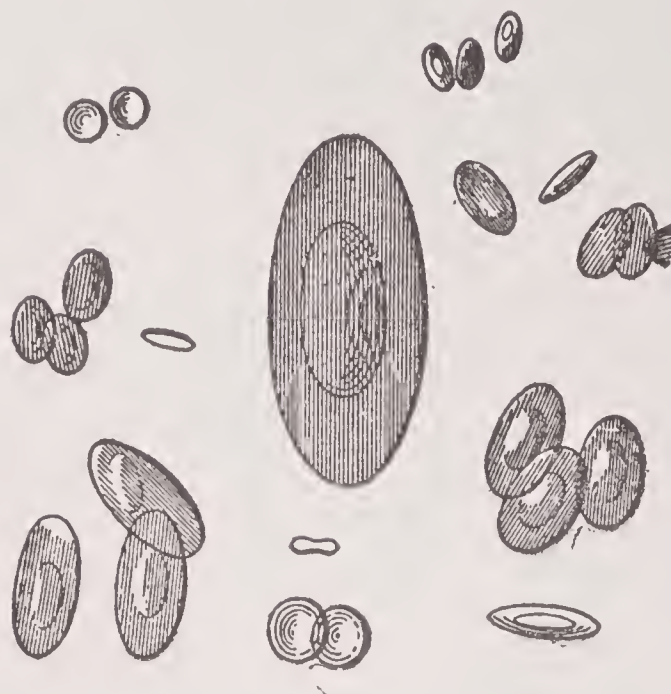
**Blondel**, a French minstrel and poet of the 12th century, a confidential servant and instructor in music of Richard Cœur de Lion. While his master was the prisoner of the Duke of Austria, Blondel, according to the story, went through Palestine and all parts of Germany in search of him. He sang the king's own favorite lays before each keep and fortress till the song was at length taken up and answered from the windows of the castle of Loewenstein, where Richard was imprisoned. This story is preserved in the "Chronicles of Rheims" of the 13th century. The poems of Blondel, with all the legendary and historical data relating to him, were published by Prosper Tarbé (Rheims, 1862).

**Blondin, Charles**, a French rope dancer, born at St. Omer, Pas-de-Calais, in 1824, was trained at Lyons, where he made such rapid progress that he was designated "The Little Wonder." After making a several years' tour of the United States, on June 30, 1859, before a crowd of 25,000 persons, he crossed the Falls of Niagara on a tight-rope in five minutes; on July 4, he crossed blindfold, trundling a wheelbarrow; on Aug. 19, he carried a man on his back; on Sept. 14, 1860, he crossed on stilts in the presence of the Prince of Wales. His engagement at the Crystal Palace in 1862, where he performed on a rope 249 yards long, and 170 feet from the ground, drew immense crowds. After several years' retirement, he reappeared in 1880, and in 1888 again performed in London, where he died, Feb. 22, 1897.

**Blood**, the red circulating fluid in the bodies of man and the higher animals. It is formed from chyle and lymph when these substances are subjected to the action of oxygen taken into the lungs by the process of inspiration. It is the general material from which all the secretions are derived,

## Blood

besides which it carries away from the frame whatever is noxious or superfluous. In man its temperature rarely varies from



BLOOD CORPUSCLES.

36.6° C.=98° F., but in birds it sometimes reaches 42.8° C.=109° F. The blood in reptiles, amphibia, and fishes, and the circulating fluid in the invertebrata, is cold, that is, in no case more than a little above the temperature of the surrounding medium. The vessels which conduct the blood out of the heart are called arteries, and those which bring it back again veins. The blood in the left side of the heart and in the arteries, called arterial blood, is bright red; that in the right side of the heart and in the veins, called venous blood, is blackish purple. Viewed by spectrum analysis, the hæmoglobin of arterial blood differs from that of venous blood, the former being combined with oxygen and the latter being deoxidized. The density of blood is 1.003 to 1.057. Its composition in 1,000 parts is as follows:

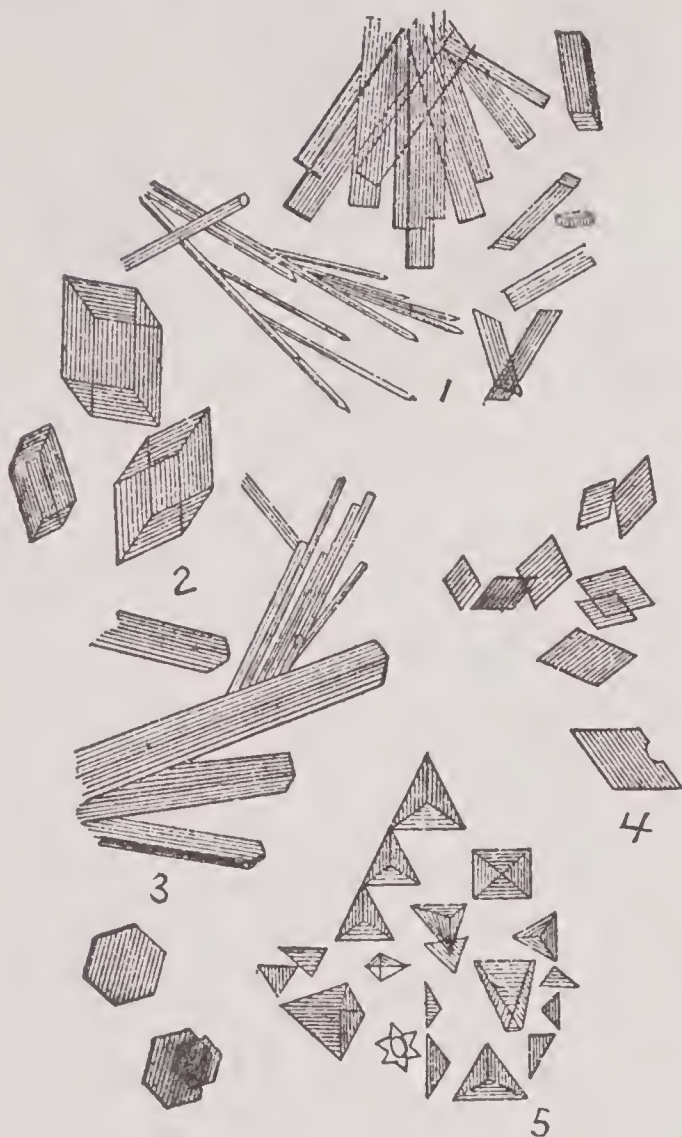
|  |                   |
|--|-------------------|
| Water.....   | 780.15 to 785.58  |
| Fibrine .....  | 2.10 to 3.57      |
| Albumen .....  | 65.09 to 69.41    |
| Coloring matter.....   | 133.00 to 119.63  |
| Crystallizable fat .....   | 2.43 to 4.30      |
| Fluid fat .....  | 1.31 to 2.27      |
| Extractive matter of uncertain kind.....   | 1.79 to 1.92      |
| Albumen with soda.....   | 1.26 to 2.01      |
| Sodium and potassium chlorides, carbonates, phosphates and sulphates .....                   | 8.37 to 7.83      |
| Calcium and magnesium carbonates, phosphates of calcium magnesium and iron ferric oxide .... | 2.10 to 1.42      |
| Loss .....   | 2.40 to 2.59      |
|  | <hr/> 1,000 1,000 |

Blood has a saline and disagreeable taste, and, when fresh, a peculiar smell. It has an alkaline reaction. It is not, as it appears, homogeneous, but under a powerful



## Blood

microscope is seen to be a colorless fluid with little, round red bodies called blood disks or blood corpuscles, and a few larger ones called white corpuscles floating about in it. When removed from the body and allowed to stagnate it separates into a thicker portion called cruor, crassamentum or clot, and a thinner one denominated serum. See BLEEDING: BLOOD LETTING: BLOOD STAINS, etc.



BLOOD CRYSTALS.

1. Human. 2. Hamster. 3. Cat. 4. Human.  
5. Guinea Pig. 6. Swine.

In law, whole blood is descent not simply from the same ancestor, but from the same pair of ancestors, while half blood is descent only from the one. Thus in a family two brothers who have the same father and mother stand to each other in the relation of whole blood, but if the mother die, and the father marry again and have children, these stand to the offspring of the first marriage only in the relation of half blood. The corruption of blood is the judicial stripping it of the right to carry with it up or down the advantage of inheritance; its purification or restitution is the restoration to it of the privilege of inheritance.

**Blood, Thomas** (commonly called Colonel Blood), born in Ireland about 1618, was a disbanded officer of Oliver Cromwell, and lost some estates in Ireland at the

## Blood Letting

Restoration. His whole life was one of plotting and adventure, though it is probable that he acted a double part, keeping the Government informed of so much as might secure his own safety. His most daring exploit was an attempt to steal the crown jewels (May 9, 1671) from the Tower. He was seized with the crown in his possession, but was not only pardoned by Charles, but obtained forfeited Irish estates of £500 annual value. He died in London, in 1680.

**Blood Bird** (*myzomela sanguinolenta*), an Australian species of honey-sucker, so called from the rich scarlet color of the head, breast and back of the male.

**Blood, Council of**, the name popularly applied to the Council of Troubles, established by the Duke of Alva, in the Netherlands, in 1567. Although it had no charter nor authority from any source, it was omnipotent and superseded all other authorities. In the first three months alone its victims numbered 1,800, and soon there was hardly a Protestant house in the Netherlands that had not furnished a victim.

**Blood Flower**, the English name of the *hæmanthus*, a genus of plants belonging to the order *amaryllidaceæ* (amaryllids). The allusion is to the brilliant red flowers. The species, which are mostly from the Cape of Good Hope, are ornamental plants.

**Blood-hound**, a variety of hound or dog, so called from the ability which it possesses to trace a wounded animal by the smell of any drops of blood which may have fallen from it. It is the *canis familiaris*, variety *B. sagax*, of Linnæus, now called variety *sanguinaria*. It is the sleuth-hound of the Scotch. It has large, pendulous ears, a long curved tail, is of a reddish tan color, and stands about 28 inches high. The breed is not now often pure. It was formerly employed to track escaped prisoners and other fugitives from justice. There are other sub-varieties, especially the Cuban blood-hound, used in the Maroon wars in Jamaica during the 18th century, as well as more recently against escaped negro slaves in the swamps of the South before the abolition of slavery in the United States, and finally the African blood-hound, used in hunting the gazelle.

**Blood Indians**, a tribe of North American Indians of the Siksika Confederacy, dwelling in the Northwest Territories of Canada; known also as Kino Indians.

**Blood Letting**, a method of relieving the human system in states of general or local plethora by the abstraction of blood. General plethora is best treated, according to this method, by withdrawing a considerable quantity of blood from the arteries (arteriotomy) or veins (venesection). Local engorgement, or hyperæmia, of a part



## Blood Letting

is usually treated by abstracting blood from the smallest sized vessels, or capillaries, present in the skin, by the methods of scarification or leeching. In these cases, the removal of blood from the superficial textures diverts the blood stream in part from underlying tissues, and thus reduces the tendency to inflammatory action in the deeper structures. In general blood letting the object is to reduce the strength of the blood stream throughout the whole system, and thus to diminish the acuteness of feverish conditions. The most usually employed method of accomplishing this is by the opening of one of the superficial veins of the arm, and allowing a sufficient quantity of blood to escape from the blood vessel thus operated upon. The vein chosen for the operation is generally one of those near the front of the elbow joint, which can be conveniently reached in this region without disturbing the patient, and which can be closed after the operation by applying a dressing with the elbow bent when the operation is completed. In performing the operation, it is first essential to make the vein stand out clearly under the skin, and to do so it is necessary to remember that the veins return the blood from the extremities to the trunk, and, therefore, that pressure must be applied constricting the arm above the elbow, thus causing the veins to swell from retardation of the blood flow within their walls. A bandage is thus tied tightly around the middle of the upper arm, and, as a result of its action, the veins in front of the elbow joint commence to swell and stand out as blue cords, distinctly to be seen through the delicate skin of this region. Selecting the largest of these swollen veins, the operator places his left thumb upon it immediately below the point where he desires to open it. This prevents any backward flow of the blood in the vein, and renders it yet more distinct at the point where it is to be opened. Now taking a sharp lancet in his right hand, the surgeon pushes its point steadily downward through the skin into the blue column that marks the position of the vein, taking care, however, only to divide its outer wall and not to transfix it completely. Having by this means made a slit about half an inch long in its outer wall, he withdraws the instrument and removes his left thumb from the vein. A steady flow of dark blood now takes place from the wound; this is received into a graduated glass vessel, by which the operator may gauge accurately the amount of blood removed. Should the flow of blood tend to diminish, the patient is requested to grasp some hard object tightly with the hand of the side operated upon, and an immediate increase will occur in the blood flowing from the wound. When a sufficiency of blood has been abstracted by

## Blood Root

this means, the operator places a large and firm pad of lint over the wounded vein, and bending the arm at the elbow to a right angle, bandages it firmly in that position, observing especially that the pad of lint is tightly pressed against the wound in the skin. When the bandaging is complete, and only then, the constricting band around the upper arm may be removed. There is danger in removing it earlier, since air may enter at the wound in the vein; and, being sucked upward into the chest may cause sudden cessation of the heart's action, and a considerable risk of immediate death. On account of this danger, it is not advisable for unskilled persons to attempt the operation. When the bandage and pad are firmly applied, and when the constricting band is removed, the patient's arm is placed in a sling and kept at rest for a week, when the wound in the skin and the vein is generally healed, and the patient may be permitted to use his arm again without incurring any risk. In children the veins in the arm are too small to be operated on satisfactorily, hence the external jugular vein of the neck must be selected in such cases; but the danger of the entrance of air is still greater in this region than in the arm; the operation should, therefore, be reserved for very urgent cases, and only performed with the utmost caution. The amount of blood actually abstracted in blood letting must depend on the age of the patient and the nature of the case. The operation would be scarcely necessary if less than a quarter of a pint is to be removed, and it is now rare to remove more than one pint at one operation, however severe the case in which it is employed. See BLEEDING.

**Blood Poisoning**, a name loosely used of pyæmia and allied diseases. It is also used popularly in a wider sense for the results on the human system of poison germs from malaria, bad drains, etc.; or for the condition of the blood caused by such ailments as Bright's disease of the kidneys, etc.

**Blood Rain**, rain nearly of the color of blood, and which many of the unscientific suppose to be actual blood. It arises either from minute plants, mostly of the order *algæ*, or from infusorial animaleulæ. It is akin to red snow, which is similarly produced. The word also applies to a bright scarlet alga or fungus, called *palmella prodigiosa*, sometimes developed in very hot weather on cooked vegetables or decaying fungi.

**Blood Root** (*sanguinaria canadensis*), a plant of Canada and the United States, belonging to the poppy order, and so named from its root stock yielding a sap of a deep orange color. Its leaves are heart shaped and deeply lobed, the flower grows



on a scape and is white or tinged with rose. The plant has acrid narcotic properties, and has been found useful in various diseases. *Geum canadense*, another American plant used as a mild tonic, is also known as blood-root.

**Blood Stains, Detection of**, an important subject in connection with forensic medicine. On criminal trials the guilt of prisoners has frequently been established by the discovery of these stains. The following scheme shows the various methods employed in the investigation: Visual—aided by (a) ordinary lens; (b) microscope; (c) spectroscope; (d) artificial light. Chemical — (a) heat—positive (1, change of color; 2, coagulation); (b) ammonia—negative; (c) hæmatin test; (d) guaiacum test.

Blood, when liquid, stains all articles with which it comes in contact. It sinks into woven textures and such material as soft wood, but on metallic surfaces and on hard woods it forms a film of greater or less thickness, and quickly dries. At first it is of a reddish brown color, but in the course of a few weeks this deepens and becomes almost black. Looked at with a lens of low power—say 10 or 20 diameters—the blood, if in any quantity, and coagulated, and if it has not sunk into the texture of the cloth, is observed to present an irregular surface, and entangled in it have frequently been detected foreign materials which have afforded a clue to the culprit, and to the manner in which the crime has been committed. Thus hairs, fragments of cotton, epithelial scales from the throat, and minute fragments of bird's feathers have often been noted. This preliminary investigation concluded, the attempt is now made to discover the peculiar corpuscles of the blood (see BLOOD). This is a matter of great difficulty when the blood has stained such articles as linen or cotton stuffs and become dry, but when spilt on hard surfaces, or when it is in such quantity as to form a distinct coagulum, the corpuscles are generally easily determined by the following process. The object is, by breaking up the coagulum to dissolve out the corpuscles in some medium as nearly as possible of the same density as the *liquor sanguinis* of the circulation. Numerous media, have, from time to time, been proposed, such as solutions of sugar, phosphate of soda, iodide of potassium, etc., but the one generally employed is a solution of glycerine in water of specific gravity 1.028. If this solution be applied, for example, to the stained blade of a knife, or if a minute portion of dried blood clot be gently dissolved in it, a reddish fluid is obtained which under a high power of the microscope (300 diameters) rarely fails to exhibit numerous corpuscles which by their peculiar appearance are at once recognized to be mammalian blood

disks. In the case of stained linen, etc., there is greater difficulty. The stained portion must be thoroughly moistened with the solution, and then squeezed over a glass rod. When the reddish fluid reaches the surface, it must be removed with the blade of a knife, placed on glass, and submitted to the microscope. By this simple process, unless the stain be of great age, its character is determined. Human blood in these circumstances, however, cannot be distinguished from the blood of the other members of the great class of the mammalia, with the solitary exception of the camel tribe, which present an oval blood corpuscle.

Of late years, the interesting fact has been discovered that blood possesses a distinct spectrum, so that it is possible to determine that a reddish fluid is really blood, although the corpuscles may not have been discovered owing to their accidental destruction. The stained portion of cloth or a portion of blood clot is digested in distilled water, and, as the result, a liquid of a reddish color is obtained. This should be placed in a deep, narrow cell and examined by a spectroscopic eye-piece with a low power of the microscope. Two dark bands make their appearance, one in the middle of the green rays, and the other at their junction with the yellow. These are highly characteristic of the presence of the blood of some red blooded animal.

Lastly, under this head of the visual detection of blood, the presence of blood stains may unexpectedly be discovered with artificial light, by examining the furniture and especially the walls of an apartment on which blood has fallen. During the day the spots of blood remain undetected, but at night, and with artificial light, they are clearly visible. It is especially on papers with dark blue figuring that this interesting fact has been observed.

The chemical relations of blood are very definite. All stains due to blood are soluble, and this fact enables us at once to distinguish them from insoluble stains which closely resemble them, and which have frequently been mistaken for them, such as paint and iron mold. The stain to be examined is cut out and suspended by means of thread in a glass tube filled with distilled water. Should the stain be at all recent, it immediately dissolves, and long filmy streaks of coloring matter are discharged and descend in wavy lines to the bottom of the tube, where ultimately a stratum of reddish fluid of greater or less intensity is collected. The clear supernatant fluid is poured off, and the colored portion is divided into two parts. One part is boiled, and if the fluid contain blood, the following peculiar changes take place. The color is discharged, the redness disappears and gives way to a grayish green, and in



## Blood Stone

addition a distinct coagulum is formed. Both these changes are highly characteristic of blood. Should some liquor potassæ be now added, the coagulum is redissolved, and shows a green color by reflected light. This may be described as a positive test of the presence of blood. The action of ammonia supplies us with a valuable negative one. If this volatile alkali be added to a solution of blood, no change of color is produced. All other soluble stains are more or less altered in color, such as those from the juices of fruits, etc., which have frequently been mistaken for blood, and thus have given rise to grave suspicions. Experiments were made in France to form a fluid which in its chemical reactions, it was expected, could not be distinguished from blood. Mixtures of madder and other coloring matters with white of egg were proposed, but while they coagulated with heat, there was no alteration in the color of the liquid. If a particle of dried blood can be removed from a weapon or any surface, an attempt may be made to prove that it is blood by the formation of blood or hæmatin crystals. The procedure is as follows: the particle is placed on a microscopic glass slide and moistened with glacial acetic acid. The glass is now gently heated over a spirit lamp, when ebullition occurs, the blood particle dissolves, and ultimately a reddish brown stain is left. If this stain is examined by the microscope, peculiar prismatic crystals are visible among the dried debris.

Lastly, in several interesting medico-legal cases where it was suspected that articles of clothing had been washed in order to obliterate the traces of blood, its presence has been determined by its reaction with the resin of guaiacum. On the suspected site of the blood stain are placed a few drops of a spirituous solution of guaiacum freshly prepared. The resin is at once observed to separate on the surface of the cloth; if to this is now added a small quantity of peroxide of hydrogen, a beautiful sapphire blue color is struck.

Such are the chief means employed to detect blood. It is important to remember that they do not enable us to distinguish human from other mammalian blood — with the exception already mentioned — nor arterial from venous, nor male from female, nor adult from that of the young; but the blood disks of birds and cold blooded animals generally, from their size and other peculiarities, cannot be mistaken for those of man.

**Bloodstone**, a jaspery variety of quartz of a dark green color, variegated with red spots, like drops of blood. It is frequently made into seal and ring stones, and other small ornamental articles. Certain kinds of hematitic iron ore were called blood-

## Blood=vessels

stones by the ancients because, as Theophrastus says, they seemed “as if formed out of concerted blood.” At the present day the term is more especially restricted to the hard and compact hematite, which is made into burnishers, and which possesses the valuable property of laying on gold or silver leaf without fraying or tearing it; it should be of a deep red color, free from flaws, close-grained, and susceptible of a fine polish.

**Blood=vessels**, the tubes or vessels in which the blood circulates. They are divided into two classes — arteries and veins — which have two points of union or connection — the first in the heart, from which they both originate, and the other in the minute vessels or network in which they terminate. The arteries arise from the heart and convey the blood to all parts of the body; the veins return it to the heart. The arteries distribute throughout the body a pure red blood, for the purposes of nourishment; while the veins return to the heart a dark-colored blood more or less loaded with impurities and deprived of some of its valuable properties. But this is not returned again to the body in the same state. For the heart is wisely divided into two portions or sides, a right and left, one of which receives the impure blood from the veins and sends it to the lungs to be defecated and freshly supplied with oxygen or vital air, while the other receives the pure red blood from the lungs, and circulates it anew through the arteries. The arteries arise from the left ventricle of the heart by one large trunk nearly an inch in diameter. This is gradually subdivided into smaller ones, as it proceeds toward the limbs, till they terminate at last in vessels so small as to be almost invisible, and in a fine network of cells extending through the whole body, in which the blood is poured out, and nutrition, or the increase of the body, takes place, and from which the residue is taken up by the small veins, to be returned to the heart. The arteries and veins are widely different in their structure as well as their uses. The former are composed of very strong, firm, elastic coats or membranes, which are four in number. The external covering and the internal lining of the arteries, though belonging to different classes of membranes, are both very thin and soft. The second coat is very thick, tough, and elastic, being that which chiefly gives their peculiar appearance to the arteries. The third is formed of fibers, apparently muscular, arranged in circular rings around the tube of the vessels. It is well known that the pulse of the heart is felt in the arteries alone, though in the bleeding of a vein we sometimes see the blood start as if in unison with the beating of the heart. The pulse is produced by the wave or stream of blood which is driven by the heart through the arteries, distending



and slightly elevating them, after which they instantly contract from their elasticity, and thus force the blood into the smaller vessels. The pulse varies in its character with the general state of the health. When arteries are cut or wounded the firmness of their coats prevents their closing, and hence arises the fatal nature of wounds of large vessels, which will remain open till they are tied up, or till death is produced.

The veins commence in small capillary tubes in every part of the body, and by their gradual union form large trunks till they at last terminate in two (one ascending from the lower parts of the body, the other descending from the head and arms), which pour their contents into the heart. Their structure is much less firm than that of the arteries. They are very thin and soft, consisting of only two thin coats or membranes. The inner or lining membrane is frequently doubled into folds, forming valves, which nearly close the passage in the veins, and thus give very material support to the blood as it is moving up in them toward the heart. These valves are not found in the veins of the bowels, the lungs, or the head. The number of the veins is much greater than that of the arteries, an artery being often accompanied by two veins. They differ also in this, that while the arteries are deeply seated in the flesh, to guard them from injury, the veins are very frequently superficial, and covered only by the skin. The veins, it is well known, are the vessels commonly opened in blood-letting, although in cases which render it necessary a small artery is sometimes divided.

There are two portions of the venous system which do not correspond exactly with our general description; these are the veins of the bowels and of the lungs. The former circulate their blood through the liver before it returns to the heart, and the latter, the pulmonary veins, convey red blood from the lungs to the heart. It should also be mentioned that the large vein which brings back the blood from the lower part of the body, receives from the lymphatic and lacteal vessels the chyle from the bowels which supplies the waste of the blood and nourishes the body, and the serous and other watery fluids which are taken up by the absorbents in all parts of the body. See HEART.

**Blood Wood**, a name of several trees. Indian blood wood (*Lagerstræmia reginæ*), is a large tree of the henna family, with wood of a blood-red color, used for many purposes. It is called also jarool.

**Blood Wort**, same as blood root (*sanguinaria*).

**Bloody Assizes**, the name given by the people to those courts which were held in England by the infamous Judge Jeffreys,

in 1685, after the suppression of the Duke of Monmouth's rebellion. Upward of 300 persons were executed after short trials; very many were whipped, imprisoned and fined; and nearly 1,000 were sent as slaves to the American plantations.

**Bloody Falls**, the lowest cataract of the Copper Mine river in the Northwest Territories of Canada; so named because of a massacre here of Eskimos by Chippewa Indians, in 1770.

**Bloody Mary**, an epithet popularly applied to Mary, Queen of England, on account of the persecutions of the Protestants during her reign.

**Bloom**, a lump of puddled iron, which leaves the furnace in a rough state, to be subsequently rolled into the bars or other material into which it may be desired to convert the metal. Also a lump of iron made directly from the ore by a furnace called a bloomery.

**Bloomer, Amelia Jenks**, an American reformer, born in Homer, N. Y., May 27, 1818; was married in 1840 to Dexter C. Bloomer, of Seneca Falls, N. Y., where for several years, she and her husband were engaged in publishing a semi-monthly periodical. In 1849 she began publishing "The Lily" in the interests of temperance reform and women's rights; in 1853, on removing to Mt. Vernon, O., she resumed its publication there, and also became associate editor of "The Western Home Journal." In 1855 the couple removed to Council Bluffs, Ia., where Mr. Bloomer became an organizer of the Republican Party in that State, and a Federal official and a judge. She carried on for many years her reformatory work. Mrs. Bloomer will be remembered longest because of her personal adoption and her active advocacy of a costume of a short skirt and Turkish trousers, which had been devised by Mrs. Elizabeth Smith Miller, and which became more popularly known as the Bloomer costume. She died in Council Bluffs, Ia., Dec. 30, 1894.

**Bloomfield**, a township in Essex co., N. J.; on the Delaware, Lackawana and Western and the Erie railroads, the Morris canal, and trolley lines connecting with Newark, the Oranges, Jersey City, and other cities; 10 miles N. W. of New York. It was founded in 1685, under the name of Watsession, and received its present name from Gen. Joseph Bloomfield, in 1796. The oldest church in the town dates from this year. Bloomfield once ranked as an educational center. Here were located in addition to other similar institutions, the Bloomfield Classical School, Madam Cooke's Female Seminary, and a Presbyterian Theological Seminary, the edifice of the latter being now occupied by a German Theological Seminary. It has a fine Mountainside Hos-



## Bloomfield

pital; contains the residences of many New York business men; and is engaged in the manufacture of church, and cabinet organs, woolen goods, hats, shoes, rubber goods, tissue and photographic paper, saddlery, hardware, electric elevators, and a variety of brass goods. It has a National bank, daily and weekly newspapers, an assessed property valuation of nearly \$4,000,000, and a total debt of about \$250,000. Pop. (1890) 7,708; (1900) 9,668; (1910) 15,070.

**Bloomfield, Maurice**, an American educator, born in Bielitz, Austria, Feb. 23, 1855; came to the United States in 1857; entered the University of Chicago, and was graduated at Furman University, in Greenville, S. C., in 1877; took a course in Sanskrit and comparative philology in Yale College, in 1877-1878; and was a fellow of Johns Hopkins University in 1878-1879. He continued his studies in Berlin and Leipzig, in 1879-1881; became an Associate in Johns Hopkins University in 1881; and subsequently Professor of Sanskrit and Comparative Philology there. He published numerous grammatical and philological papers; edited for the first time from the original Sanskrit MSS. the "Supra of Kan-eika;" translated the "Atharva-Veda" in the "Sacred Books of the East;" and in 1900 was engaged in compiling a "Concordance of the Vedas."

**Bloomfield, Robert**, an English poet, born at Honington, Dec. 3, 1766. Apprenticed to a shoemaker in London, he



ROBERT BLOOMFIELD.

chanced upon odd volumes of the poets, and thus was awakened his native poetic genius. He first came into public notice with "The Milk Maid," and good fortune attended his "The Sailor's Return." He essayed a longer flight in "The Farmer's Boy" (1800), by which he established his title to rank among the minor poets. He died in Shefford, in 1823.

**Bloomington**, city and county-seat of McLean co., Ill.; on several important railroads; 60 miles N. N. E. of Springfield. It is the seat of the Illinois Wesleyan University (Methodist Episcopal), a Roman Catholic College, two hospitals, three sanitariums, and the general offices of the Chicago and Alton railroad. The Illinois

## Blount

State Normal University and the State Soldiers' Orphans' Home are located at Normal, two miles from the city. Bloomington has electric light and street railway plants, waterworks supplied from an artesian well, public library, 3 National banks, railroad shops, and manufactories of machinery, stoves, farming implements, patent medicines, brick and tile, etc. Pop. 20,484; (1900) 23,286; (1910) 25,768.

**Bloomington**, city and county-seat of Monroe co., Ind.; on the Louisville, New Albany, and Chicago railroad; 60 miles S. S. W. of Cincinnati. It is in a limestone and quarrying region; is the seat of the Indiana State University; and besides its farming and quarrying interests has important manufacturing concerns, especially in the lines of leather and hardware. The city has the Monroe County Library, a National bank, several daily and weekly periodicals, and a property valuation of over \$1,500,000. Pop. (1890) 4,018; (1900) 6,460; (1910) 8,838.

**Bloomsburg**, a town and county-seat of Columbia co., Pa.; on the Susquehanna river, the Pennsylvania canal, and several railroads; 40 miles W. of Wilkesbarre. It is in an iron and limestone region; contains a number of iron furnace foundries, silk mills, brass and copper tube works, furniture and desk factories, carpet factories, etc.; is the seat of the State Normal School and a literary institute, and has an assessed property valuation of about \$2,500,000. Pop. (1900) 6,170; (1910) 7,413.

**Blouet, Paul** (blö-ā'), (MAX O'RELL), a French lecturer and author, born in Brittany, France, March 2, 1848. During his early life he was an officer of cavalry in the French army, but in 1873 went to England and became a teacher. After the publication of his first book, "John Bull and His Island" (1883), he abandoned teaching and devoted himself to literature. He made several lecturing tours of the United States. Works: "John Bull and His Daughters" (1884); "Jonathan and His Continent" (1888, with Jack Allyn); "A Frenchman in America" (1891); "John Bull & Co." (1894). He died May 24, 1903.

**Blount, Charles**, an English deist, born in Holloway, London, April 27, 1654. He became noted for his contributions (often but flippant) to the political, literary, and theological controversies of the times, some of his works being "Anima Mundi," a translation of the first two books of "Apollonius Tyanæus," "Great is Diana of the Ephesians," "Janua Scientiarum," and "Vindication of Learning." His miscellaneous works, with preface by Gildon, appeared in 1695. Despairing of marriage with his deceased wife's sister, he died by his own hand in 1693.



**Blount, James H.**, an American legislator, born in Macon, Ga., Sept. 12, 1837. He made his first appearance in public affairs in 1872, when he was elected to Congress from the Sixth District of Georgia. He held his seat by successive re-elections till 1893, when he declined a further term. As he finished his last term the House paid him the unusual honor of suspending its proceedings to give the members an opportunity to testify to their appreciation of his worth. In his last term he was Chairman of the Committee on Foreign Affairs, and his familiarity with American relations with other countries led President Cleveland to appoint him a Special Commissioner to Hawaii in March, 1893, for the purpose of investigating the deposition of the royal government and the establishment of the American protectorate over the kingdom. On his arrival in Honolulu he at once caused the American flag to be hauled down from the Provisional Government House, and the United States marines to be withdrawn from the locality. This proceeding led to considerable excitement in the United States; the withdrawal of United States Minister Stevens from Honolulu; the appointment of Commissioner Blount as his successor; and a renewal both in Washington and Honolulu of the agitation for the annexation of Hawaii to the United States. On the completion of his mission he resumed practice. He died March 8, 1903. See HAWAII.

**Blow Fly**, the name popularly given to such two winged flies as deposit eggs in the



BLOW FLY.

flesh of animals, thus making tumors arise. Several species of musca do this, so do breeze flies, etc.

**Blowing Machine**, an apparatus for producing an air blast for metallurgical purposes. The earliest blowing machine was, doubtless, some form of the common bellows.

**Blowing Engines**.—For blast furnaces and for Bessemer steel converters, blowing engines of large size are employed. In the former, the strength of the blast sometimes is as high as 10 pounds per square inch.

For the Bessemer converter, where a much greater pressure is required, it occasionally reaches 30 pounds per square inch. A blowing engine consists of a steam cylinder, an air cylinder, and a large air chamber, to insure a uniform blast. Sometimes the latter is dispensed with, and large main pipes used instead. The blowing cylinder is of cast iron, with an air tight piston, which, as it ascends and descends with the motion of the engine, alternately inhales and expels the air at each end. To effect this, a series of valves are provided, and these are arranged as follows: Inlet valves are placed on the top of the cylinder, and also on three sides of the box, but on the fourth side there are two outlet valves. These valves consist of numerous openings, against which leather flaps lie when they are shut. Valves of a similar nature are placed at the bottom of the cylinder. When the piston descends, it would create a vacuum in the upper portion of the cylinder, provided there were no openings in it; but the external air pressing on the inlet valves, opens them, and fills the space above the piston; at the same time, the outlet valves, which only open outward, are tightly closed by the air pressing inward from the pipe. Again, when the piston ascends, it compresses the air above it, and exactly reverses the action of the valves; that is to say, it shuts the inlet valves, opens the outlet valves, and allows the compressed air to pass along the outlet pipe, which is made of large size, so as to offer as little resistance as possible to the passage of the air. The valves at the bottom of the cylinder work exactly in the same way, the inlet valves opening when the piston ascends, and shutting when it descends, thus compelling the inhaled air to pass into the pipe, by the lower outlet valves. The air is conducted by the pipe into a receiver of large capacity, which serves to equalize the blast before it passes to the tuyers. A blast engine at Shelton Ironworks, in England, with a blowing cylinder 8 feet 4 inches in diameter, has a 9-foot stroke, working with 186 horse power, and making 32 single strokes of the piston per minute, inhales 15,700 cubic feet of atmospheric air per minute; but this is compressed by the blowing cylinder to a pressure of 3 pounds per square inch above the atmosphere, which reduces the volume supplied by the cylinder to 13,083 cubic feet. Its volume, however, is largely increased again, when raised to the hot blast temperature, before entering the furnace.

**Trompe**.—In the Catalan forges of Spain, the South of France, and some parts of the United States, there is a very ingenious water blowing machine in use called a trompe; but it can only be advantageously



## Blowing Machine

employed where a fall of a few yards of water is available. A cistern to act as a reservoir for the water; pipes (generally two in number), through which it descends; and a wind chest to allow the air and water to separate, constitute the essential parts of the apparatus. It is put in operation by lifting the wedge with a lever; this allows the water to rush down the pipe, and, in doing so, draws in air through sloping holes, called aspirators, at the throat of the pipe. A continuous current of water and air is thus supplied to the wind chest, which is provided with an opening for the escape of the water, while the air passes out in a regular stream by the nozzle pipe. The height from which the water falls determines the tension of the blast; but the height seldom exceeds 27 feet, which gives a pressure of from  $1\frac{1}{2}$  to 2 pounds to the square inch. The separation of the air from the water is greatly promoted by the current impinging on the platform.

*Fans.*—The fan is another machine for producing blasts of air. It is employed for such purposes as the melting of pig iron in foundries and for forge fires. It is also used as an exhaust to withdraw foul air from mines, public buildings, and ships. For mines it is occasionally of a very large size. The winnowing of corn is another application of it. The common blast fan is like a wheel with the arms tipped with vanes or blades, instead of being joined by a rim, and it is placed usually in an eccentric position, inside a chest, with central openings on each side for the admission of air. It is generally driven by steam power, and as it revolves, air is sucked in at the center, drawn toward the tips, and impelled forward through the exit pipe. Blast fans seldom exceed 3 feet in diameter. The number of revolutions made per minute ranges from 700 to 1,800; but the pressure of the fan blast does not usually go beyond 6 ounces per square inch for ordinary foundry cupolas. Schiele's fan has numerous curved blades, and is nearly noiseless. It does not require much power to drive it, and has been very much used. Lloyd's fan has also curved blades, but they are fewer in number than in Schiele's.

*Rotary Pressure Blowers.*—These are machines introduced in comparatively recent years. They act by regular displacement of the air at each revolution, since their pistons or drums closely fit their cases. In this respect they differ from fans, because, although there were no outlet for the blast, a fan could be kept revolving, but in such a case a pressure blower would stop. The rotary blower of Roots, of Connersville, Ind., is one of the best known, and is now very largely used for producing blasts in metallurgical operations, as well as for other purposes, in the United States

## Blowpipe

and Europe. Its most improved form consists of a pair of horizontal shafts traversing a case of the form of two semi-cylinders, separated by a rectangle equal in depth to the diameter of the semi-cylinders, and in width to the distance between the centers of the shafts. These shafts carry a pair of solid arms or pistons, the relative positions of which are maintained by external gearing at both ends provided with safety coverings. Each has a section somewhat resembling the figure "8" and the action of which, as they revolve, takes the air in by an aperture at the bottom of the machine, and expels it with considerable pressure, if required, at the top. It gives a much greater pressure of blast than is attainable by the fan. Another machine of this kind, designed by J. G. Baker, of Philadelphia, is employed for the same purposes as Root's. It has a central drum with two vanes fairly fitting the two ends and the bored semi-cylindrical top of the case. Two lower drums, crescent shaped in section, work by external gears at double the velocity of the central drum, the vanes of which move successively through the opening in each of the lower drums. The latter turn so as alternately to form abutments to prevent escape of air from either the entrance or delivery side. These rotary blowers produce blasts from a few ounces up to 3 pounds per square inch.

**Blowitz, Henry Georges Stephane Adolphe Oppen de**, a French journalist, born in Pilsen, Austria, Sept. 28, 1832; settled in France; was successively appointed Professor of German in the Lycée of Tours and at Limoges, Poitiers, and Marseilles; was naturalized a French citizen in 1870; and became the Paris correspondent of the London "Times" in 1871. He was noted for his success in obtaining secret and important information long before it was ready for official promulgation; and for his personal interviews with the most eminent men of the time in Europe. Many of his disclosures in his letters to the "Times," such as the text of the Treaty of Berlin, which he forwarded before it had been signed, created much excitement throughout Europe. He contributed more than 4,000 columns to the "Times;" was made an officer of the Legion of Honor, an officer of the Institute of France, and a doctor of philosophy; and published several works on the affairs of Europe. He died Jan. 18, 1903.

**Blowpipe**, a small instrument used in the arts for glass blowing and soldering metals, and in analytical chemistry and mineralogy, for determining the nature of substances by the action of an intense and continuous heat. Its utility depends on the fact, that when a jet of air or oxygen is thrown into a flame, the rapidity of com-



bustion is increased, while the effects are concentrated by diminishing the extent or space originally occupied by the flame.

The blowpipe generally consists of a conical tube of metal, about eight inches long, closed at the wider or lower end, but open at the narrow or upper end, which latter constitutes the mouthpiece, and is turned over to admit of the lips closing perfectly round it. Near the lower end, a small tube, fitted with a small platinum tip, is inserted in the large tube—the space below being intended as a chamber for condensing the moisture of the breath, and through this tip, a fine current of air can be projected against the flame experimented with.

The use of the mouth blowpipe, so as to sustain a prolonged steady blast, requires some skill, and is at first very fatiguing to the learner. In breathing, the manipulator involuntarily closes the back of the mouth, retaining in the expanded

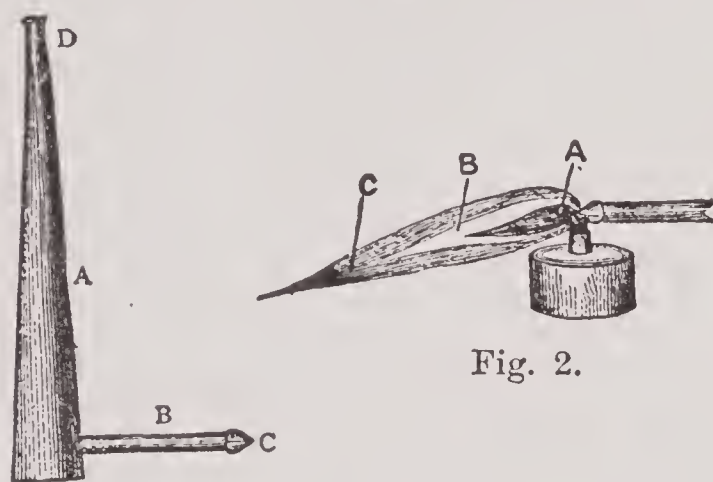


Fig. 1.

BLOWPIPE.

Fig. 1.—A, conical tube. B, small tube. C, platinum tip. D, mouth piece.

Fig. 2.—Blow-pipe in use. A-B, oxidizing flame. C, reducing flame.

cheeks sufficient air to last till the lungs have been replenished through the nose. Where high temperatures are required mechanical blowpipes are resorted to.

When a current of air from the blowpipe is directed against a candle or gas jet, the flame almost entirely loses its luminosity, owing to the perfect combustion of the gases evolved from the source of heat, and is projected in a lateral direction, as a long, pointed cone, consisting of three distinct parts. The first or central cone is of a dark blue color, and there the combustion is complete from the excess of air thrown in from the small nozzle. The second cone, or that immediately surrounding the first, is somewhat luminous; and here the oxygen being insufficient for the combustion of the carbon, any metallic oxide subjected to the action of this portion of the flame is deprived of its oxygen, and reduced to the condition of metal; for this reason the

luminous cone is generally termed the reducing flame of the blowpipe. Beyond the second cone, or where the flame comes freely in contact with the atmosphere, and abundance of oxygen is present to effect complete combustion of the gases, is a third, or pale yellow envelope, containing excess of atmospheric air at a very high temperature, so that a portion of metal, such as lead or copper, placed at this point, becomes rapidly converted into its oxide; this outer part of the flame is on this account called the oxidizing flame of the blowpipe.

Substances under examination before the blowpipe are generally supported either on wood-charcoal or platinum—the latter in the condition of wire or foil. In applying the blowpipe test, the body to be examined is either heated alone, or along with some flux or fusible substance; this being added, in some cases, for the purpose of assisting in the reduction of metals from their ores and other compounds: in others, for the production of a transparent, glassy bead, in which different colors can be readily observed. When heated alone, a loop of platinum wire, or a piece of charcoal, is generally employed as a support; the former when the color of the flame is to be regarded as the characteristic reaction, the latter when such effects as the oxidation or reduction of metallic substances are to be observed.

The following are examples of the difference in color communicated to the flame by different substances: Salts of potash color the flame violet; soda, yellow; lithia, purplish red; baryta, yellowish green; strontia, carmine; lime, brick red; compounds of phosphoric acid, boracic acid, and copper, green. The commonly occurring metallic oxides reducible by heating on charcoal alone in the inner flame of the blowpipe are the oxides of zinc, silver, lead, copper, bismuth, and antimony; the principal ores not so reducible are the alkalis and alkaline earths, as also the oxides of iron, manganese, and chromium. The fluxes generally used in blowpipe experiments are either carbonate of soda, borax (biborate of soda), or the ammonia phosphate of soda, otherwise called microcosmic salt. The carbonate of soda, when heated on platinum wire in the oxidizing flame, forms with silica a colorless glass; with oxide of antimony, a white bead, etc. The following metals are reduced from their compounds when heated with carbonate of soda on charcoal in the inner flame of the blowpipe: viz., nickel, cobalt, iron, molybdenum, tungsten, copper, tin, silver, gold, and platinum. When compounds of zinc, lead, bismuth, arsenic, antimony, tellurium, and cadmium are similarly treated, these metals are also formed, but being volatile,



## Blowpipe

pass off in vapor at the high temperature to which they are exposed.

Borax, as a flux, is generally mixed with the substance under examination, and placed on platinum wire. When thus heated in either of the flames, baryta, strontia, lime, magnesia, alumina, and silica yield colorless beads; cobalt gives a fine blue color; copper, a green, etc. With microcosmic salt, the results obtained are generally similar to those with borax, and need not be especially mentioned, as the test is applied in the same way. The blowpipe has been long used by goldsmiths and jewelers for soldering metals, and by glass blowers in fusing and sealing glass tubes, etc.; it has also been applied in qualitative analysis for many years, but more recently chemists (especially Plattner) have devoted their attention to its use, and have even employed it with great success in quantitative chemical analysis; the advantages being that only a very small quantity of material is required to be operated upon, while the results may be obtained with great rapidity and considerable accuracy.

The oxyhydrogen blowpipe is an arrangement by which a jet of oxygen and hydrogen, in the proportions to form water, is ignited and directed against any object. The most intense heat is produced, most of the metals being volatilized when placed in it, and even the diamond changes into ordinary carbon, and is burned when exposed to its flame. When a cylinder of quicklime is heated by it, a most dazzling light is produced, rivalling the electric light in brilliancy, and known as the calcium light.

**Blowpipe**, a kind of weapon much used by some of the Indian tribes of South America, both in war and for killing game. It consists of a long, straight tube, in which a small poisoned arrow is placed, and forcibly expelled by the breath. The tube or blowpipe, called *gravatána*, *pucuna*, etc., is 8 to 12 feet long, the bore not generally large enough to admit the little finger. It is made of reed or of the stem of a small palm. Near Pará, it is in general very ingeniously and nicely made of two stems of a palm (*iriartea setigera*) of different diameters, the one fitted into the other. In some places the inner tube is formed of the thin stem of a reed, protected by an outer one of this palm. A sight is affixed to it near the end. The arrows used in that district are 15 to 18 inches long, made of the spines of another palm, sharply pointed, notched so as to break off in the wound, and their points covered with curari poison. A little soft down of the silk cotton tree is twisted round each arrow, so as exactly to fit the tube. In Peru, arrows of only 1½ to 2 inches long are used, and

## Blücher

a different kind of poison seems to be employed. An accidental wound from one of these poisoned arrows not infrequently proves fatal. In the hand of a practiced Indian, the blowpipe is a very deadly weapon, and particularly when directed against birds sitting in the tops of high trees. As his weapon makes no noise, the hunter often empties his quiver before he gathers up the game, and does more execution than an English sportsman could with his double barreled fowling piece. In Borneo, the Dyaks have a similar blowpipe called a *sumpitan*. It, however, has an iron spear head tied on the end so that it can be used as a spear. It is employed both in war and hunting. Small arrows, which have on their end a piece of pith adapted to the bore of the tube, are used. These are pointed with sharp fish teeth and poisoned with upas. They are blown with great accuracy; and if the upas juice is fresh, a wound from an arrow, fired at a distance of 40 yards, proves fatal to man.

**Blubber**, the fat of whales and other large sea animals, from which train oil is obtained. The blubber lies under the skin and over the muscular flesh. It is eaten by the Eskimos and the seacoast races of the Japanese Islands, the Kuriles, etc. The whole quantity yielded by one whale ordinarily amounts to 40 or 50, but sometimes to 80 or more hundred weights.

**Blücher, Gebhard Leberecht von** (blü-cher), a distinguished Prussian General, born at Rostock, Mecklenburg-Schwerin, Dec. 16, 1742. He entered the Swedish service when 14 years of age and fought against the Prussians, but was taken prisoner in his first campaign, and was induced to enter the Prussian service. Discontented at the promotion of another officer over his head, he left the army, devoted himself to agriculture, and by industry and prudence acquired an estate. After the death of Frederick II. he became a Major in his former regiment, which he commanded with distinction on the Rhine in 1793 and 1794. After the battle of Kirrweiler in 1794 he was appointed Major-General of the Army of Observation stationed on the Lower Rhine. In 1802, in the name of the King of Prussia, he took possession of Erfurt and Mühlhausen. Oct. 14, 1806, he fought at the battle of Auerstädt. After the Peace of Tilsit he served in the Department of War at Königsberg and Berlin. He then received the chief military command in Pomerania, but at the instigation of Napoleon was afterward, with several other distinguished men, dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher,



then 70 years old, engaged in the cause with all his former activity, and was appointed commander-in-chief of the Prussians and the Russian corps under General Winzingerode. His heroism in the battle of Lützen (May 2, 1813), was rewarded by the Emperor Alexander with the Order of St. George. The battles of Bautzen and Hanau, those on the Katzbach and Leipsic, added to his glory. He was now raised to the rank of Field-Marshal, and led the Prussian army which invaded France early in 1814. After a period of obstinate conflict the day of Montmartre crowned this campaign, and, March 31, Blücher entered the capital of France. His King, in remembrance of the victory which he had gained at the Katzbach, created him Prince of Wahlstadt, and gave him an estate in Silesia. On the renewal of the war in 1815 the chief command was again committed to him, and he led his army into the Netherlands. June 15 Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In this engagement his horse was killed, and he was thrown under his body. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and taking Napoleon in the rear and flank assisted materially in completing the great victory of Belle Alliance or Waterloo. He was a rough and fearless soldier, noted for his energy and rapid movements, which had procured him the name of Marshal Vorwärts (Forward). He died at Krieblowitz, Silesia, Sept. 12, 1819.

**Blue**, one of the seven colors into which the rays of light divide themselves when refracted through a glass prism, seen in nature in the clear expanse of the heavens; also a dye or pigment of this hue. The blue pigments in common use by artists are few in number, and consist of native and artificial ultramarine, cobalt, indigo, and Prussian blue. Genuine ultramarine, prepared from the mineral lapis lazuli, and ordinary cobalt blue, sold for artists' work, are permanent colors. They are used either alone, or mixed with other pigments, chiefly for skies and distances in landscape, and by themselves, or to make up grays and other mixed tints in figure painting. Owing to the exceptionally high price of real ultramarine, the artificial color, which is of doubtful permanency, is usually substituted for it. Prussian blue and indigo are highly useful colors, since it is only these that yield dark blues, and only from them, mixed with yellows or browns, that strong greens can be obtained. It is unfortunate accordingly that both are more or less fugitive. All the blues above named are used both in oil and water color painting, but indigo less than the others in oil, since it is most apt to fade in that medium.

A number of different names are used in commerce for what is essentially the same pigment, or for pigments closely resembling one another. The following statement gives some explanation of these: Cobalt blues are mixtures of cobalt with earthy or metallic bases, which have been subjected to the action of heat, and have received the following names: Cobalt blue, cerulean blue, royal blue, Dumont's blue, Saxon blue, Thénard's blue, Leithner's blue, Hungary blue, Zaffre or enamel blue, Vienna blue, azure blue, and Paris blue. The last name is also applied to a Prussian blue, and azure is also given to a variety of ultramarine blue. Smalt is a powdered cobalt glass used in illumination and flower painting. Artificial ultramarine is also called French ultramarine, French blue, new blue, and permanent blue. Coarse qualities of this color are largely used by house painters. Intense blue is a refined indigo. Prussian blue (sesqui-ferrocyanide of iron) is otherwise named Berlin blue, Paris blue, and ferrocyanide of iron. The name Paris blue is also given to a cobalt color. Antwerp blue is a variety of Prussian blue made lighter by the addition of an aluminous base, and not so permanent. Blue ochre (hydrated phosphate of iron) is a subdued permanent blue, but not much employed. Blue verditer is a hydrated oxide of copper which changes and ultimately blackens by time. It is used in distemper work and paper staining.

**Blue, Victor**, an American naval officer, born in Marion, S. C., Dec. 6, 1865; entered the United States Naval Academy in 1883; was commissioned a passed naval cadet in 1887; transferred to the Engineer Corps in 1889, and promoted to Ensign, Dec. 12, 1892. After serving on the "Alliance" and "Thetis" he was assigned to duty at the Naval Academy in 1896, and early in 1898 was promoted to Lieutenant, junior grade. Soon after the declaration of war against Spain he was promoted to full Lieutenant, and was assigned to the gunboat "Suwanee." During the bombardment of the harbor defenses of Santiago de Cuba, Commander Delehanty of the "Suwanee," being ordered by Rear-Admiral Sampson to get positive assurance of the presence of the Spanish ships under Cervera in the blockaded harbor, assigned the task to his second officer, Lieutenant Blue. The latter landed at Aservaderos and went inland to the camp of the insurgent General, Rabi, who furnished him with a guide and a mule and sent him on to an insurgent post nearer Santiago. There he found three other guides with whom he made his way through the Spanish lines to a hill top overlooking the bay, where he discovered the vessels as was supposed. He was back at Rabi's camp the next evening and reported on the



## Blue Beard

"Suwanee" the following morning after a daring journey of 72 miles through the enemy's country. For this feat he was highly commended both by Rear-Admiral Sampson and the Secretary of the Navy. He subsequently made a second trip into the interior, on a confidential mission to the insurgent General, Gomez. After the war he was presented with a gold medal by the women of South Carolina and with a handsome sword by the Legislature of his native State.

**Blue Beard**, the name of the blood thirsty husband in the familiar tale of "Blue Beard," best described in Perrault's "Tales" (1697). The original of this monstrous personage was a character celebrated in Breton legend, Gilles de Laval, Baron de Retz (1396-1440), famous in the wars of Charles VII. According to tradition he used to entice the children of peasants into his castle, and there sacrifice them to the Devil and practice sorcery with their remains. After 14 years of such a course he grew so bold that his crimes were discovered, and a heap of children's bones found in his castle. He was condemned to death, strangled, and his corpse burned at the stake at Nantes in 1440. Another Breton legend represents de Retz with a red beard about to marry a beautiful girl after having already made away with seven wives. The bride expostulates at the altar. De Retz offers her fine clothes, castles, all his possessions, finally his body and soul. "I accept!" shrieks the bride, turning into a blue devil and making a sign which transforms de Retz's beard from red to blue. Henceforth he belonged to Hell, and became the dread of the country round, under the name of Blue Beard. Frescoes of the 13th century have been found in Morbihan, Brittany, representing scenes from the similar legend of St. Trophime. The story of Blue Beard has been the subject of numerous plays.

**Bluebell** (so called from the color and shape of the flowers), the English name of the plant genus *agrophis*, and especially of the wild hyacinth (*agrophis nutans* of Link, *scilla nutans* of Smith, *hyacinthus nonscriptus* of Linnæus). The bluebell of Scotland is the round leaved bell flower or harebell (*campanula rotundifolia*).

**Blue Berry**, a name given in the United States to the genus *vaccinium*, that which contains the bilberry, called in Scotland the blae berry (*vaccinium myrtillus*). The commonest species are *V. pennsylvanicum* and *V. resinsum*.

**Blue Bird**, a beautiful bird, the *sylvia sialis* of Wilson. Its whole upper parts are sky blue, shot with purple, with its throat, neck, breast, and sides reddish chestnut, and part of its wings and its tail feathers

## Bluefields

black. It is about 7½ inches long. It has a soft, warbling note, which is one of the first harbingers of spring.

**Blue Book**, a printed volume, issued by authority of the British Parliament containing a report. This application of the term has since been extended to include a great variety of English Governmental publications, reports and documents. The origin of the term is sufficiently obvious, blue covers having characterized the Parliamentary reports in England for centuries. In the United States and in many English colonies, the word blue book is sometimes employed in a sense akin to that attached to it in the mother country.

**Blue Bottle**, a two-winged fly, *musca (lucilia) caesar*, the body of which has some faint resemblance to a bottle of blue glass. Also the *centaurea cyanus*, more fully named the corn blue bottle, from its being found chiefly in corn fields. It belongs to the order *asteraceæ* (composites), and the sub-order *tubulifloræ*. It is from 2 to 3 feet high, with florets of the disk, which are small and purple, and those of the ray few, larger and bright blue. It is common in the United States and Europe.

**Blue Disease**, a condition in which the most prominent symptom is a peculiar discoloration of the skin and mucous membranes, due to the circulation of dark or venous blood in the vessels. It is also called cyanosis.

**Blue Eye** (*centomyza cyanotis*), a beautiful little bird, abundant and very generally dispersed in New South Wales, although not found in Victoria. It is one of the honey eaters, or honey suckers, and is sometimes called the blue cheeked honey eater. It seeks its food almost exclusively among the blossoms and small leafy branches of gum trees, and finds it partly in insects and partly in nectar, though perhaps also in berries. It is a bold and spirited bird, of most elegant and graceful movements. Numbers are often seen together clinging and hanging in every variety of position, frequently at the extreme ends of the small thickly flowered branches, bending them down with their weight.

**Bluefields**, town, seaport, and capital of the former Mosquito Indian Reservation; now the Department of Zelaya, Nicaragua, on the Atlantic coast near the mouth of the Bluefields river, and 165 miles E. of Managua. The reservation lies along the Atlantic coast extending S. almost to Graytown, one of the termini of the projected Nicaragua canal. For many years Great Britain maintained a protectorate over the reservation, which at one time belonged to Honduras. The interest of the United



## Blue Fish

States in the proposed interoceanic canal long ago gave its people much concern about the future of the reservation and its capital. In 1893, when the war broke out between Nicaragua and Honduras, the United States Government sent a war vessel to Bluefields to protect the large American commercial interests there. Early in the following year Nicaragua took possession of the town and proclaimed martial law. Chief Clarence protested to Great Britain against the usurpation of his rights and British war vessels were sent to the reservation and re-established Clarence in authority. During 1893-1896 the reservation and its capital were the subjects of much controversy between the United States, Great Britain, Nicaragua, and the natives of the reservation. On Nov. 20, 1894, a convention of Mosquito delegates agreed to submit to the authority and laws of Nicaragua and changed the name of the reservation to the Department of Zelaya in honor of the President of Nicaragua. The deposed Chief, Clarence, was taken from Bluefields to Jamaica in a warship and has since lived there under an allowance of the British Government.

**Blue Fish**, a species of *coryphæna* found in the Atlantic; also, a fish like a mackerel but larger, found on the Atlantic coast, and sometimes called horse mackerel and salt water tailor.

**Blue Gowns**, the name commonly given to a class of privileged mendicants in Scotland. The proper designation of these paupers was the King's Bedesmen, or Beads-men. In ancient times, a beadsman was a person employed to pray for another. From practices of this kind, there sprang up a custom in Scotland of appointing beadsmen with a small royal bounty, who ultimately degenerated into a class of authorized mendicants. Each of the beadsmen on his majesty's birthday received a gown or cloak of blue cloth, with a loaf of bread, a bottle of ale, and a leathern purse containing a penny for every year of the king's life. Every birthday, another beadsman was added to the number, as a penny was added to each man's purse. The most important part of the privilege was a large pewter badge, attached to the breast of the gown, which, besides the name of the bearer, had the inscription, "Pass and Repass." This inferred the privilege of begging, and bespoke the kindly consideration of all to whom the beadsman appealed for an alms or a night's lodging.

**Blue Grass**, a grass cultivated for pasturage in Northern and Central Kentucky, deriving its name from the underlying strata of blue limestone which gives it a luxuriant growth, and distinguished from other species by flat panicles, smooth culms

## Blue Mantle

and sheaths, and short, blunt ligules. The blue grass region, which occupies about 10,000 square miles in Northern Kentucky, is an undulating and fertile plateau surrounded by hills. The soil is very rich, and agriculture, especially the raising of tobacco and hemp, is carried on with great success. Its characteristic feature, however, consists of the celebrated pastures of blue grass, which support the horses and other live stock for which Kentucky is famous. Stock farms abound throughout the whole district, especially in the neighborhood of Lexington.

**Blue Hen State**, a sobriquet for the State of Delaware. During the War for Independence, a certain popular officer of Delaware, named Captain Caldwell, asserted that a game cock to be unconquerable must be "a blue hen's chicken." This name was at once applied to his regiment and later to the State and its people.

**Blue Jay** (*cyanocitta cristata*), a common North American bird of the crow family, and occupying in the New World the place held by the jays (*garrulus*) of the Old. In the United States the blue jay is sometimes persecuted, sometimes protected, becoming as shy and cunning in the one case as he is familiar and impudent in the other. They are mischievous birds, but devour large numbers of injurious caterpillars. The length of the bird is almost a foot; the color is grayish purple above, black on the neck, lilac brown to white below. The common blue jay has a wide distribution, and there are several other North American species. The long tailed blue jays belong to a rarer genus (*Xanthura*) found in Central and in South America.

**Blue Laws**, a name given to certain rulings or decisions of colonial magistrates reported by Rev. Samuel A. Peters, a Church of England clergyman, of Connecticut, as the actual laws of the New Haven colony. Though one of them forbade a woman to kiss her child on the Sabbath or a fast day, and another provided in what fashion men should cut their hair, they have been soberly accepted by great numbers of people as actually enacted laws, illustrative of Puritan illiberality. They appear in Peters' "General History of Connecticut," and were evidently a somewhat spiteful satire upon the Puritan legislation, which contained many statutes concerning Sabbath observances and the vices of drinking and gambling that would now be deemed inquisitorial. The term is generally applied to any law one does not like that affects personal habits.

**Blue Light**. See BENGAL LIGHT.

**Blue Mantle**, one of the English pursuivants at arms, connected with the Herald's College.



## Blue Monday

**Blue Monday**, in Bavaria and some other parts of Europe, a name formerly given to the Monday before Lent, when the churches were decorated with blue. It was kept as a holiday by classes whose ordinary avocation required them to labor on Sundays. As this led to violent disturbances the custom was legally abolished. The term now signifies a Monday of depression, or blue spirits, particularly among clergymen, but is very loosely used.

**Blue Mountains**, a beautiful wooded range of mountains in Oregon, from 8,000 to 9,000 feet high, which, with the Powder River Mountains, separate the Columbia valley from the Great Basin.

**Blue Mountains**, the central mountain range of Jamaica, the main ridges of which are from 6,000 to 8,000 feet high. Also a mountain chain of New South Wales, part of the great Dividing Range. The highest peaks rise over 4,000 feet above the sea. The range is now traversed by a railway, which attains a maximum height of 3,494 feet.

**Blue Peter** (a corruption of blue repeater, one of the British signal flags), a flag, blue with a white square in the center used as a signal for sailing, for recalling boats, etc.

**Blue Pill** (*pilula hydrargyri*), a pill made by rubbing two ounces of mercury with three of confection of roses till the globules disappear, and then adding one of liquorice root to form a mass. It is given when the secretion of the liver is defective as a "chologogue purgative," i. e., as a purgative designed to promote evacuation of the bile.

**Blue Point**, the S. extremity of Patchogue Bay, Long Island, N. Y., which lends its name to the well known oysters—blue points.

**Blue Print**, a positive photographic print from a transparent negative.

**Blue Print Paper**, paper sensitized by potassium ferrieyanide and citric acid; used for making blue print photographs and print plans, mechanical drawings, etc., giving white lines on blue ground.

**Blue Ridge**, the most easterly range of the Alleghany Mountains. It forms the continuation of the chain called South Mountain in Pennsylvania and Maryland. It is known as the Blue Ridge till it crosses the James river; thence to North Carolina as Alleghany Mountains; and in North Carolina again as Blue Ridge.

**Blue Stocking**, a literary woman, generally with the imputation that she is more or less pedantic. Boswell, in his "Life of Johnson," states that in his day there were certain meetings held by ladies to afford them opportunity of holding converse with eminent literary men. The most distin-

## Blum

guished talker at these gatherings was a Mr. Stillingfleet, who always wore blue stockings. His absence was so felt that the remark became common, "We can do nothing without the blue stockings." Hence the meetings at which he figured began to be called sportively Blue Stocking Clubs, and those who frequented them blue stockings.

**Blue Tit**, or **Blue Titmouse**, a bird, called also blue tomtit, blue cap, blue bonnet, hick mall billy biter and ox eye. It is the *parus caeruleus* of Linnæus. It has the upper part of the head light blue, encircled with white; a band around the neck and the spaces before and behind the eye of a duller blue; cheeks white; back light, yellowish green, the lower parts pale, grayish yellow; the middle of the breast dull blue. The male is more brightly colored than the female. Average length to end of tail, which is rather long: male  $4\frac{3}{4}$  inches; expansion of wings,  $7\frac{3}{4}$ ; female,  $4\frac{7}{8}$  inches; expansion of wings,  $7\frac{1}{2}$ . It builds its nest in the chink of a wall, under eaves or thatch, or in a hole of a tree, and lays from 6 to 8, some say 12 or even 20, eggs of a slightly reddish color, marked all over with irregular small spots of light red.

**Blum, Ernest** (bliim), a French dramatist, born in Paris, Aug. 15, 1836. Either alone or in collaboration with other dramatists he is author of many highly successful plays. The drama of "Rose Michel" (1877), of his own composition, insured his place among the most successful French dramatists of the time. Among his later compositions are "Adam and Eve" (1886); "The Nervous Woman" (1888); "End of the Century" (1890).

**Blum, Robert**, a German Liberal leader, born in very humble circumstances at Cologne, Nov. 10, 1807; was secretary and treasurer of a theater at Cologne, and subsequently at Leipsic, until 1847, when he established himself as bookseller and publisher. His leisure was devoted to literature and politics, and in 1840 he founded at Leipsic the Schiller Society, which celebrated the poet's anniversary, as a festival in honor of political liberty. When the revolutionary movement broke out in 1848, Blum was one of its most energetic leaders. He was elected one of the Vice-Presidents of the Provisional Parliament at Frankfurt, and as such ruled that turbulent assembly by presence of mind and a stentorian voice. In the National Assembly he became leader of the Left, and was one of the bearers of a congratulatory address from the Left to the people of Vienna, when they rose in October. At Vienna he joined the insurgents, was arrested, and was shot on Nov. 9. Blum was a man of strong character, great natural intelligence, and stir-



## Blumenbach

ring eloquence. The news of his execution excited great indignation among the Democrats in Germany, who, besides instituting commemorations for the dead, made an ample subscription for his widow and children.

**Blumenbach, Johann Friedrich** (blö'men-bäch), a German naturalist, born in Gotha, May 11, 1752. He studied at Jena and Göttingen, and wrote, on the occasion of his graduation as M. D., a remarkable thesis on the varieties of the human race. He became Professor of Medicine, Librarian, and Keeper of the Museum at Göttingen in 1778, where he lectured for 50 years. His principal works are the "Institutiones Physiologicae," long a common text book; "Handbuch der vergleichenden Anatomie" ("Handbook of Comparative Anatomy"), the best treatise that had appeared up to its date; and "Collectio Craniorum Diversarum Gentium." The last work, published between 1790 and 1828, gives descriptions and figures of his extensive collection of skulls, still preserved at Göttingen. He advocated the doctrine of the unity of the human species, which he divided into five varieties, Caucasian, Mongolian, Negro, American, and Malay. His anthropological treatises, and memoirs of his life by Marx and Flourens, were translated into English. He died in Göttingen, Jan. 22, 1840.

**Blumenreich, Franziska** (blö'men-rīch), a German novelist, born in Bohemia, April 2, 1849. Among her very numerous novels the more notable are "At the Abyss of Marriage" (1888); "Freighted with Bliss" (1890); "Storms in Port" (1892). She is a zealous advocate of woman's rights.

**Blumenthal, Oskar** (blö'men-täl), a German dramatist and critic, born in Berlin, March 13, 1852. Sprightliness of dialogue is the most distinguishing character of his plays; the most successful of them are "The Big Bell," "A Drop of Poison," "The Black Veil." He has published several volumes of critical and miscellaneous essays.

**Blumlisalp** (bliim'lēs-älp), a group of mountain peaks in the Bernese Oberland in the S. of Switzerland, S. W. of the Jungfrau. The highest peak, the Blümlisalphorn, is about 12,000 feet in altitude.

**Blunderbuss**, a short gun, unrifled and of large bore, widening toward the muzzle. It is by no means to be ranked with arms of precision, but is loaded with many balls or slugs, which scatter when fired, so that there is a certainty of some one of them hitting the mark.

**Blunt, Edmund March**, an American author, born in Portsmouth, N. H., June 20, 1770; was noted for his publication of the "American Coast Pilot" (1796), describing all the coasts of the United States, and containing a vast amount of invalua-

## Bluntschli

ble information for seamen. More than 30 editions of this work have been published, and it is still in use in the United States and the principal European countries, having been translated into nearly every foreign language. He also compiled a number of nautical books and charts. He died in Sing Sing, N. Y., Jan. 2, 1862.

**Blunt, George William**, an American hydrographer, born in Newburyport, Mass., March 11, 1802; a son of Edmund March Blunt. He went to sea when 14 years old and served as a sailor till nearly 21; and in 1822-1866 was a publisher of charts and nautical books in New York. He made original surveys of many American harbors; was one of the committee that organized the present system of pilotage for New York city; made several revisions of the "American Coast Pilot;" and was influential in causing the Federal Government to adopt the French system of lighthouses and to organize the Lighthouse Board. He died in New York city, April 19, 1878.

**Blunt, Stanhope English**, an American military officer; born in Boston, Mass., Sept. 29, 1850; was graduated at the United States Military Academy and commissioned 2d lieutenant in 1872. He rose through the ranks to major in the ordnance department. He served at various posts and arsenals in the West; was a member of several boards, including that which selected the Krag-Jorgensen rifle for use in the army; and had command of the Rock Island Arsenal, Ill. He wrote "Firing Regulations for Small Arms," and numerous papers on the use of small arms.

**Blunt, Wilfrid Scawen**, an Irish poet, born at Crabtree Park, Sussex, in 1840. He was attaché of legation at The Hague, Athens, Madrid, Buenos Ayres, and elsewhere. He supported Arabi Pasha in the revolt in Egypt in 1881; and was imprisoned in 1888 for his insurrectionary actions in Ireland. He is author of "Sonnets and Songs by Proteus" (London, 1875); "The Love Sonnets of Proteus" (1881; new ed. 1885); "The Future of Islam" (1882); "The Wind and the Whirlwind," political poems (1884); "Ideas About India" (1885); and "Esther: a Young Man's Tragedy" (1895).

**Bluntschli, Johann Kaspar** (blöntsh'lē), a Swiss jurist and statesman, born in Zurich, March 7, 1808; became professor in the newly founded university in that city in 1833. He took an active part in the political struggles that divided his country, and at first inclined to the party of reform, until the events of 1839 induced him to join the Conservatives, of whom he was, for a time, a leader. He was a Councilor of State, and became a member of the Govern-



ment and of the Federal Directory, and afterward worked for the formation of a moderate Liberal Conservative Party in Switzerland. In 1848 he went to Munich as Professor of Civil and International Law. There he published his "Allgemeines Straatsrecht" (5th ed., 1876), on which his reputation as a juriseonsult chiefly rests; "Deutsches Privatrecht" (3d ed., 1864); and, in conjunction with Arndts and Pözl, "Kritische Ueberschau der Deutschen Gesetzgebung und Rechtswissenschaft" (6 vols. 1853-1858). In 1861 he removed to Heidelberg University, and became a Privy Councilor of Baden, actively forwarding all Liberal measures in the State. Liberty in ecclesiastical matters he had equally at heart; he acted several times as president of the Protestantenverein, and it was after delivering a closing speech at the general synod of Baden that he died suddenly at Karlsruhe, Oct. 21, 1881. He was the author of valuable histories of Zurich and of the Swiss Confederation, and of a number of works on law, being especially an authority in international law.

**Blushing**, a sudden reddening of the skin, induced by various mental states, particularly those involving shame or humiliation, shyness or modesty. It usually affects only the face and neck; rarely among civilized peoples the breast and other parts of the body. But "the men of certain races, who habitually go nearly naked, often blush over their arms and chests, and even down to their waists" (Darwin). It is often accompanied by expressive movements; the face is turned aside, the eyes cast down or restlessly moved. It causes increased heat of the parts affected, with a sensation of heat and tingling, and often a general feeling of discomfort. It does not occur in young children.

Blushing is an excellent illustration of the control exercised over the circulation of the blood by the nervous system. Under ordinary circumstances, the muscular coat of the small arteries throughout the body is constantly maintained in a state of partial contraction by means of the nerves distributed to it. The blood propelled into them by the heart is thus prevented from distending them to their full extent, and its passage to the capillaries in connection with them is controlled. When, however, from any cause the action of these nerves is suspended, the arteries under their influence at once dilate, the corresponding capillaries become fuller, and the tissues containing them appear much redder than in their ordinary condition.

Under the influence of shyness, shame, etc., an alteration takes place in the nervous influence proceeding from the brain, which, for the time, lessens or stops the action of the nerves controlling the arteries

of the skin of the face and neck, and blushing is the consequence. Why it should result from these and not from other mental states, and why the effect should be confined in general to the face and neck, are much more intricate questions, which cannot be discussed here. For one answer to them, with many interesting facts on the subject, see Darwin's "Expression of the Emotions," chap. xiii.

**Blüthgen, August Edward Viktor** (blüt'gen), a German novelist, born at Zörbig, near Halle, Jan. 4, 1844. He has won high distinction as a writer for the young. Among his stories for boys and girls are "The Rogues' Looking Glass" (1876); "The Battle of Frogs and Mice" (1878); and with these is to be classed the letterpress (verses) of O. Pletsch's "Picture Books." Of novels and romances he is author of a great many, *e. g.*, "The Peace Breaker" (1883); "The Step-Sister" (1887); "Madame the Countess" (1892), etc.

**Blyden, Edward Wilmot** a negro author, born at St. Thomas, W. I., Aug. 3, 1832. After vainly seeking, in 1845, admission to some college in the United States, he went to Liberia, and graduated at the Alexander High School, of which he afterward became principal. In 1880 he became President of Liberia College, has held important government positions, and was commissioner to the Presbyterian General Assembly of the United States in 1861 and 1880. He is proficient in many languages, including Latin, Greek, Spanish, Hebrew and Arabic. He has published "Liberia's Offering" (1873); "From West Africa to Palestine" (1873); "The Negro in Ancient History," etc.

**Blythe, Herbert** (better known as MAURICE BARRYMORE), an American actor; born in India in 1847; was graduated at Cambridge University, England; studied for the civil service; was admitted to the bar but did not practise this profession, giving it up for the stage. His first engagement in the United States was in New York, and he has since been the leading man in many companies. He was also the author of many plays, including "Nadjeska" (written for Mme. Modjeska) and "The Robber of the Rhine" (libretto). He died March 25, 1905.

**Boa**, the name of a genus of reptiles belonging to Cuvier's tribe of serpents proper, having the tympanic bone or pedicle of the lower jaw movable, which is itself almost always suspended to another bone analogous to the mastoid, attached the skull by muscles and ligaments, which contribute to its mobility. The branches of this jaw are not united, and those of the upper jaw are attached to the intermaxillary bone only by ligaments, so that these animals can dilate the mouth sufficiently to swal-



low bodies larger than themselves. Their palatal arches partake of this mobility. In the species of this tribe not possessed of venom, the branches of the upper and lower jaw throughout their entire length, as well as the palate bones, are armed with pointed, recurved, solid, and permanent teeth, forming four nearly equal rows above, and two below.

The genus *Boa* comprises all those serpents which, in addition to the preceding characters, have the *scuta* on the under part of the tail single; a hook on each side of the vent; the tail prehensile; the body compressed and largest in the middle, and with small scales, at least on the posterior part of the head.

The species properly belonging to this genus are among the largest of the serpent tribe, some of them, when full grown, being 30, and even 40 feet long. Though destitute of fangs and venom, nature has endowed them with a degree of muscular power which renders them terrible. Happily, they are not common in situations much frequented by mankind, but are chiefly found in the vast marshy regions of Guiana and other hot parts of the American continent.

Though these enormous serpents are not inactive when fasting or hungry, they become very sluggish and inert after having gorged their prey, at which time they are most easily destroyed. In order to obtain their food, the boas of largest size attach themselves to the trunk or branches of a tree, in a situation likely to be visited by quadrupeds for the sake of pasture or water. There the serpent swings about in the air, as if a branch or pendent of the tree, till some luckless animal approaches; then, suddenly relinquishing its position, swift as lightning he seizes the victim, and coils his body spirally round its throat and chest, till, after a few ineffectual cries and struggles, the animal is suffocated, and expires. In producing this effect, the serpent does not merely wreath itself around its prey, but places fold over fold, as if desirous of adding as much weight as possible to the muscular effort; these folds are then gradually tightened with enormous force, and speedily induce death. The animals thus destroyed by the larger boas are deer, dogs, and even bullocks. The prey is then prepared for being swallowed, which the creature accomplishes by pushing the limbs into the most convenient position, and then covering the surface with a glutinous saliva. The reptile commences the act of deglutition by taking the muzzle of the prey into its mouth, which is capable of vast extension; and, by a succession of wonderful muscular contractions, the rest of the body is gradually drawn in with a steady and regular motion. As the mass advances in the gullet the parts through which it has passed resume their former

dimensions, though its immediate situation is always betrayed by external protuberance.

As already mentioned, the species of *boa* are peculiar to the hot parts of South America, though nothing is more common than the error of confounding the great serpents of India, Africa, etc., with the proper *boa*. The great serpents of the old Continent belong to the genus *Python*, and will be treated of under that title. It is nevertheless true that Pliny has spoken of the huge serpents of India, and afterward of large serpents of Italy, which were called *boæ*, the name being derived according to him from the fact of their sometimes sucking cows.

Among the most celebrated species is the *boa constrictor*, distinguished by a large chain, formed alternately of large, blackish, irregular hexagonal spots, with pale, oval spots, notched at their two extremities, along the back. This is the largest species of the genus, but several other large American serpents, whose habits are the same, are also called *boas*, though included in different genera. Among these are the ringed *boa*, which was worshiped in ancient times by the Mexicans and propitiated by human sacrifices, and the dog-headed *boa*. The *anaconda* is also included by some in the genus. The other species are of smaller size, and some do not much exceed that of the largest common snakes. We cannot reflect upon the natural history of these great reptiles without being struck with their peculiar adaptation to the situations in which they are commonly most abundant. In regions bordering on great rivers, which inundate vast tracts, these serpents live securely among the trees with which the soil is covered, and are capable of enduring very protracted hunger without much apparent suffering or diminution of vigor. Noxious as such districts are to human life, they teem with a gigantic and luxuriant vegetation, and are the favorite haunts of numerous animals, preyed upon, and to a certain degree restricted in their increase, by the *boas*. As their prey comes within their reach, they require no deadly apparatus of poison to produce their destruction, since nature has endowed them with vast muscular strength. Once fairly involved in the crushing folds of a *boa*, the strength of the strongest man is of no avail.

**Boabdil** (properly Abu-Abdallah, and nicknamed Ez-Zogoiby, "the unlucky"), the last Moorish King of Granada, dethroned his father, Abu-l-Hasan, in 1481, and two years later was defeated and taken prisoner by the Castilians near Lucena. He was set free on condition of paying tribute, and returned to Granada to struggle with his father and with his heroic uncle, Ez-Zaghal, for the throne. Thus the Moors wasted the strength they sorely needed for



## Boadicea

the final struggle with the Christians. The fall of Malaga and Baza was but the prelude to the loss of the capital. After leaving the palace of the Alhambra and yielding the keys of Granada to Ferdinand, Boabdil rode to the mountainside to take his farewell view of the city. The spot where he turned his horse is known as "*El ultimo sospiro del Moro*," "the Last Sigh of the Moor." It is said that his mother taunted him with weeping like a woman over what he could not defend like a man. Going to Africa, he there flung away his life in battle.

**Boadicea**, Queen of the Iceni, in Britain, during the reign of Nero. Having been treated in the most ignominious manner by the Romans, she headed a general insurrection of the Britons, attacked the Roman settlements, reduced London to ashes, and put to the sword all strangers to the number of 70,000. Suetonius, the Roman general, defeated her in a decisive battle (A. D. 62), and Boadicea, rather than fall into the hands of her enemies, put an end to her own life by poison.

**Boanerges**, a Greek word translated in Mark iii: 17, "sons of thunder." It is of doubtful etymology, but is probably the Aramaic pronunciation of Hebrew *beni regesh*, *regesh* in Hebrew meaning tumult or uproar, but in Arabic and Aramaean thunder. It is an appellation given by Christ to two of His disciples, the brothers James and John, apparently on account of their fiery zeal.

**Boar**, the uncastrated male of the swine (*sus scrofa*), or of any other species of the genus. The wild boar is the male of a swine either aboriginally wild or whose ancestors have escaped from domestication. The common wild boar is *sus scrofa*; variety, *aper*. It is of a brownish black color; but the young, of which six or eight are produced at a birth, are white or fawn colored, with brown stripes. It is wild in Europe, Asia and Africa, lives in forests, sallies forth to make devastations among the crops adjacent, is formidable to those who hunt it, turning on any dog or man wounding it, and assaulting its foe with its powerful tusks. *Sus larvatus* is the masked boar.

**Boardman, George Dana**, an American missionary, born in Livermore, Me., Feb. 8, 1801. He studied at Andover and was ordained in the Baptist Church. In 1825 he went to Burma, where he labored assiduously in spreading Christianity. The mission planted by him became the central point of all Baptist missions in Burma. He died in Burma, Feb. 11, 1831.

**Boardman, George Dana**, an American clergyman and author, born in Tavoy, Brit-

## Boat

ish Burma, Aug. 18, 1828; son of the American Baptist missionary of the same name. He was educated in the United States, graduating at Brown University in 1852, and at Newton Theological Institution in 1855. He became pastor at Barnwell, S. C.; afterward at Rochester, N. Y., till 1864, when he became pastor of the First Baptist Church in Philadelphia. Besides sermons and essays, his chief works are "Studies in the Creative Week" (1878) "Studies in the Model Prayer" (1879); "Epiphanies of the Risen Lord" (1879); "The Kingdom" (1898). He died April 28, 1903.

**Boardman, Richard**, an English missionary, born in 1738. He became a member of Wesley's conference in 1763, and volunteered for service in America in 1769. He preached in New York and through the Middle States till 1774, and then, returning to England, continued his itinerant ministry. He is known as one of the founders of Methodism in the United States. He died in Cork, Ireland, Oct. 4, 1782.

**Boar Fish** (*capros*), a genus of fishes in the *carangidae* or horse mackerel family of *acanthopterygii* or bony fishes with spinous rays. The protrusible mouth presents a resemblance to a hog's snout, as the name suggests. The body has an oval, compressed form like that of the related John Dory, from which it differs conspicuously in the absence of spines at the base of dorsal and anal fins, and of long filaments on the dorsal spines. The common boar fish (*C. aper*) is a well known inhabitant of the Mediterranean, rarely caught on the coasts of England. The eyes are very large, and placed far forward; the body is of a carmine color, lighter below, and with seven transverse orange bands on the back. The flesh is little esteemed.

**Boas, Franz** (bō'az), a German ethnologist, born in Minden, Westphalia, July 9, 1858; studied at Heidelberg, Bonn, and Kiel Universities, in 1877-1882; traveled in the Arctic regions in 1883-1884; was assistant in the Royal Ethnographical Museum in Berlin, and privat docent in geography at the University in 1885-1886; and teacher of anthropology in Clark University, Worcester, Mass., in 1888-1892. He has spent much time among various American Indian tribes, and, among other works, has published "Baffin Land" (1885); "The Central Eskimo," in the "Annual Report" of the United States Bureau of Ethnology (1888); "Indians of British Columbia" (1888-1892); etc.

**Boat**, a small open vessel or water craft usually moved by oars or rowing. The forms, dimensions and uses of boats are quite varied and some of them carry a light sail. The boats belonging to a ship of war are the launch or long boat, which is



## Boat Bill

the largest, the barge, the pinnace, the yawl, cutters, the jolly boat and the gig. The boats belonging to a merchant vessel are the launch or long boat, before mentioned, the skiff, the jolly boat or yawl, the stern boat, the quarter boat and the captain's gig.

**Boat Bill**, the English name of *canceroma*, a genus of birds belonging to the sub-family *ardeina*, or true herons, and especially of the *canceroma cochlearia*. The bill, from which the English name comes, is very broad from right to left, and looks as if formed by two spoons applied to each other on their concave sides. The *C. cochlearia* is whitish, with the back gray or brown and the belly red; the front is white, behind which is a black cap, changed into a long crest in the adult male. It inhabits the hot and humid parts of South America.

**Boat Fly**, the English name of the water bugs of the genus *notonecta*, so called because they swim on their backs, thus presenting the appearance of boats.

**Boatswain** (bōsn), an officer on board a ship, whose function it is to take charge of the rigging, cables, cordage, anchors, sails, boats, flags and stores. He must inspect the rigging every morning and keep it in good repair; and must either by himself or by deputy steer the life boat. If on a ship of war he must call the men to their duty by means of a silver whistle given him for the purpose; besides taking into custody those condemned by a court martial, and, either by himself or by deputy, inflict on them the punishment awarded.

**Boaz**, a Bethlehemite of means, who took upon himself the duty of providing for Ruth, as the near relation of her dead husband Elimelech. From him Jesus Christ was directly descended.

**Bobadilla, Francisco de**, a Spanish statesman, appointed plenipotentiary concerning the State of Hispaniola, in 1500. Having sent its governor, Columbus, to Spain in chains, he was censured, and recalled, but was drowned on the return voyage, in 1502.

**Bobbin**, a reel or other similar contrivance for holding thread. It is often a cylindrical piece of wood with a head, on which thread is wound for making lace; or a spool with a head at one or both ends, intended to have thread or yarn wound on it, and used in spinning machinery (when it is slipped on a spindle and revolves therewith) and in sewing machines (applied within the shuttle).

**Bobbin Net**, a machine made cotton net, originally imitated from the lace made by means of a pillow and bobbins.

**Boboli** (bob'ō-lē), **Gardens**, the famous grounds of the Pitti Palace at Florence.

## Bob-o-link

They contain many fine statues and the Isoletto fountain, designed by Jean de Bologne.

**Bobolina**, a Greek woman, celebrated for her courage in aid of the Greek revolt. After her husband had been slain by the Turks in 1812, she resolved to avenge his death. In 1821, she equipped three vessels at her own expense, fought with extraordinary courage at Tripolitiza and Naupha and was killed in action, in 1825.

**Bob-o-link, Boblink, Reed Bird, or Rice Bird** (*dolichonyx oryzivorus* or *icterus acripennis*), a common American bird found from Paraguay to Canada, the only one of its kind, and that difficult to classify. Some place it near the Baltimore bird (*icterus*), others near starlings, but both the characteristics and the character of the bob-o-link exhibit much that is unique. The beak is short and straight; the nostrils surrounded by a fold of skin; the wings are long, especially in their first feather; the tail feathers are stiff pointed. The plumage is unusually conspicuous for a ground bird. In the male the head, lower surface, and tail are black, while the upper surface is lighter, yellowish white in front, black with yellow streaks behind. The color and the note change with the seasons and with the functions of the bird. The female is much plainer—yellowish brown with darker streaks above, and pale grayish yellow below.

The name—originally Bob Lincoln—is an imitation of the bird's note. In song, the full throated male bob-o-link is unique, rivaling the lark, inimitable by the mocking bird, "in qualities of hilarity and musical tintinnabulation," according to Burroughs ("Birds and Poets"), quite unequaled. His volubility borders on the burlesque. In disposition also the male is interesting; he affords the "most marked example of exuberant pride, and a glad, rollicking, holiday spirit, that can be seen among American birds." His love making emotions appear to be unusually strong, as strong indeed as his Quaker mate is shy, retiring and indifferent. The change of the male in color and form at the breeding time is very striking. He becomes black and white more emphatically, so as sometimes to be called the skunk bird, and acquires a broad form and a curious, mincing gait. Robert o' Lincoln becomes an ornithological coxcomb of the highest order. He sings on brier and weed, or jerking up and down in the air, while his mate may be brooding in a simple nest among the grass. The bob-o-link is said to exhibit the common trick of seeking by exaggerated fuss in some other quarters to lead intruders away from the nest.

The bob-o-link is a bird of passage, spending the winter in the West Indies. In summer it is found as far N. as the banks of



## Bob White

the Saskatchewan, in 54° lat., but is most plentiful in the Atlantic States and other Eastern parts of the United States, where it is to be seen in every meadow and cornfield. It renders good service by the destruction of insects and their larvæ; but in the South, both in April and August, at seed time and harvest, its ravages seriously cripple the rice growing industry, and destroy about a fourth of the crop. Thousands of men and boys are then employed to shoot the trespassers, who are killed in great numbers for the table; their flesh is delicate, and resembles that of the ortolan. On account also of their beauty and powers of song, many are caught, caged and sold in the markets.

**Bob White**, popular name of a small game bird of the United States, given because of its peculiar call. In the Northern States it is known as QUAIL (q. v.), and in the Southern as PARTRIDGE (q. v.).

**Bocage, Manoel do** (bōk'āzh or bōs'āzh), a Portuguese poet, born in 1766. He is esteemed the most original and most truly national of his country's modern poets. His sonnets are the finest in the language. He died in 1806.

**Bocardo**, the old North gate of Oxford, England, occasionally used as a prison. Here Cranmer was incarcerated, and through it went Ridley and Latimer to meet death by fire in 1555. The term was used generally to denote any prison.

**Boccaccio, Giovanni** (bō-kāch'yō), an Italian novelist and poet, son of a Florentine merchant, was born in 1313, in Certaldo, a small town in the valley of the Elsa, 20 miles from Florence. He spent some years unprofitably in literary pursuits and the study of the canon law, but in the end devoted himself entirely to literature. He found a congenial atmosphere in Naples, where many men of letters frequented the court of King Robert, among the number being the great Petrarch. In 1341 Boccaccio fell in love with Maria, an illegitimate daughter of King Robert, who returned his passion with equal ardor, and was immortalized as Fiammetta in many of his best creations. His first work, a romantic love tale in prose, "Filocopo," was written at her command; as was also the "Teseide," the first heroic epic in the Italian language, and the first example of the *ottava rima*. In 1341 he returned to Florence at his father's command, and during a three years' stay produced three important works, "Ameto," "L'amorosa Visione" and "L'amorosa Fiammetta," all of them connected with his mistress in Naples. In 1344 he returned to Naples, where Giovanna, the granddaughter of Robert, who had succeeded to the throne, received him with distinction. Between 1344 and 1350

## Boccage

most of the stories of the "Decameron" were composed at her desire or at that of Fiammetta. This work, on which his fame rests, consists of 100 tales represented to have been related in equal portions in 10 days by a party of ladies and gentlemen at a country house near Florence while the plague was raging in that city. The stories in this wonderful collection range from the highest pathos to the coarsest licentiousness. They are partly the invention of the author, and partly derived from the fabliaux of mediæval French poets and other sources. On the death of his father, Boccaccio returned to Florence, where he was greatly honored, and was sent on several public embassies. Among others he was sent to Padua to communicate to Petrarch the tidings of his recall from exile and the restoration of his property. From this time



GIOVANNI BOCCACCIO.

an intimate friendship grew up between them which continued for life. They both contributed greatly to the revival of the study of classical literature, Boccaccio spending much time and money in collecting ancient manuscripts. In 1373 he was chosen by the Florentines to occupy the chair which was established for the exposition of Dante's "Divina Commedia." His lectures continued till his death. Among his other works may be mentioned "Filostrato," a narrative poem; "Il Ninfale Fiesolano," a love story; "Il Corbaccio, ossia Il Labirinto d'Amore," a coarse satire on a Florentine widow; and several Latin works. The first edition of the "Decameron" appeared without date or place, but is believed to have been printed at Florence in 1469 or 1470. The first edition with a date is that of Valdarfer, Venice, 1471; what is, perhaps, the only existing perfect copy of this was sold in London, in 1812, for £2,260. He died in Certaldo, in 1375.

**Boccage** (bōk-āzh'), **Marie Anne Fiquet du** (née LE PAGE), a French poet, born in Rouen, Oct. 22, 1710. She published a



Bock

small volume of verse in 1746; next an imitation of Milton, "Paradis Terrestre," in 1748; and, in 1756, her most important work, "La Colombiade." Her letters to her sister, written while traveling through England, Holland and Italy, are her most interesting work. During her lifetime she was excessively bepraised by men so great as Voltaire and Fontenelle; but modern readers cannot help thinking that her beauty must have recommended her verses. She was elected a member of many learned academies, and died Aug. 8, 1802.

**Bock, Karl Ernst**, a German anatomist, born in 1809; died in 1874. At the outbreak of the Polish Revolution he went to Warsaw, where he acted as hospital physician, first in the Polish service and later in the Russian. On his return home he was elected Extraordinary Professor in the University of Leipsic. His title to fame vests chiefly on his "Handbook of Human Anatomy."

**Bock Beer**, a kind of strong beer, the first drawn from the vats in the spring when the winter's brew of lager beer is broached. So called on account of the German legend which affirms that, in a competitive trial of the strength of beers brewed by two rival brewers, in which each drank the product of the other, the defeated candidate declared that it was not the beer of his rival which had made him unsteady on his legs and overthrew him, but a young he goat which some children were chasing and which ran against him and overturned him. As the bock was blamed for his fall (although many suspected the beer) that particular variety of beer has been named bock beer in commemoration of the occurrence.

**Böckh, Philipp August** (bèch), a German classical antiquary, born at Carlsruhe, in 1785. He was educated at Carlsruhe and Halle, and obtained, in 1811, the chair of Ancient Literature in the University of Berlin, where he remained for the rest of his life. He opened a new era in philology and archæology by setting forth the principle that their study ought to be an historical method intended to reproduce the whole social and political life of any given people during a given period. Among his chief works are an edition of "Pindar" (1811-1822); "The Public Economy of the Athenians" (1817), translated into English and French; "Investigations into the Weights, Coins and Measures of Antiquity" (1838); and "Documents Concerning the Maritime Affairs of Attica" (1840). The great "Corpus Inscriptionum Græcarum" was begun by him with the intention of giving in it every Greek inscription known in print or manuscript. He died in Berlin, in 1867.

Bodenstedt

**Bode, Johann Elert**, a German astronomer, born in Hamburg, Jan. 19, 1747; became astronomer of the academy in Berlin, in 1772, and, in 1786, director of the observatory there. He published numerous astronomical works, including "Sternkunde" (3d ed., 1808), and "Uranographia" (2d ed., 1818), and founded the "Astronomische Jahrbücher." He died Nov. 23, 1826. The arithmetical relation subsisting between the distances of the planets from the sun, called after him Bode's law, may be thus stated: Write, in the first instance, a row of fours, and under these place a geometrical series beginning with 3, and increasing by the ratio of 2, putting the 3 under the second 4; and by addition we have the series 4, 7, 10, etc., which gives nearly the relative distances of the planets from the sun.

|       |   |    |    |    |    |     |     |     |
|-------|---|----|----|----|----|-----|-----|-----|
| 4     | 4 | 4  | 4  | 4  | 4  | 4   | 4   | 4   |
|       | 3 | 6  | 12 | 24 | 48 | 96  | 192 | 384 |
| <hr/> |   |    |    |    |    |     |     |     |
| 4     | 7 | 10 | 16 | 28 | 52 | 100 | 196 | 388 |

Thus, if 10 be taken as the distance of the earth from the sun, 4 will give that of Mercury, 7 that of Venus, and so forth. The actual relative distances are as follows, making 10 the distance of the earth:

| Mercury. | Venus. | Earth. | Mars. | Asteroids. | Jupiter. | Saturn. | Uranus. | Neptune. |
|----------|--------|--------|-------|------------|----------|---------|---------|----------|
| 3.9      | 7.2    | 10     | 15.2  | 27.4       | 52.9     | 95.4    | 192     | 300      |

Close as is the correspondence between the law and the actual distances, no physical reason has been given to account for it, although there is little room for doubt that such exists. Bode's law is, therefore, in the present state of science, empirical. Kepler was the first to perceive the law, and Bode argued from it that a planet might be found between Mars and Jupiter, to fill up the gap that existed at the time in the series. The discovery of the planetoids has proved the correctness of this prediction.

**Bodenstedt, Friedrich Martin**, a German poet and miscellaneous writer, born in 1819. Having obtained an educational appointment at Tiflis he published a work on the peoples of the Caucasus (1848) and "A Thousand and One Days in the East," which were very successful. In 1854 he was appointed Professor of Slavic at Munich, and in 1858 was transferred to the chair of Old English. He was afterward a theatrical director at Meiningen and traveled in the United States, etc. Among the best of his poetical works are the "Songs of Mirza-Schaffy," purporting to be translations from the Persian, but really original, which have passed through more than 100 editions. He



## Bodin

translated Shakespeare's "Sonnets," and with other writers issued a translation of Shakespeare's works. He died April 19, 1892.

**Bodin, Jean** (bō-dan'), a French political writer; born in 1530, or 1529. He studied law at Toulouse, delivered lectures on jurisprudence there, and afterward went to Paris and practised. Being unsuccessful in his profession, he turned his talents to literary labors; was invited by Henry III. to his court; and afterward traveled with the king's brother, Francis, Duke of Alençon and Anjou, to Flanders and England, where he had the gratification of hearing lectures in Cambridge on his work "De la République," originally written in French, but afterward translated by Bodin himself into Latin. His great work "De la République" (1576) has been characterized as the ablest and most remarkable treatise on the philosophy of government and legislation produced from the time of Aristotle to that of Montesquieu. According to his view, the best form of government is a limited monarchy. Toward the latter part of his life, Bodin sided with the adherents of Henry VI. He died in Laon in 1596.

**Bodle**, a copper coin formerly current in Scotland, of the value of two pennies Scotch, or the sixth part of an English penny.

**Bodleian, or Bodleyan, Library**, a library founded at Oxford, England, by Sir Thomas Bodley, in 1597, who presented to it about \$50,000 worth of books, and induced others also to become donors to the institution. The library was opened to the public on Nov. 8, 1602. The first stone of a new building to accommodate it was laid on July 10, 1610. At present it contains about 300,000 volumes. All members of Oxford University who have taken a degree are allowed to read in it, as are literary men of all countries.

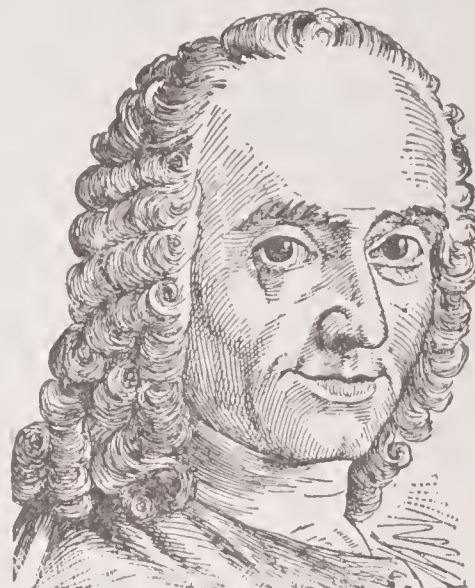
**Bodley, Sir Thomas**, the founder of the Bodleian Library at Oxford, was born at Exeter, in 1544. He was educated partly at Geneva, whither his parents, who were Protestants, had retired in the reign of Queen Mary. On the accession of Elizabeth they returned home, and he completed his studies at Magdalen College, Oxford. He traveled much on the Continent, and was employed in various embassies to Denmark, Germany, France, and Holland. In 1597 he returned home, and dedicated the remainder of his life to the re-establishment and augmentation of the public library at Oxford. He expended a very large sum in collecting rare and valuable books, besides leaving an estate for the support of the library. He was knighted at the accession of James I. He died in London in 1612.

**Bodmer, Georg**, a Swiss inventor, born in Zürich, Dec. 6, 1786. He invented the

## Body

screw and cross wheels; and made valuable improvements in fire arms and in various kinds of machinery, particularly in that of wool spinning. He died in Zürich, May 29, 1864.

**Bodmer, Johann Jakob**, a Swiss literary critic, born near Zürich, July 19, 1698; was the first to make English literature known in Germany; and wrote dramas, and the epics, "The Deluge" (1751) and "Noah" (1752). He published two volumes of "Critical Letters," and prepared editions of ancient German poetry; "Specimens of Thirteenth Century Suabian Poetry," "Fables from the Time of the Minnesingers," "Kriemhilde's Revenge," etc. He died Jan. 2, 1783.



JOHANN JAKOB BODMER.

**Bodoni, Giambattista**, an Italian printer, born at Saluzzo, in 1740. In 1758 he went to Rome, and was employed in the printing office of the Propaganda. He was afterward at the head of the ducal printing house in Parma, where he produced works of great beauty. His editions of Greek, Latin, and French classics are highly prized. He died at Parma in 1813.

**Bödttcher, Ludwig** (bet'che), a Danish lyricist, born in Copenhagen, in 1793; spent many years in Italy, and nature and man in Italy equally with nature and man in Denmark are the themes of his finest poems,—notably "Bacchus," and the collection called "Poems Old and New." He died in 1874.

**Body**, the material framework of man or of any of the inferior animals, including the bones, the several organs, the skin, with hair, nails, and other appendages. The following is a list of the quantities of the various elements found in a human body weighing 154 pounds:

|                 | lbs. | oz. | grs. |
|-----------------|------|-----|------|
| Oxygen.....     | 111  | 0   | 0    |
| Hydrogen.....   | 15   | 0   | 0    |
| Carbon.....     | 20   | 0   | 0    |
| Nitrogen.....   | 3    | 9   | 0    |
| Phosphorus..... | 1    | 12  | 19   |
| Sulphur.....    | 0    | 2   | 217  |
| Calcium.....    | 2    | 0   | 0    |
| Fluorine.....   | 0    | 2   | 0    |
| Chlorine.....   | 0    | 2   | 382  |
| Sodium.....     | 0    | 2   | 116  |
| Iron.....       | 0    | 0   | 190  |
| Potassium.....  | 0    | 0   | 290  |
| Magnesium.....  | 0    | 0   | 12   |
| Silicon.....    | 0    | 0   | 2    |



Body Color

The organic, non-metallic, and metallic elements are not found in the body in their pure state, but are mixed together, forming the following compounds, the aggregate of which, as in the preceding table, amounts to 154 pounds:

|                            | lbs. | oz. | grs. |
|----------------------------|------|-----|------|
| Water.....                 | 111  | 0   | 0    |
| Gelatine.....              | 15   | 0   | 0    |
| Fat.....                   | 12   | 0   | 0    |
| Albumen.....               | 4    | 3   | 0    |
| Fibrine.....               | 4    | 4   | 0    |
| Phosphate of lime.....     | 5    | 13  | 0    |
| Carbonate of lime.....     | 1    | 0   | 0    |
| Fluoride of calcium.....   | 0    | 3   | 0    |
| Chloride of sodium.....    | 0    | 3   | 376  |
| Chloride of potassium..... | 0    | 0   | 10   |
| Sulphate of soda.....      | 0    | 1   | 170  |
| Carbonate of soda.....     | 0    | 1   | 72   |
| Phosphate of soda.....     | 0    | 0   | 400  |
| Sulphate of potash.....    | 0    | 0   | 400  |
| Peroxide of iron.....      | 0    | 0   | 150  |
| Phosphate of potash.....   | 0    | 0   | 105  |
| Phosphate of magnesia..... | 0    | 0   | 75   |
| Silica.....                | 0    | 0   | 3    |

**Body Color**, a term applied to such pigments as have body enough to be opaque, as distinguished from those which are transparent. As a general rule, pigments have more body the nearer they approach to white; consequently the light parts of pictures in oil are in body color to give them brightness and strength, while the dark parts are transparent to give them depth. Water color painting, when executed by mixing the pigments with water after the manner of an oil painting, is said to be painted in body color.

**Boece**, or **Boyce** (bois), **Hector**, a Scottish historian, born in Dundee about 1465. He studied first at Dundee, and then at the University of Paris, where he became Professor of Philosophy in the College of Montaigu, and made the acquaintance of Erasmus. About 1500 he quitted Paris to assume the principalship of the newly founded university of King's College, Aberdeen. In 1522 he published in Paris a history in Latin of the prelates of Mortlach and Aberdeen. Five years afterward appeared the work on which his fame chiefly rests, the "History of Scotland" in Latin—"Scotorum Historiæ a prima gentis origine," etc. It abounds in fable, but the narrative seems to have been skilfully adjusted to the conditions of belief in his own time. In 1536 a translation of the history was published, made by John Ballentyne or Bellenden, for James V. He died in 1536.

**Boehm**, **Sir Joseph Edgar** (bem), a British sculptor, born in Vienna, July 6, 1834; was educated at Vienna, and 1848-1851 in England; he studied in Italy also, and for three years in Paris. He made his home in England in 1862, and resided there till his death. Boehm received the first imperial prize at Vienna in 1856; was elected member of the Academy of Flor-

Bœhmeria

ence in 1875, Associate of the London Royal Academy in 1878, Royal Academician in 1882; created baronet in 1883. Among his very numerous works are a colossal statue in marble of Queen Victoria, 1869; colossal statue of John Bunyan, 1872; colossal equestrian statue of the Prince of Wales, 1877; statue of Thomas Carlyle; horse group in bronze for Eton; colossal equestrian statues of the Duke of Wellington, of Lord Napier of Magdala, and of Lord Northbrook; statue of King Leopold I. of Belgium; recumbent statues of General (Chinese) Gordon and of many church dignitaries. At the Royal Exhibition, 1889, Beehm exhibited "The British Guardsman of 1818," and "The Inniskillen Dragoon of 1815." Notable among his works are a life size bull, with his leader, in marble, and a large equestrian bronze group of "St. George and the Dragon;" several race horses; a colossal lion and lioness; a sea lion in black marble, etc. He executed busts of Gladstone, John Bright, John Ruskin, etc., and designed the effigy of Queen Victoria for the coinage commemorative of the 50th year of her reign. He died in London, Dec. 12, 1890.

**Boehme**, **Jakob** (bé'mè), a German mystical writer, born in 1575. He was apprenticed to a shoemaker in his 14th year, and 10 years later he was settled at Görlitz as a master tradesman, and married to the daughter of a thriving butcher of the town. He was much persecuted by the religious authorities, and at his death the rites of the Church were but grudgingly administered to him. Raised by contemplation above his circumstances, a strong sense of the spiritual, particularly of the mysterious, was constantly present with him, and he saw in all the workings of nature upon his mind a revelation of God, and even imagined himself favored by Divine inspirations. His first work appeared in 1616, and was called "Aurora." It contains his revelations on God, man, and nature. Among his other works are "De tribus Principiis," "De Signatura Rerum," "Mysterium Magnum," etc. His writings all aim at religious edification, but his philosophy is very obscure and often fantastic. The first collection of his works was made in Holland in 1675 by Henry Betke; a more complete one in 1682 by Gichtel (10 vols., Amsterdam). William Law published an English translation of them, two vols., 4to. A sect, taking their name from Boehme, was formed in England. He died in 1624.

**Bœhmeria**, a genus of plants, order *urticaceæ*. From several species valuable fibers are obtained. *B. frutescens*, or puya, a plant growing wild in Nepaul and Sikkim, is the source of the celebrated Pooah fiber, which rivals the best European flax



## Bœotia

for tenacity. This species attains the height of six or eight feet; but the stem is usually very slender. It is cut down for use when the seed is formed; the bark is then peeled off, dried, boiled with wood ashes, and beaten with mallets, to separate its component fibers. *B. speciosa*, the wild rhea, also yields a very strong fiber, which is much used in the East. *B. nivea*, the *tehou ma* of the Chinese, is now known to yield the fiber used in the manufacture of the beautiful fabric called Chinese grass cloth. The most important species, *B. nivea* or *tenacissima*, will be examined under its common name, RAMIE (q. v.).

**Bœotia** (bē-ō'sha), a division of ancient Greece, lying between Attica and Phocis, and bounded E. and W. by the Eubœan Sea and the Corinthian Gulf respectively, had an area of 1,119 square miles. The whole country is surrounded by mountains, on the S., Mts. Cithæron and Parnes, on the W., Mt. Helicon, on the N., Mt. Parnassus and the Opuntian Mountains, which also closed it in on the E. The N. part is drained by the Cephissus, the waters of which form Lake Copais; the S. by the Asopus, which flows into the Eubœan Sea. The country originally had a superabundance of water, but artificial drainage works made it one of the most fertile districts of Greece. The inhabitants were of the Æolian race; most of the towns formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian States. Refinement and cultivation of mind never made such progress in Bœotia as in Attica, and the term Bœotian was used by the Athenians as a synonym for dullness, but somewhat unjustly, since Hesiod, Pindar, the poetess Corinna, and Plutarch were Bœotians. Along with Attica, Bœotia now forms a nomarchy of the Kingdom of Greece, with a population (1896) of 313,069.

**Boerhaave, Hermann**, a celebrated Dutch physician, one of the most influential medical authorities living in the 18th century; born in Woorhout, near Leyden, Dec. 13, 1668. Boerhaave received from his father a liberal education. In 1682 he was sent to Leyden to study theology. Here he gave, at the age of 20, the first public proof of his learning and eloquence. In 1688 he received a gold medal from the city for an academic oration, in which he attacked the doctrines of Spinoza. In 1689 he received the degree of Doctor of Philosophy, and maintained an inaugural dissertation, "De Distinctione Mentis a Corpore," in which he attacked Epicurus, Hobbes, and Spinoza (Leyden, 1690). He now commenced, at the age of 22, the study of medicine. Drelincourt was his first and only teacher. From him he received only a little instruc-

## Boerhaave

tion; and by his own solitary study he learned a science on which he was afterward to exert so important an influence. His first study was anatomy, which he pursued from books rather than from observation. He attended dissections, indeed, but his writings show a deficiency of practical knowledge. Still he exercised a salutary influence on the study of anatomy, as the use he made of mechanical illustrations induced anatomists to apply themselves to a more accurate study of the forms of the organs. After this preliminary study, Boerhaave read all the works, ancient and modern, on medicine, in the order of time, proceeding from his contemporaries to Hippocrates, with whose superior excellence and correct method he was forcibly struck. He also studied botany and chemistry, and although still preparing himself for the clerical profession, was made in 1693 Doctor of Medicine at Harderwyck. His dissertation was "De Utilitate Explorandorum Excrementorum in Ægris, ut Signorum."

After his return to Leyden, some doubts being raised as to his orthodoxy, he finally determined to follow the profession of medicine. In 1701 the University of Leyden chose him, on the death of Drelincourt, to deliver lectures on the theory of medicine; on which occasion he pronounced his dissertation "De Commendando Studio Hippocratico." In this he eulogizes the method of Hippocrates, which was that of experimental philosophy, to which Bacon had recently recalled the scientific world, but to which Boerhaave himself did not always adhere. Boerhaave now began to develop those great and peculiar excellencies which make him a pattern to all who undertake the office of instruction. Pupils crowded from all quarters to hear him. In 1703 he delivered another dissertation, "De Usu Ratiocinii Mechanici in Medicina" (Leyden, 1703). In this he began to deviate from the Hippocratic method, and to introduce the first principles of a defective system, to which his eminent talents gave afterward exclusive currency. His method was eclectic, combining the speculations of opposing schools, and led him to attach too much importance to mechanical and chemical theories of vital actions. In 1709 the University of Leyden appointed him successor to Hotton, in the chair of medicine and botany. On this occasion he delivered a dissertation, "Quæ Repurgatæ Medicinæ facilis asseritur Simplicitas," which deserves to be placed by the side of those in which he recommends the study of Hippocrates.

The course of instruction to which Boerhaave was now devoted induced him to publish two works, on which his fame still rests, viz.: "Institutiones Medicæ in Usus Annuæ Exercitationis Domesticos"; and "Aphorismi de Cognoscendis et Curandis Morbis in Usum Doctrinæ Medicinæ." In



the former, which is a model of comprehensive erudition and clear method, he unfolds his system in its fullest extent; in the latter he undertakes the classification of diseases, and discourses separately on their causes, nature, and treatment. The professorship of botany, which he also filled, contributed no less to his reputation. He rendered essential services to botany by his two catalogues of plants in the garden of Leyden, the number of which he had very much increased. We are indebted to him for the description and delineation of several new plants, and the introduction of some new species. In 1714 he was made rector of the university, and at the close of his term of office delivered an oration, "De Comparando certo in Physicis," one of his best pieces. At the end of this year he succeeded Bidloo in the chair of practical medicine, which he occupied for more than 10 years. In this office he had the merit of introducing clinical instruction, that is, of lecturing to his students at the bedside of patients in hospital, for the first time in Europe. The university conferred on him, at the death of Lemort, the professorship of chemistry, which science he had taught since 1703. His "Elements of Chemistry" is one of his finest productions, and notwithstanding the entire revolution which has taken place in this branch of science, is still highly valuable. Ill health compelled him to resign the professorships of chemistry and botany, which he had held for 20 years. In 1730 he was again appointed rector. He died Sept. 23, 1738.

**Boers** (Dutch, *boer*, a peasant or husbandman), the name commonly applied to the South African colonists of Dutch descent. The Cape Colony was founded by the Dutch in 1650. The Dutch were at this period the leading maritime power of Europe, and their African colonies assumed great importance. When Holland was reduced to the last extremity by the invasion of Louis XIV., serious thoughts were entertained of making the Cape Colony the final refuge of Dutch independence, but this crisis passed away with the advancing power of William. The colony subsequently fell into comparative neglect, and the colonists, left to their own resources, began to develop a character of their own. The troubles in which the parent State was involved by European wars now began also to affect them. The colony was taken possession of by the English in 1795, restored at the peace of Amiens in 1802, taken again in 1806, and finally ceded to England in 1815. The last change was highly distasteful to the colonists. Naturally distrustful of a foreign government, they had formed from their experience of the country and its inhabitants a policy and habits of their own, into which the newcomers could not be expected at once to enter. The Boers, more-

over, were strongly conservative, believing that they understood the situation better than anyone else, and they had acquired in their struggles with the natives a reckless daring, which, added to the coolness and caution of the Dutch character, was likely to make them formidable opponents to any government which provoked their hostility.

The policy of the British governors was not always adapted to the circumstances, and the attempts of the British missionaries, encouraged by the colonial government, to convert and civilize the natives excited the jealousy of the Boers, who thought their own interests compromised by the encouragement given to the converts. The government on various occasions sided with the Kaffirs against the Boers, which, whatever the merits of the particular disputes, was not calculated to conciliate the latter. The emancipation of their slaves in 1833, and the cession to the Kaffirs in 1835 of a frontier district of neutral territory in the E., filled up the measure of provocation, and the Boers resolved to place themselves by emigration beyond the British rule. A first band set out by land in 1835 for Port Natal, but being ignorant of the passes of the country, went out of their way. Part of them settled in the district near the Zoutpansberg or Salt-pan mountain, part proceeded to Algoa bay, but did not succeed in forming a permanent settlement. Another band also proceeding to Natal was attacked by the Matebele Kaffirs, and obliged to fall back on the Modder river. After receiving reinforcements they again advanced, and settling in the Orange river district, formed a commonwealth under Peter Retief. This colony was in 1837 invited to join the British settlers who had in the meantime taken possession of Port Natal. Crossing the Quathlamba mountains for this purpose, Retief and some of his principal followers were treacherously murdered in an interview with the chief of the Zulu Kaffirs. The remainder turned S., and formed the settlement of Peter Maritzburg. Under the leadership of Pretorius they defeated the Zulus, but the colonial government denied their right to form an independent community in this district.

In 1842 a British force was landed, and the Boers were compelled to retire from the coast and acknowledge the British sovereignty. Many of them recrossed the mountains, and settled in the Vaal district. Further disagreements with the colonial government, which had now possession of Natal, led to another emigration to the N. of the Klipp river. Here they struggled successfully with the Kaffirs till 1845, when the colonial government proclaimed the Buffalo river the N. boundary of Natal. The Boers openly resisted, but finding their strength unequal to the conflict, again emigrated to the Vaal country. In 1848 the



## Boethus

colonial government likewise annexed by proclamation the Orange river settlement. The Boers, headed by Pretorius, took up arms, but being defeated retired beyond the Vaal, and with the previous settlers formed the Transvaal republic. Those who remained continued their resistance to the British authority until, in 1851, on the outbreak of the Kaffir war, the British relinquished the Orange river territory, and recognized the independence of the Orange Free State. See CAPE COLONY: TRANSVAAL: ORANGE RIVER COLONY: SOUTH AFRICAN WAR.

**Boëthus** (bō-ē'thus), a Greek sculptor, born in Chaleedon in the 2d century B. C.

He is celebrated for his statues of children. "The Boy with the Swan" was his most famous work. A girl playing with dice and a boy extracting a thorn were subjects of other masterpieces by him.

**Boethius, Anicius Manlius Severinus**, a Roman statesman and philosopher, called "the last of the classic writers"; born in Rome or Milan, of an ancient family, about A. D. 470; was educated in Rome, in a manner well calculated to



BOY WITH SWAN.

develop his extraordinary abilities. Theodoric, King of the Ostrogoths, then master of Italy, loaded him with marks of favor and esteem, and raised him to the first offices in the empire.

He was the oracle of his sovereign and the idol of the people. The highest honors were thought inadequate to reward his virtues and services. But Theodoric, as he grew old, became irritable, jealous, and distrustful of those about him. The Goths now indulged in all sorts of oppression and extortion, while Boethius exerted himself in vain to restrain them. He had already made many enemies by his strict integrity and vigilant justice. These at last succeeded in prejudicing the king against him, and rendering him suspicious of Boethius. His opposition to their unjust measures

## Bog

was construed into a rebellious temper, and he was accused of a treasonable correspondence with the court of Constantinople. He was arrested, imprisoned, and executed A. D. 524 or 526. His occupations as a statesman did not prevent Boethius from devoting himself assiduously to the study of philosophy. He made many laborious translations of the Greek philosophers, particularly of Aristotle. These translations, and especially his commentaries on Aristotle, caused him to be regarded up till the 14th century as the highest authority in philosophy. His treatise, "De Musica," also supplied for many centuries the place of Greek originals. He was long considered a Catholic saint, but there is no evidence that he was even a Christian. His fame now chiefly rests on his "Consolations of Philosophy," written in prison, a work of elevated thought and diction. It is written partly in prose and partly in verse. The oldest edition of this work was published at Nuremberg in 1473. It was translated by King Alfred and Chaucer, and was highly prized during the Middle Ages.

**Bog**, a piece of wet, soft, and spongy ground, where the soil is composed mainly of decaying and decayed vegetable matter. Such ground is valueless for agriculture until reclaimed, but often yields abundance of peat for fuel. A bog seems usually to be formed as follows: A shallow pool induces the formation of aquatic plants, which gradually creep in from the borders to the deeper center. Mud accumulates round their roots and stalks, and a semi-fluid mass is formed, well suited for the growth of moss, particularly sphagnum, that absorbs water, and shoots out plants above as the old decay beneath; these are consequently rotted, and compressed into a solid substance, gradually replacing the water by a mass of vegetable matter. A layer of clay, frequently found over gravel, assists the formation of bog by its power of retaining moisture. When the sub-soil is very retentive, and the quantity of water becomes excessive, the superincumbent peat sometimes bursts forth and floats over adjacent lands. Bogs are generally divided into two classes: red bogs, or peat mosses, and black bogs, or mountain mosses. The former class are found in extensive plains frequently running through several counties, such as chat moss in Lancashire, and the Bog of Allen in Ireland, the depth varying from 12 to 42 feet. Their texture is light and full of filaments. The lower parts, more entirely decayed, approach nearer to the nature of the humus than the upper portion, and, being more carbonaceous, are more valuable for fuel. Black bog is formed by a more rapid decomposition of plants. It is heavier and more homogenous in quality, but is usually found in limited and detached portions, and at high



## Bogaers

elevations where its reclamation is difficult. In Ireland bogs frequently rest on a calcareous subsoil, which is of great value in reclaiming them. In the reclamation of bog land a permanent system of drainage must be established; the loose and spongy soil must be mixed with a sufficient quantity of mineral matter to give firmness to its texture and fertilize its superabundant humus; proper manures must be provided to facilitate the extraction of nutriment from the new soil, and a rotation of crops adopted suitable for bringing it into permanent condition. The materials best adapted for reclaiming peat are calcareous earths, limestone gravel, shell marl, and shell sand. Thoroughly reclaimed bogs are not liable to revert to their former condition. Trunks of trees are often found in bogs, as are also bones of extinct animals.

**Bogaers, Adriaan** (bō'gärs), a Dutch poet, born at The Hague, in 1795. He holds an eminent place among the many disciples of Tollens, and surpasses his master in correctness of taste. He long withheld his compositions from publication, and not till 1832 did he become known to his countrymen; he then published his first lyric poem, "Volharding"—an appeal to his countrymen to stand fast in the struggle with Belgium—together with other patriotic pieces. His first poem of any considerable compass, the epic "Jochebed," and his masterpiece, "The Voyage of Heemskerk to Gibraltar," were first formally published in 1860–1861, though they had had for many years a private circulation among friends. He afterward published three volumes, "Ballads and Romances," "Flowers of Poesy from Abroad," and "Poems." He died in 1870.

**Bogardus, Everardus**, a minister of the Dutch Reformed Church in New Amsterdam, now New York; husband of Anneke Jans. The latter owned a farm of 60 acres, comprising now one of the most valuable sections of New York city. The Bogardus heirs have for many years endeavored unsuccessfully, to recover this property, which is held by the corporation of Trinity Church. He died Sept. 27, 1647.

**Bogardus, James**, an American inventor, born in Catskill, N. Y., March 14, 1800; was apprenticed to a watchmaker, and early showed the bent of his mind by improvements in the construction of eight-day clocks, and by the invention of a delicate engraving machine. The dry gas meter is his invention, as is also the transfer machine to produce bank note plates from separate dies; and in 1839 his plan for manufacturing postage stamps was accepted by the British Government. Later he introduced improvements in the manufacture of india rubber goods, tools, and machinery; and invented a pyrometer, a deep sea sound-

## Bog Rush

ing machine, and a dynamometer. He died in New York, April 13, 1874.

**Bog Butter**, a fatty, spermaceti-like mineral resin found in masses in peat bogs, composed of carbon, oxygen, and hydrogen.

**Bogdanovich, Ippolit Feodorovich** (bog-dä-nō'vich), a Russian poet, born in Little Russia, in 1744. His early poems, written when he was a boy, won for him admission to the university. His most celebrated work is a charming free elaboration of Lafontaine's "Loves of Psyche and Cupid." He also wrote dramas and comedies, and published a collection of "Proverbs." He died in 1803.

**Bogdanovich, Modést Ivanovich**, a Russian military historian and commander, born in 1805; was a very able soldier, and even abler with the pen; his "Bonaparte's Campaign in Italy, 1796" (2d ed., 1860), and "History of the Art of War," and particularly his "History of the Campaign of 1812" (2d ed., 1861), having attracted wide notice. He died in Oranienbaum, Aug. 6, 1882.

**Boggs, Charles Stuart**, an American naval officer, born in New Brunswick, N. J., Jan. 28, 1811; entered the navy in 1826; served on the "Princeton" in the Mexican War; was assigned to the gunboat "Varuna" in Farragut's Gulf Squadron in 1861. In the attack on Forts St. Philip and Jackson, in April, 1862, he destroyed six Confederate gunboats and two rams, and in the last moments of the fight his own vessel was sunk. In 1869–1870 he served with the European Squadron; in the latter year was promoted to Rear-Admiral; and in 1873 was retired. He died in New Brunswick, April 22, 1888.

**Boghead Coal**, a brown cannel coal of Scotland, found at Boghead, near Bathgate, and very valuable for gas and oil making.

**Bögh, Erik** (bëch), a Danish poet and dramatist, born in Copenhagen, Jan. 17, 1822. He is best known for his witty stanzas and epigrams in periodicals, for "This and That," a collection of humorous essays, and for a hundred or so of plays and farces. A novel, "Jonas Tvärnrose's Vexations," has merit. He died in 1899.

**Bog Iron Ore**, or **Bog Ore**, a variety of limonite. It occurs in a loose and porous state in marshy places, often inclosing wood, leaves, nuts, etc., in a semi-fossilized state; also a variety of limnite.

**Bog Pimpernel**, a species of pimpernel, *anagallis tenella*. It is found in bogs, and not like its congener, the scarlet pimpernel (*A. arvensis*), in corn fields. It is a small creeping plant with rose colored flowers.

**Bog Rush**, an English book name for *schænus*, a genus of the order *cyperaceæ* (sedges). As now limited it contains only



## Bogomilian

the black bog rush, a plant found on wet moors, and recognizable on account of its dark brown, nay, almost black, heads of flowers. It is also the name of a species of warbler about the size of a wren.

**Bogomilian**, a Slavonic Christian sect, founded in the 12th century by a monk called Basil. His tenets were akin to those of the Manicheans and of the Gnostics. He believed that the human body was created not by God, but by a demon whom God had cast from Heaven. Basil was burned alive at Constantinople, for his tenets, under the Emperor Alexius Comnenus.

**Bogotá**, under Spanish rule Santa Fé de Bogotá, in South America, the federal capital of the United States of Colombia. It is situated within the limits of the province of Cundinamarca, on a tableland which, at an elevation of 8,694 feet above the sea, separates the basin of the Magdalena from that of the Orinoco. The tableland has an area of about 400 square miles, and is bounded on all sides by mountains, which, though lofty enough to give shelter, are yet below the line of perpetual snow. This extensive plain—a temperate zone on the verge of the equator, with a salubrious climate and an average temperature of 60° F.—is exceedingly fertile, being as rich in pasture as in grain. The greater number of its people, however, are sunk in poverty. This is largely due to the heavy cost and difficulty of transport, which hamper all industries. Bogotá is 65 miles from its port, Honda, the head of navigation on the Magdalena; and from this point, although a railway has been projected, at present goods must be conveyed over the mountains in packages of not more than 125 pounds. The transport of heavy machinery is thus impossible. The few manufactures of the place include soap, leather, cloth, and articles made from the precious metals. Bogotá was founded in 1538, and in 1598 became the capital of the Spanish Vice-Royalty of New Granada; since 1554 it has been the seat of an archbishop. In 1800 it contained 21,464 inhabitants, and in 1821, 30,000; in 1905 about 120,000. The river Bogotá, otherwise called the Funcha, is in itself an object of physical interest. It is the single outlet of the waters of the tableland, which, both from geological features and from aboriginal traditions, appears to have once been a land locked basin, somewhat like the still loftier and larger plateau of Titicaca. Be this as it may, the river has found, if it has not forced, a passage for itself toward the Magdalena. At the cataract of Tequendama the waters plunge over a precipice 700 feet high, their force having hollowed out a well 130 feet deep in the rock below; and the clouds of spray clothe the adjacent ground with the

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most luxuriant vegetation. Some miles from the fall stands the natural bridge of Icononzo, formed as if by the fortuitous jamming of rocks from the opposite sides of the cleft; and the plateau also contains a lake, Guatavita.

**Bog Spavin**, an encysted tumor filled with gelatinous matter inside the hock of a horse.

**Bog Stalker**, an idle and stupid vagrant.

**Bogue, David**, one of the founders of the London Missionary Society, was born in Berwickshire, in 1750. He studied at Edinburgh and was licensed to preach by the Church of Scotland, but went to London to teach in 1771. He afterward became minister of an Independent chapel at Gosport, and here he also took a tutorship in a seminary, for Independent students of theology. This became a great school of missionaries, and out of it grew the scheme for foreign missions realized in the London Missionary Society. Bogue also took an active part in the establishment of the British and Foreign Bible Society and the Religious Tract Society. He was on the point of going as a missionary to India in 1796, when the East India Company refused to sanction the scheme. Bogue died at Brighton, Oct. 25, 1825. He published numerous books, including an "Essay on the Divine Authority of the New Testament." In conjunction with Dr. James Bennet, he wrote a "History of Dissenters" (3 vols., 1809), of great value, though somewhat impaired by partisan prejudices.

**Boguslavski, Adalbert** (bō-gō-slav'ske), a Polish dramatist, born near Posen, in 1759. He composed the first opera ever written in the Polish language. For several years he was director of theaters in various towns, and in 1790 became director of the National Theater at Warsaw. As an actor he excelled alike in tragedy and in comedy, and he formed many pupils who gained high distinction on the stage. The best of his dramatic compositions is the popular melodrama, "The Wonder, or the Men of Krakau and the Mountaineers." He died in 1829.

**Bohemia**, a former Kingdom, now a Province of the Austro-Hungarian monarchy (Austrian or Cisleithan portion), bounded by Bavaria, Saxony, the Prussian Province of Silesia, Moravia, and the Archduchy of Austria; area 20,223 square miles; population (1900), 6,318,697, of whom more than 2,000,000 are Germans, the rest mostly Czechs. The prevailing religion is the Roman Catholic, the country being an archbishopric with three bishoprics. The language of the country is the Czech dialect of the Slavonic in some districts, and in most of the cities, German is spoken. Bohemia is surrounded on all sides by mountains, and



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has many large forests. Its plains are remarkably fertile. The chief rivers are the Elbe and its tributary the Moldau, which is even larger.

*Productions.*—All sorts of grain are produced in abundance, as also large quantities of potatoes, pulse, sugar beet, flax, hops (the best in Europe), and fruits. Wine is not abundant, but in some parts is of quite good quality. The raising of sheep, horses, swine and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, zinc, iron, cobalt, arsenic, uranium, antimony, alum, sulphur, plumbago and coal. There are numerous mineral springs, but little salt. Spinning and weaving of linen, cotton and woolen goods are extensively carried on; manufactures of lace, metal and wood work, machinery, chemical products, beet root sugar, pottery, porcelain, etc., are also largely developed. Large quantities of beer (Pilsener) are exported. The glassware of Bohemia, which is known all over Europe, employs 50,000 workers. The trade, partly transit, is extensive, Prague, the capital, being the center of it. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Teplitz, Aussig and Eger. The educational establishments include the Prague University and upward of 4,000 ordinary schools. The Province sends 110 representatives to the Austrian Parliament; the Provincial Diet consists of 242 members.

*Literature.*—Bohemia possesses a literature of considerable bulk, including in it also works written in Czech by Moravian and Hungarian writers. The earliest fragment is doubtfully referred to the 10th century, and it was not till after the 13th century that it attained to any development. The next century was a period of great activity, and to it belong versified legends, allegorical and didactic poems, historical and theological works, etc. The most flourishing period of the older literature falls within 1409–1620, John Huss (1369–1415) having initiated a new era, which, however, is more fertile in prose works than in poetry. The following period, up to the beginning of the 19th century, was one of decline, but in recent times there has been a great revival, and in almost all departments Bohemian writers have produced works of merit.

*History.*—Bohemia was named after a tribe of Gallic origin, the Boii, who were expelled from this region by the Marcomans at the commencement of the Christian era. The latter were in turn obliged to give place to the Germans, and these to the Czechs, a Slavic race, who had established themselves in Bohemia by the middle of the 5th century, and still form the bulk of the population. The country was at first divided into numerous principalities, Chris-

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tianity was introduced about 900. In 1092 Bohemia was finally recognized as a kingdom under Wratislas II. In 1230 the monarchy, hitherto elective, became hereditary. The monarchs received investiture from the German Emperor, held one of the great offices in the imperial court, and were recognized as among the seven Electors of the Empire. Frequently at strife with its neighbors, Bohemia was successively united and disunited with Hungary, Silesia, Moravia, etc., according to the course of wars and alliances. Ottokar II. (1253–1278) had extended his conquests almost from the Adriatic to the Baltic, when he lost them and his life in contest with Rudolph, the founder of the house of Hapsburg. After the close of the Przemysl dynasty (which had held sway for about six centuries) by the assassination of Ottokar's grandson, Wenceslas III., the house of Luxemburg succeeded in 1310, and governed Bohemia till 1437, the reign of Charles II. (1346–1378) being especially prosperous. Toward the close of this second dynasty civil wars were excited by the spread of the Hussite movement, the central figure of the struggle being John Ziska, the leader of the Taborites. A temporary union between the moderate Hussites and the Catholics having proved a failure, the Reformed Party elected as king, in 1433, the Protestant noble, George Podibrad. On his death, in 1471, they chose Wladislas, son of Cassimir, King of Poland, who also obtained the crown of Hungary. His son Louis lost both crowns with his life in the battle of Mohacz against the Turks, and Ferdinand of Austria became, in 1527, sovereign of both kingdoms. Bohemia then lost its separate existence, being declared a hereditary possession of the house of Austria; and its subsequent history pertains to that of the Austrian Empire. In 1848 an attempt was made to assert its ancient independence against the Austrian dominion; a conflict took place, Prague was bombarded, and the insurrection suppressed.

**Bohemian Brethren**, a religious society, instituted in Prague, about the middle of the 15th century, originally composed of remnants of the Hussites. In 1453 they settled on the borders of Silesia and Moravia. The Thirty Years' War entirely broke up the societies of the Brethren; but afterward they united again, though persecuted. Their exodus and settlement, in 1722, on the estates of Count Zinzendorf, in Saxony, occasioned the formation of the Herrnhuters. See MORAVIANS.

**Bohemond**, or **Boëmond**, first sovereign of Antioch, was son of Robert Guiscard, and distinguished himself in the first crusade, in 1096. He besieged and took Antioch, of which he was made Prince by the Crusaders, and established there a little kingdom,



which existed nearly 200 years. Besieged by the Saracens, he completely defeated them; but was soon after captured, and remained their prisoner two years. He subsequently visited Europe, married a daughter of the King of France, and got the emperor to acknowledge his title. Died in Italy in 1111. Six princes of his name succeeded him in the sovereignty of Antioch, the last, Bohemond VII., being de-throned in 1288.

**Böhlän, Helene**, a German novelist, born at Weimar, Nov. 22, 1859. She shows now and then a leaning toward the romantic school, but on the whole her high power of description is realistic and her writings are imbued with passion. Among her novels are "Under Death's Ban" (1882); "Guilty of a Pure Heart" (1888); "In Fresh Water" (1891).

**Böhlen, Peter von** (bō'len), a German Orientalist, born in 1796. Having devoted himself to the Oriental languages, he obtained an appointment at Königsberg, in 1825, as Extraordinary, and in 1830, as Ordinary, Professor of Oriental Literature. The most important of his writings is "Das alte Indien" ("Ancient India"). He died in 1840.

**Bohlen Lectures**, a lecture course on a foundation of \$10,000 furnished by John Bohlen, a lay member of the Protestant Episcopal Church. They are delivered each year in Philadelphia, Pa., by eminent representatives of that Church. Among the most notable are those upon "The Influence of Jesus," by Bishop Brooks, and the "Fitness of Christianity," by Bishop Huntington.

**Bohol** (bō'hol), one of the Philippine Islands, belonging to the Visayas or Bisayas group. It has an area of about 1,300 square miles and a population (U. S. census, 1903) of 269,223. Sugar cane is grown and the island is reputed rich in gold deposits. The most important town is Tagbilaran, a port on the S. W. coast. In the N. is Calape. These ports were officially declared open to commerce, Dec. 11, 1899. The Visayas dialect prevails throughout Bohol.

**Boiardo** (bō-yär'dō), **Matteo Maria, Count of Scandiano**, one of the greater Italian poets, was born in 1434 at Scandiano, a village situated at the foot of the Lombard Apennines. He studied at the University of Ferrara, and, in 1462, married the daughter of the Count of Norellara. He lived principally at the court of Ferrara on terms of intimate friendship with Duke Borso and Duke Ercole, by the latter of whom he was employed on important diplomatic missions, and appointed, in 1481, Governor of Modena, and, in 1487, Governor of Reggio. As an administrator he was distinguished for his clemency, and is

said to have held that no crime should be visited with capital punishment. He died at Reggio, in 1494. Boiardo has been called the "Flower of Chivalry." His fame rests on the "Orlando Innamorato" (1486), a long narrative poem in which the romances of the Carolingian cycle are recast into "ottava rima." Full of rich and graceful fancy, this is the only work in which the spirit of chivalry is found in union with the spirit of the Renaissance. The chief characters, the Paladins of Charlemagne, are led in a maze of adventure from Paris to Spain, Hungary, Africa and the far East; Orlando, whose love for the Eastern princess Angelica is the central subject, being none other than the hero of the old "Chanson de Roland." Ariosto adopted Boiardo's characters and magic machinery, and brought his narrative to a close in the "Orlando Furioso," by which the fame of the earlier poem has been unfairly obscured. After going through 16 editions before 1545, Boiardo's work became almost forgotten, its vigorous but rough and provincial style being uncongenial to the Florentine taste. Boiardo's other works comprise various Latin eclogues, a versification of Lucian's "Timon," translations of Herodotus, the "Ass" of Lucian, and the "Golden Ass" of Apuleius, and a series of sonnets and "Canzoni" (Reggio, 1499).

**Boidæ**, a family of *ophidiæ* (serpents) belonging to the suborder *colubrina*. They have no poison fangs. They have the rudiments of hind limbs. The chief genera are *boa*, *python* and *eryx*.

**Boieldieu, François Adrien** (bwäl-dye), a French musical composer, born in 1775; author of numerous well known operas: "Le Calife de Bagdad," "Jean de Paris," etc.; "La Dame Blanche" is, however, esteemed his *chef d'œuvre*. His style is characterized by a sweet and natural melody, much imaginative gayety, and simple but pleasing accompaniments. Boieldieu was a member of the Institute. He died in 1835.

**Boies, Horace**, an American lawyer, born in Aurora, Erie co., N. Y., Dec. 7, 1827; went to Wisconsin Territory in 1844; and after working on a farm returned to Erie county, where he studied law and was admitted to the bar in 1849. He practiced at and near Buffalo till 1867, becoming active in Republican politics during this period; and in the last year removed to Waterloo, Ia., where he continued law practice. His opposition to the tariff and prohibition policy of the Republican Party caused him to unite with the Democrats; and, in 1890-1894, he served two terms as Governor of Iowa, being defeated for a third term in 1893. He was a conspicuous candidate for the presidential nomination



in the National Democratic Conventions in 1892 and 1896; and in the campaign of 1896 he supported Mr. Bryan.

**Boii**, a powerful Celtic people who dwelt originally in Transalpine Gaul, part of whom settled in the modern Bohemia, and bequeathed their name to that country.

**Boil**, a disease called by medical men *furunculus*. It is a phlegmonous tumor, which rises externally, attended with redness and pain, and sometimes with a violent, burning heat. Ultimately it becomes pointed, breaks, and emits pus. A substance called the core is next revealed. It is purulent, but so thick and tenacious that it looks solid, and may be drawn out in the form of a cylinder, more pus following. The boil then heals. A blind boil is one which does not suppurate.

**Boileau, Nicolas** (bwä-lō'), a French poet, born at Paris, Nov. 1, 1636. He was educated at Beauvais, and received both a legal and a theological training. In his 21st year, however, he inherited a competence, and decided to follow a life of purely literary activity. In his youth he appears to have been most generally known by the surname Despréaux, which he had taken in

gained the favor of the king, who awarded him various pensions, and in 1677 appointed him, along with Racine, to the post of royal historiographer. "L'Art Poétique," which contains the exposition of his literary creed, and which was imitated by Pope in the "Essay on Criticism," was published in 1674, along with four cantos of the "Lutrin," a clever serio-comic description of an ecclesiastical squabble over a reading desk. Two cantos, concluding the poem, appeared in 1681. Between 1669 and 1677 Boileau published nine epistles, written, like his satires, on the Horatian model. To celebrate the capture of Namur in 1692, he composed an ode which remains a glaring example of servile flattery and bad verse. This deplorable production was admirably burlesqued by Prior. In his last years Boileau retired to Auteuil, where he died March 13, 1711.

**Boiler**, the name applied to any vessel or cauldron for boiling large quantities of liquor, but most commonly used as the designation of a metallic vessel in which water is converted into steam by the action of fire, the steam being intended by its expansive force to give motion to a steam engine, or to be used for a variety of manufacturing purposes. Boilers may be subdivided into the following classes: (a) Shell or tank boilers. (b) Water-tube boilers.

Shell or tank boilers consist of a large shell or tank, usually cylindrical in form with flat ends. Within this shell are contained the water and steam, so that the whole of the shell is exposed to the full pressure of the steam. In some cases the furnaces are external, but generally they are contained within the shell. The following are examples of shell boilers (see accompanying plate): Cornish and Lancashire boilers (Fig. 7), ordinary marine boilers (Figs. 1, 2), and locomotive boilers. Boilers may also be classified as flue boilers and multitubular boilers; and multitubular boilers may be subdivided into fire-tube boilers and water-tube boilers. The Lancashire boiler is an example of the flue type of boiler, because there are internal flues of large diameter passing through it. Ordinary marine and locomotive boilers are examples of multitubular fire-tube boilers, because the products of combustion flow through a large number of tubes of small diameter. In water-tube boilers the water flows through the tubes, and the products of combustion flow over the outsides. Examples of water-tube boilers are shown in plate.

We will now give a brief description of the different types of boilers:

**Lancashire Boiler** (Fig. 7).—Boilers of this type are usually from 7 to 8 feet in diameter, and they may vary in length from 20



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accordance with a practice of the time. He published his satirical "Adieux d'un Poète à la Ville de Paris," in 1660, and, in 1663, we find him united with Molière, La Fontaine and Racine, in the famous "society of four." In 1666 he published a collection of satires from which the royal privilege was for a time withdrawn, through the influence of Chapelain, one of the writers whom he had gibbeted. Boileau, however, soon



to 30 feet. Within the boiler are two cylindrical flues, at the front ends of which are the two furnaces. Conical "Galloway" tubes are usually fitted into the internal flues, as shown, for the purpose of improving the circulation of the water. At the rear end of the fire grate is a fire-brick bridge, which serves to prevent the fuel falling over the end of the grate, but the main object of which is to cause the gases to mix more rapidly in order to facilitate rapid and complete combustion. The length of the fire grate should not exceed 6 feet, as with a longer grate it is impossible to ensure a uniform distribution of the fuel over the surface of the grate. The bulk of the air for combustion passes through the fire, and the rest of it is admitted through gratings in the furnace doors. If the fire is thick it is impossible to insure complete combustion without this additional supply above the fires. The boiler is cased in brick-work built in such a way as to form external flues at the sides and beneath the boiler. The products of combustion after leaving the internal flues pass down to the bottom flue, along which they flow to near the front end of the boiler; they then flow through the side flues to the rear end, and from thence into the flue leading to the economizer or chimney. The feed-water is sent by means of a pump or an injector into the boiler through the vertical pipe shown at the left-hand side of the front end, and it is discharged into the boiler through the perforations in the long horizontal pipe shown. The steam is collected by the upper perforated pipe which is shown under the stop valve. The other important fittings are the pressure gauge, the water-level gauges, the safety valves, and the scum and blow-off cocks.

The marine boiler, illustrated in Figs. 1 and 2, has three furnaces, each with a separate combustion chamber. The products of combustion flow from the combustion chambers *c* into the small diameter tubes *d*, through which they flow to the front end of the boiler, where they are discharged into the uptake. The plain tubes are expanded into the tube plates by cold rolling, but a certain proportion of the tubes are used as stay tubes, and these are screwed into the tube plates and have nuts screwed on them.

In a locomotive boiler it is usual to have a fire-brick arch dividing the fire-box into two compartments, the upper of which serves as a combustion chamber. The gases flow from the fire-box through the small-diameter tubes to the smoke-box at the front end. As a high chimney cannot be used, the draught has to be obtained artificially, and in locomotives it is always obtained by means of a steam blast, the exhaust steam from the engine cylinders being used for the purpose.

*Water-tube Boilers.*—In Fig. 8 a boiler of the Babcock and Wilcox type is shown. The upper drum is kept about half full of water, and the space above it is the steam space. The feed-water is fed into the upper drum. The main heating tubes are expanded into front and rear headers, which are sinuous in form in order that the tubes may not be in vertical planes. This arrangement insures complete mixing of the gases as they flow between the tubes, and thus tends to increase the efficiency of the boiler. The front and rear headers are connected to the upper drum by the tubes shown, and a mud drum is connected to the lower ends of the rear headers. The circulation of the water within the boiler is due to the difference in density between the water in the rear headers and their connecting pipes, and the water and the steam in the main tubes and front headers. The flow is, therefore, from front to rear in the upper drum, down the rear pipes and upward through the main inclined tubes and the front headers. A modified form of boiler is being built by this firm for marine purposes, and a large number have been adopted.

The Belleville boiler is illustrated in Figs. 5 and 6. The steam drum, *N*, is of very small diameter, about 20 inches in full-sized boilers. The heating surface consists of a number of tubes arranged in elements, and all the tubes in the same element are connected up in series. Each element may therefore be regarded as a flattened helix. The boiler shown contains eight of these elements. The water is fed into the steam drum, from which it flows down a pipe at each end of the boiler into a mud-box. At the lower end of each down-take pipe a non-return valve is provided. The water flows from the mud-box into a feed-distributing tube, from which it flows upward through the various elements from which the water and steam are discharged into the upper drum. The steam and water are separated in the upper drum by a very elaborate arrangement of baffles.

In the economizer type of Belleville boiler the feed-water is heated before being sent into the drum, in tubes arranged similarly to those in the boiler and placed above them. When this arrangement is adopted, the number of tubes in each boiler element is reduced, and a space is left between the boiler and the economizer to form a secondary combustion chamber. Combustion above the fire and in the secondary combustion chamber is facilitated by the use of jets of air at a high velocity, which serve to rapidly mix the gases. A Thornycroft boiler of the "Daring" type is shown in Figs. 3 and 4. One of the most important features is the arrangement of the tubes so that the discharge of water and steam into the upper drum takes place above the water-level. This insures systematic and



definite circulation, and that each tube shall do its own duty and no more. The tubes in which the steam is generated are usually about  $1\frac{1}{8}$  inches in diameter. A boiler of the Yarrow type has an upper steam and water drum, and two lower semi-cylindrical water chambers; the latter are connected with the former by a series of straight generating tubes. The main advantages of this type of boiler are its simplicity and its straight tubes. Both the Thornycroft and the Yarrow types of boilers are largely used for torpedo boats and other vessels in which high speed is of the greatest importance.

*Green's Economizer.*—This is an arrangement of vertical cast-iron tubes which is generally attached to Lancashire boilers for the purpose of heating the feed-water by means of the products of combustion after they leave the boiler. The products of combustion flow round the outsides of these tubes, and the tubes are kept clean by automatic scrapers, which continuously remove the soot from the outsides of the tubes.

*Importance of Circulation of Water in Boilers.*—Rapid, free, and uniform circulation of the water in a boiler is of the greatest importance, because it insures all parts of the boiler being at approximately the same temperature, and thus prevents unequal expansion. It also diminishes the chances of sediment settling on the heating surfaces, as the sediment settles most rapidly where the velocity of flow is least. Some special place should be provided within the boiler, and away from the heating surface, where the water in its circuit may be brought approximately to rest, in order that the sediment may settle out in this place. Rapid circulation of the water diminishes the chances of corrosion, because the oxygen and carbonic acid gas, which are always in solution in natural water, are swept off the surfaces immediately they are liberated from solution. If the various currents of water within the boiler interfere with one another there will be practically still water in some places or at some times, and excessive commotion in other places, or at other times, and this excessive commotion may cause serious priming. Priming is said to take place when some of the water is carried along with the steam from the boiler. The efficiency of steam engines is greatly reduced whenever priming takes place.

*Superheated Steam.*—The temperature of saturated steam depends on the pressure. For example, the temperature of ordinary steam at atmospheric pressure is  $212^{\circ}$  F., and when the pressure is 130 pounds per square inch by gauge the temperature is  $356^{\circ}$  F. Steam is said to be superheated when it is raised to a higher temperature than that which corresponds to its pres-

sure. If superheated steam is brought into contact with water it at once takes up some of the water, becomes saturated, and its temperature falls to that corresponding to its pressure. The superheating of steam is therefore effected by supplying heat to it after it leaves the boiler, and this is usually done by passing it through tubes which are heated on the outside by products of combustion. By superheating the steam initial condensation within the engine cylinder is greatly diminished or entirely obviated, and in this way the efficiency of the engine is greatly increased. The saving in coal due to superheating may amount to as much as 25 per cent. even in first-class engines, and to more than this in common engines. The saving is seldom less than 15 per cent. even with moderate degrees of superheating. The difficulties encountered when superheating was tried, about the year 1860, are now past, and it seems certain that superheating will be adopted where economy in coal is of importance.

*Materials Used in the Construction of Boilers.*—Boilers are now generally constructed of mild steel having a tensile strength of about 28 tons per square inch. In locomotive boilers the fire-boxes are almost always constructed of copper, although in some cases, especially in the United States, mild steel is used for this purpose. The tubes of locomotive boilers are made of brass, usually about  $1\frac{7}{8}$  inches diameter. Copper tubes were at first used for the water-tube boilers of torpedo boat destroyers, but they have been found to be unsuitable for this purpose, and mild steel is now always used, and the tubes are best when solid drawn. The tubes of marine boilers are usually of wrought iron or mild steel.

*Selection of Type of Boiler.*—Before deciding which type of boiler to adopt in any given case it is necessary to consider what are the controlling features: such as, in the case of land boilers, the space available, the ease or otherwise with which a boiler can be put into the building provided for it, safety, efficiency, the kind of water available, the rate of fluctuation in the demand for steam, the facility with which steam can be raised, the pressure at which the steam is required, the first cost, and the cost of maintenance. In locomotive and marine work it is of the greatest importance that the weight and bulk of the boilers shall be as small as possible consistent with the other controlling conditions. For most purposes on land the Lancashire type of boiler is still generally preferred (where sufficient space can be provided for it and where it can be easily put into the works), for the following reasons: (a) Its first cost and cost of maintenance are comparatively low; (b) it can be easily and thoroughly inspected and cleaned, hence dirty feed-water may be used with greater

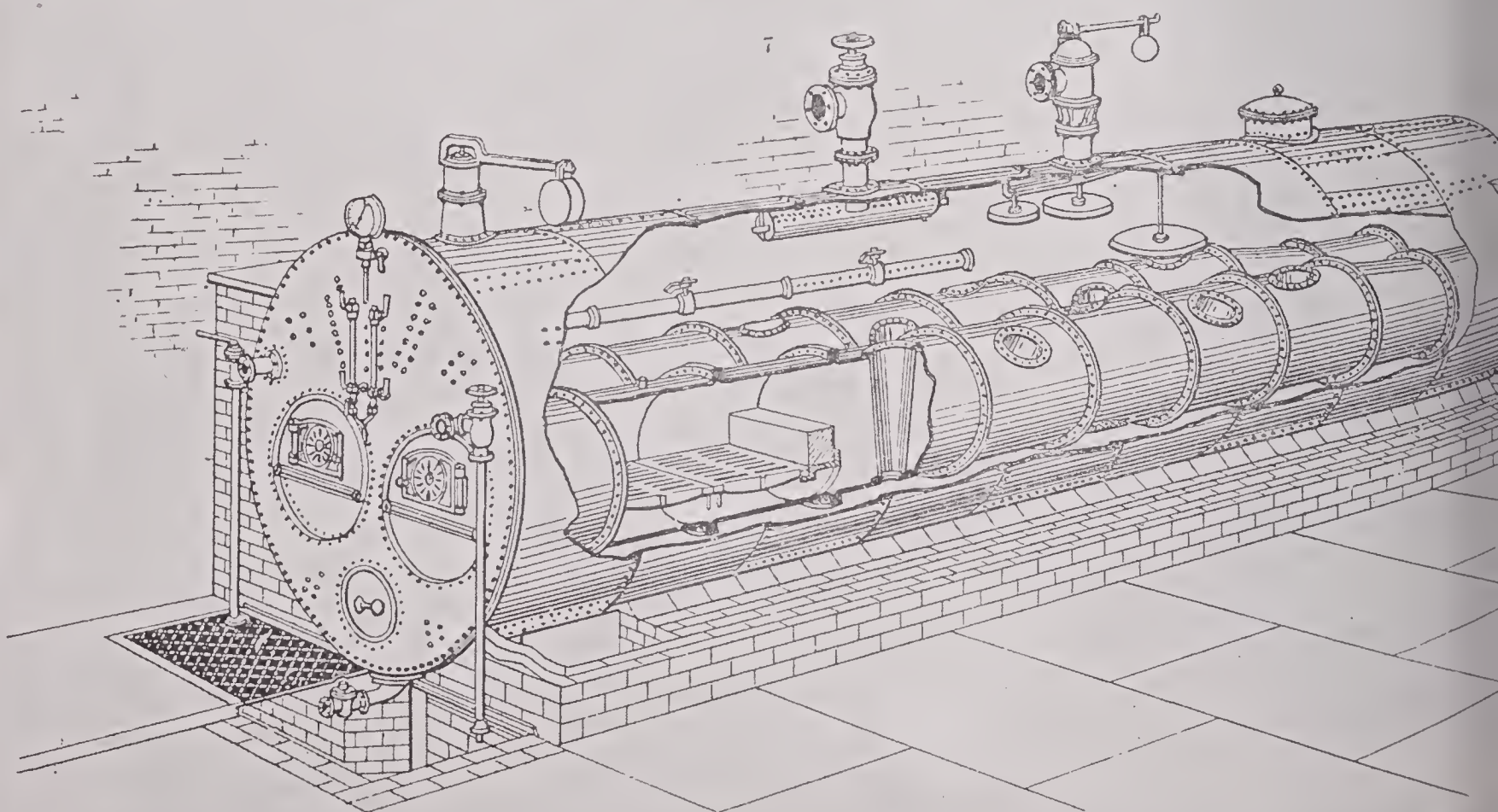
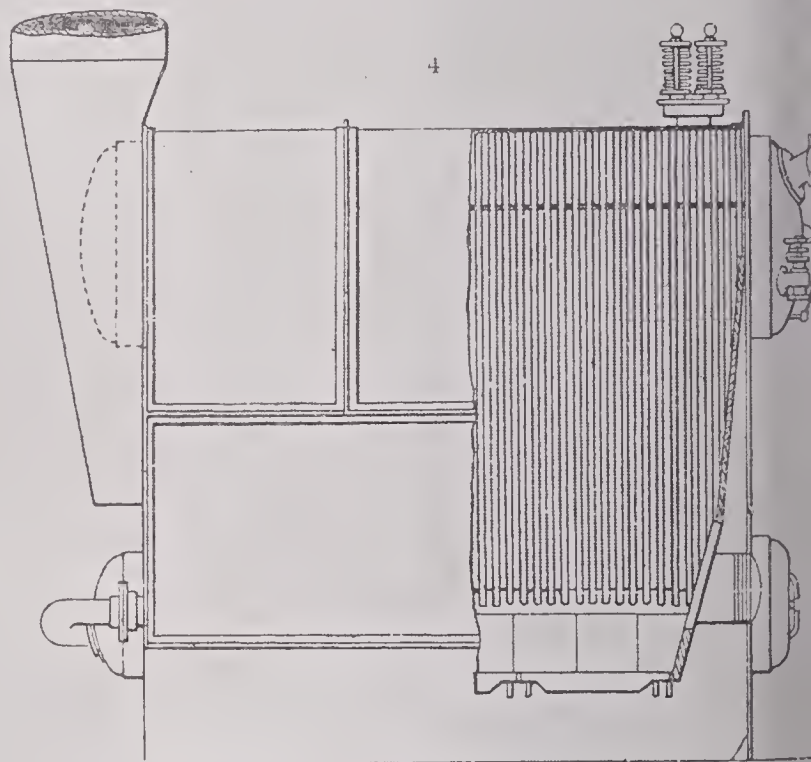
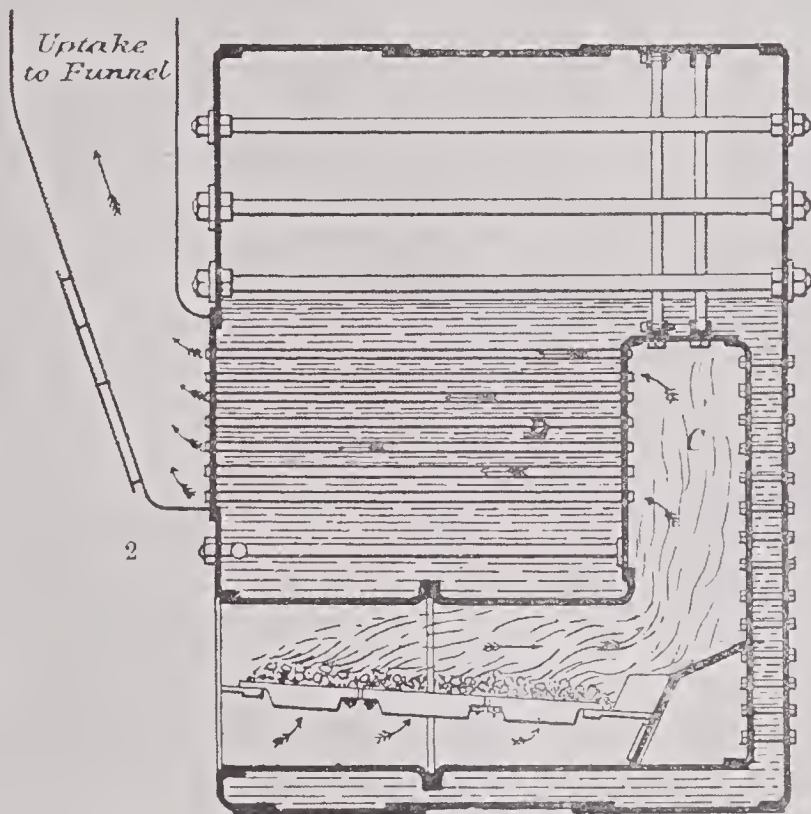
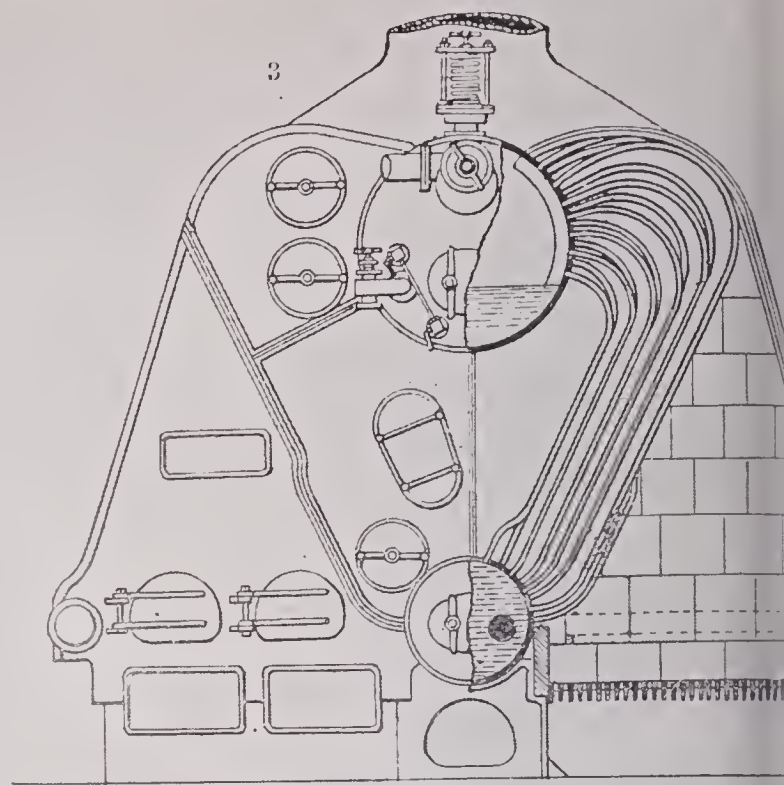
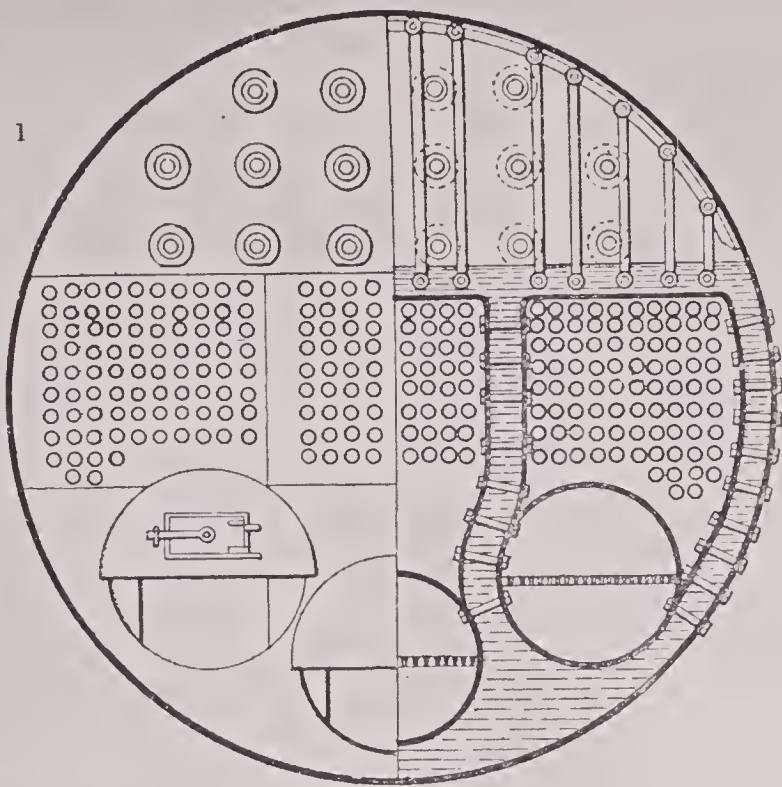


## BOILER.

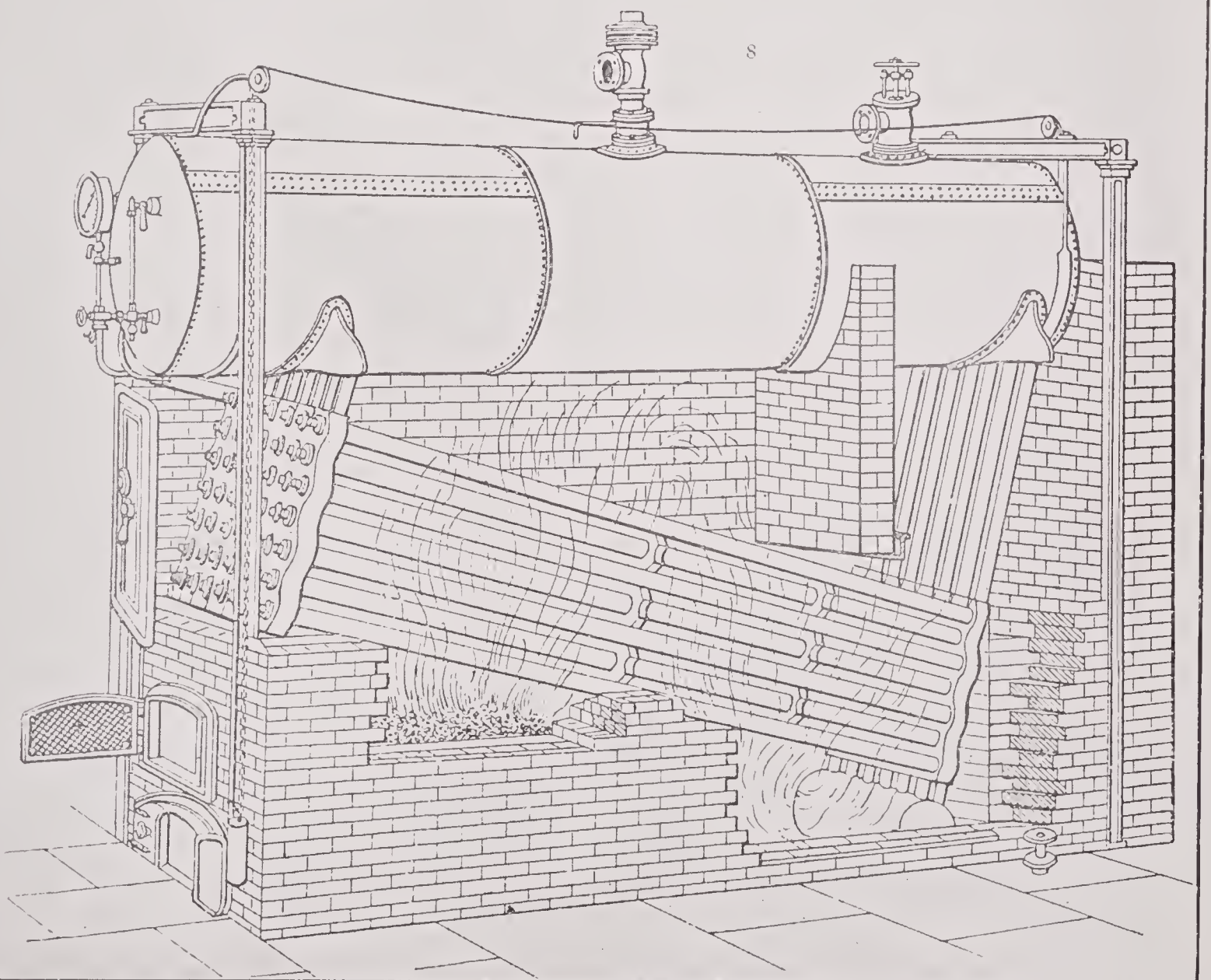
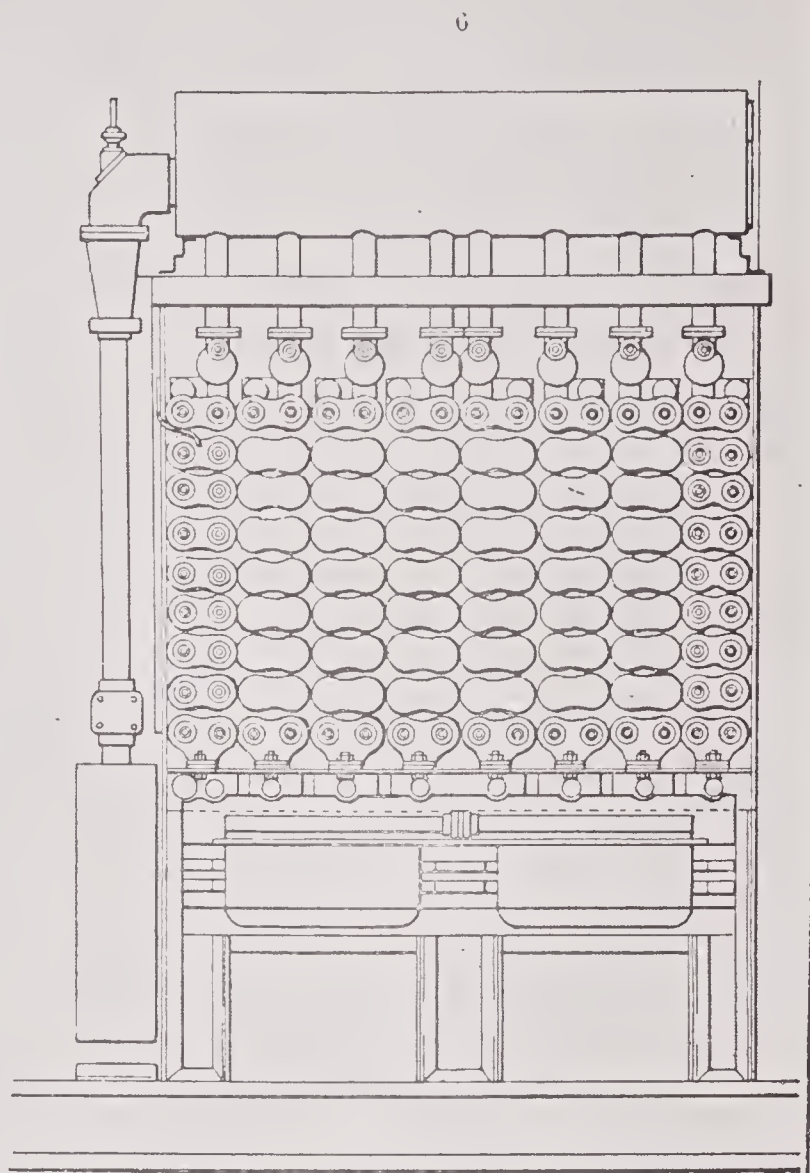
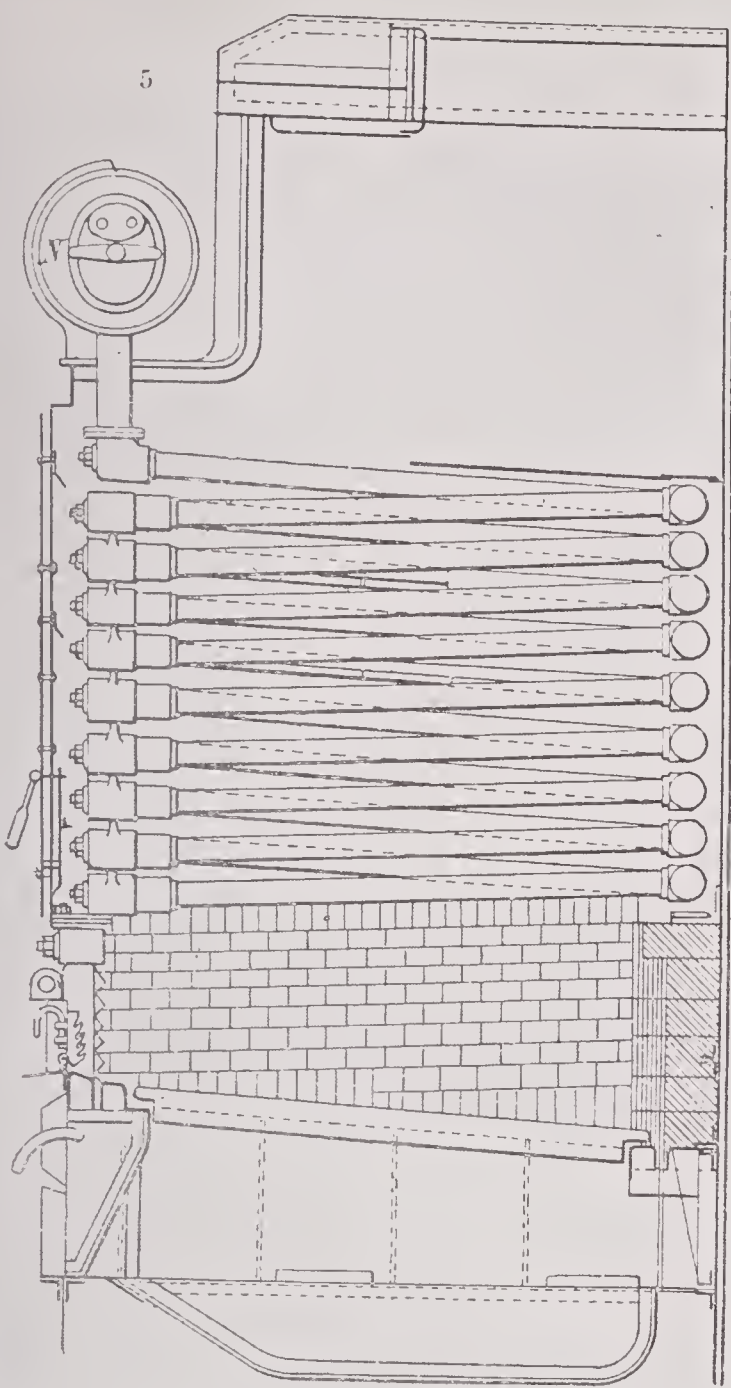
FIG.

- 1, 2. Common Type of Cylindrical Boiler.
- 3, 4. Thorneycroft Boiler.
- 5, 6. Belleville Boiler.
- 7. Lancashire Boiler.
- 8. Babcock & Wilcox Boiler.















## Boiling

safety than in the case of boilers which cannot be as readily cleaned and inspected; (c) the fluctuation of steam pressure is less under irregular conditions of working than with boilers which contain a smaller quantity of water, because the water in the boiler acts as a heat reservoir. The efficiency of this type of boiler is low under ordinary working conditions, unless it is worked in conjunction with a Green's economizer, the cost of which considerably increases both the first cost and the cost of maintenance of the plant. The great length of time required to raise steam in this type of boiler, owing to the great mass of water and brickwork which has to be heated, renders it unsuitable for those cases where steam is required intermittently for short periods. Water-tube boilers of the Babcock and Wilcox type are now being largely adopted for electric light and power stations for the following among other reasons: (a) Small floor space required, (b) the ease with which they can be placed in the building, (c) the facility with which steam can be raised, (d) their safety from disastrous explosions. This type of boiler requires more careful stoking than other types.

**Boiling**, in general, the change of a substance from the liquid to the gaseous state which takes place throughout the liquid. The boiling point, in science, is the point or degree of the thermometer at which any liquid boils. The boiling point of any liquid is always the same, if the physical conditions are the same. It is altered by adhesion of the liquid to the surface of the vessel in which it is contained, or solution of a solid in the liquid raises the boiling point. Increase, the pressure raises, while diminution of atmospheric pressure lowers, the boiling point. The boiling point of distilled water under pressure of 760 millimeters is 100° C., or 212° F. A difference of height of about 327 meters lowers the boiling point of water about 1° C., or 597 feet ascent lowers it 1° F. The boiling point of organic compounds is generally higher as the constitution is more complex. In a homologous series the boiling point rises about 19° for every additional CH<sub>2</sub> in normal alcohols, and 22° in the normal fatty acids, as ethylic alcohol, C<sub>2</sub>H<sub>5</sub>(OH) 78.4°; propylic alcohol, C<sub>3</sub>H<sub>7</sub>(OH) 97°; acetic acid, CH<sub>3</sub>.CO.OH. 118°; propionic acid, C<sub>2</sub>H<sub>5</sub>.CO.OH 149.6°. The secondary and tertiary alcohols have lower boiling points than the primary alcohols. The replacement of hydrogen in a hydrocarbon by chlorine, or by a radical raises the boiling point, as benzene C<sub>6</sub>H<sub>6</sub>. 82°, chlorobenzene C<sub>6</sub>H<sub>5</sub>Cl. 135°, amidobenzene C<sub>6</sub>H<sub>5</sub>(NH<sub>2</sub>) 182°.

Liquids are not increased in heat after they once begin to boil; a fierce fire only

## Boiling

makes them boil more rapidly. The following boiling points have been stated:

|                        | Deg.<br>Fahr. |
|------------------------|---------------|
| Mercury .....          | 663           |
| Sulphuric acid .....   | 610           |
| Olive oil .....        | 600           |
| Phosphorus .....       | 554           |
| Iodine.....            | 347           |
| Naphtha.....           | 320           |
| Oil of turpentine..... | 314           |
| Water.....             | 212           |
| Nitric acid.....       | 210           |
| Alcohol.....           | 173           |
| Sulphuric ether .....  | 113           |
| Muriatic ether.....    | 52            |

In cookery, an important preliminary rule in boiling rests on the fact that water cannot be heated in an open vessel, or in one with the ordinary fitting lid of a cooking utensil, to a higher point than 212° F. When a vessel, then, has once begun to boil, a stronger fire than is just sufficient to keep it boiling will only evaporate, or waste, the water in steam, but will not cook the food any faster. To boil a joint of meat successfully, it is necessary to place it in water already heated to the boiling point, in order that the albuminous matters of the skin, etc., may be coagulated as speedily as possible.

The meat should be trimmed, washed and dried before it is placed in the water. As it simmers, the water should be kept well skimmed, but with due remembrance of the fact that raising the lid of the vessel lowers the temperature of the water; and the preservation of an equal degree of heat throughout the operation is of the greatest importance. For fresh meat, 20 minutes is the allowance for each pound. The weather must also be considered; in frosty weather, or with very thick joints, extra 20 minutes should be given. Mutton loses in boiling, in 1 pound, 3½ ounces; beef, in 1 pound, 4 ounces. Meat that has been salted and dried has its outer coat already sealed up; it requires, therefore, to be thoroughly washed, soaked for two hours in cold water, dried, and put to boil in cold water, gradually brought to the boiling point, and kept simmering for a time proportioned to the size of the piece. Hams and tongues to be eaten cold, should be allowed to cool in the water in which they have been boiled. The following is a time table for the cooking of these meats, reckoning from the time the water boils: A ham of 16 pounds takes 5 hours; a tongue of 16 pounds, 2 to 4 hours; a pig's face of 6 pounds, 2 hours; a piece of bacon of 4 pounds, 2 hours.

Before boiling poultry or fish, it is advisable to rub the outside skin with a cut lemon. This insures a snowy white appearance in the cooked food. Fish should be placed in cold water, in which a table-



spoonful of salt and one of vinegar is mixed; should be gradually brought to the boiling point, and simmered carefully, lest the outer part should crack before the thick part is done. If on drawing up the fish plate, a thin knife will easily divide the flesh from the bone in the thick parts, and if the eyes contract, and become like balls, the fish is sufficiently cooked. Drain by laying the plate across the kettle covered with the lid, and dish perfectly dry on the strainer, which should be covered with a napkin.

Vegetables require generally to be well washed, and placed in boiling water, in which is mixed a large spoonful of salt. To preserve the green color they are best boiled in a pan without a cover. When they sink they are done. Green vegetables should be well picked, soaked in salt and water, drained and boiled in plenty of water, in a vessel without a lid. Cabbage requires two waters; spinach, very little, as it is full of moisture. Peas and beans should not soak, but be merely rinsed in a colander. Winter potatoes should soak for an hour or more.

**Boisard, François Marie** (bwä-zär'), a French fabulist, born in 1774. Of all the French fabulists he is least an imitator of the great Lafontaine. His "Fables" were at first published in the newspaper "Mercure de France," and afterward gathered in two collections. His "Ode on the Deluge" was crowned by the Rouen Academy, 1790. He died in 1833.

**Bois d'Arc** (bwä-dark') (sometimes corrupted into BODOCK), also bow-wood, or osage orange (*maclura aurantiaca*), a tree belonging to the *artocarpacæ*, suborder *moracæ*, is a native of the Southern United States. Its large, beautiful orange like fruits are scarcely eatable, but its spines make it useful as a hedge plant. Its wood is strong, and hard, and elastic, and hence was used by the Indians in the manufacture of their bows.

**Bois de Boulogne** (bwä də bö-lön'), a pleasant grove near the gates on the W. of Paris, so named after the suburb Boulogne-sur-Seine. Its trees were more or less destroyed during the Franco-Prussian War. It is still, however, one of the pleasantest Parisian holiday promenades and a famous dueling ground.

**Boise**, city, capital of the State of Idaho, and county-seat of Ada co.; on the Boise river and the Union Pacific railroad; 45 miles S. W. of Idaho City. It occupies the site of a former trading post of the Hudson Bay Company; is in an agricultural and a rich mining region; and is supplied with pure hot water from a flowing boiling well. The city is said to be the only one in the world having a natural supply of hot water. It contains the State Capitol, erected in

1885-1887, St. Teresa Academy, an Episcopal school for girls, a penitentiary, United States Assay Office, State Library, high and graded schools, and 2 National banks. The assessed property valuation exceeds \$2,000,000. Pop. (1890) 2,311; (1900) 5,957; (1910) 17,358.

**Boise, James Robinson**, an American educator, born in Blandford, Mass., Jan. 27, 1815; was graduated at Brown University, in 1840; and served there as tutor of Latin and Greek and as Professor of Greek till 1850. In 1862, he became Professor of the Greek Language and Literature in the University of Michigan; in 1868, was called to the same chair in the University of Chicago; and, in 1877, became Professor of New Testament Interpretation in the Baptist Union Theological Seminary. On the establishment of the new University of Chicago he was made Professor-Emeritus of New Testament Greek. He published several classical text books, including editions with original notes of Xenophon's "Anabasis" and the first six books of Homer's "Iliad," besides "Notes" on the Epistles to the Galatians, Romans, Ephesians, Colossians, Philemon, and Philipians. He died in Chicago, Feb. 9, 1895.

**Boisgobey, Fortuné Abraham du** (bwä-gō-bā'), a French novelist, born in Granville, Sept. 11, 1821. In 1844-1848 he was paymaster in the army at Algiers, and began to write in 1868, somewhat on the lines of Émile Gaboriau. His novels were popular, and include "The Scoundrels" (Paris, 1873); "Chevalier Casse-Con" (1873); "The Mysteries of Modern Paris" (1876); "The Demi-Monde Under the Terror" (1877); "The Old Age of M. Lecoq" (1878); "The Cat's Eye" (1888); and "The Cold Hand" (1879). He died in February, 1891.

**Bois-le-Duc** (bwä-lè-düe'), a fortified city of North Brabant, Holland, founded by Godfrey of Brabant in 1184, at the point where the Dommel and Aa unite to form the Diest; has manufactures of cloth, hats, cotton goods, etc., and a good trade in grain, its water traffic being equal to that of a considerable maritime port. The fortifications are of little modern value, but the surrounding country can be readily inundated at need. The cathedral is one of the finest in the Netherlands. Pop. (1897) 30,355. The Duke of York was defeated here by the French in 1794.

**Boisserée** (bwäs-rä'), **Gallery**, a celebrated gallery of pictures in the Pinakothek or picture gallery at Munich, collected by the brothers Sulpice (1783-1854) and Melchior Boisserée. In 1827 King Ludwig of Bavaria purchased it for 120,000 thalers.

**Boissy d'Anglas, François Antoine, Comte de**, a French statesman of the



revolutionary period; born in Saint Jean-la-Chambre, near Annonay, in 1756. He studied at Annonay, and was admitted as an advocate to the Parliament of Paris. In 1789 he was elected at Annonay to the States-General, where he was a moderate advocate of revolutionary principles, in support of which he wrote at this time various brochures. In 1792 he was returned as a deputy to the Convention. He voted against the death of Louis XVI., and after the fall of Robespierre he was appointed secretary of the Convention, and a member of the Committee of Public Safety, and intrusted with the provisioning of Paris at a time of famine, a task which he does not appear to have executed satisfactorily. He was made a member of the Council of Five Hundred in 1795, president of the Tribune in 1803, senator and commander of the Legion of Honor in 1805, was created a peer by Louis XVIII. in 1814, but supported Napoleon during the Hundred Days, and was consequently expelled from the peerage by a royal ordinance, but shortly afterward reinstated. He was from 1803 a member of the consistory of the Reformed Church, a member of the Institute from its commencement, and on its reconstruction in 1816 he became a member of the Academy of Inscriptions. He wrote an essay on the life and writings of Malesherbes (Paris, 1819-1821); "*Etudes Littéraires et Poétiques d'un Vieillard*" (5 vols. Paris, 1825).

The fame of Boissy d'Anglas rests chiefly on a scene in the Convention in 1795, when the hall was invaded by an angry mob, demanding bread and the constitution of 1793. Called temporarily to take the chair, in the absence of the president, Boissy had presented to him the head of a deputy, Féraud, which had been cut off by the insurgents and placed on the end of a pike. He saluted it, and continued calmly facing the mob, and to his courage and firmness the safety of the Convention at this crisis is attributed. Such is the popular version of a story of which the most various and contradictory accounts are given. It has been said that Boissy d'Anglas exhibited no such courage as has been attributed to him, and that he was merely kept in his place by the pressure of the mob. His enemies, who accused him of reactionary tendencies, even said the insurrection was got up by the reactionary party to discredit the revolution, and that Boissy was in understanding with the leaders of the mob. For this last accusation there appears to be no foundation, but it is quite likely the scene may have been represented in a more dramatic form than it actually occurred.

**Bok, Edward William**, an American editor; born in 1863. He edited the "*Ladies' Home Journal*," and wrote "*The Young Man in Business*," and "*Successward*."

**Boker, George Henry**, an American poet and dramatist; born in Philadelphia, Pa., Oct. 6, 1823. He graduated from Princeton in 1842; studied law; and was United States minister to Turkey in 1871-1875, and to Russia in 1875-1879. His plays include: "*Calaynos*" (1848); "*Anne Boleyn*" (1850); "*Francesca di Rimini*"; "*The Betrothed*"; and "*All the World's a Mask*." Collected plays and poems (Boston, 1856). Also "*Poems of the War*" (1864); "*Königsmark and other Poems*" (1869); "*The Book of the Dead*" (1882); and "*Sonnets*" (1886). He died Jan. 2, 1890.

**Bokhara**, a khanate of Central Asia, practically vassal to Russia, bounded on the N. by Russian Turkestan, W. by Khiva and the Russian Trans-Caspian Territory, S. by Afghanistan, and E. by Russian Turkestan. It formerly occupied considerably more territory than it does now, having been reduced by the conquests and encroachments of Russia, which have been only partially compensated by some additions. The present area of the khanate is estimated at about 92,000 square miles. The country is to a great extent occupied by deserts and low and naked ranges of mountains, and the cultivated portions of it are confined to the valley of the rivers, especially the Oxus or Amoo Daria, which forms the S. boundary for a considerable distance, and then flows from S. E. to N. W. parallel to and not far from the frontier of the country. Bokhara lies between lat. 37° and 41° N., and in greater part is no more than 1,100 or 1,200 feet above the level of the sea, but in the extreme E. is mountainous. The climate is subject to great extremes, being warm in summer and very cold in winter. There is very little rain, on which account it is necessary to resort to artificial irrigation. Besides cereals, cotton, tobacco, and vegetables are cultivated, and there is abundance of fruit. The total population amounts to about 2,250,000, and consists of the Uzbecks, who are the ruling race, and to whom the emir belongs; the Tajiks, who form the majority in the capital; the Kirghizes, less numerous than the Tajiks; about 60,000 Arabians, descendants of the soldiers who were brought into the country by the third caliph of Bagdad on the occasion of the conquest of Turkestan; Persians who have chiefly been brought as slaves to Bokhara; Turcomans, Hindus, and about 10,000 Jews who live in the towns beyond the protection of the law, and accordingly oppressed by the other inhabitants. Since the separation of Samarcand there are now only two towns of any importance in Bokhara, namely, the chief town Pokhara, with a pop. of about 75,000; and Karshi, with about 25,000. Besides these there are a few small towns and some hundred villages in the country. The capital, according to Vámbéry the center of Tartar



civilization, is ill built and has a gloomy aspect, and in luxury of dress and mode of life is far behind the towns of Western Asia. Among the people there reigns the utmost moral corruption along with a rigorous adherence to outward forms. The country is distinguished from the other countries of Central Asia by its numerous schools, and in the same proportion by the amount of culture diffused among the people generally; but the women are even more degraded than in other Mohammedan countries. The rule of the emir is absolute, though he is to some extent under the influence of the clergy. The manufactures are unimportant, but there is a very considerable caravan trade, cotton, rice, silk, and indigo being exported, and woven goods, sugar, iron, etc., being imported. There is also now a trade by railway, since the making of the line from the Caspian to Samarcand. Bokhara is remarkable for its religious fanaticism, and various European travelers have been exposed to danger. After Alexander Burnes had visited Bokhara on a commission from the government of India in 1832, the British ambassador in Teheran sent Colonel Stoddart in 1838 to obtain from the Emir Nasrulla the deliverance of the Russian prisoners that he had taken on his predatory incursions into Russian territory. Nasrulla, however, irritated at the neglect to answer his letter to the Queen of England, ordered Colonel Stoddart to be thrown into prison, and after treating him with great cruelty, compelled him to acknowledge the Mohammedan creed. Captain Conolly, who had been with a similar object in Khiva and Khokand, came in 1841 to Bokhara, and after having to submit to the same treatment as Colonel Stoddart, was executed along with him in 1842. Information of their fate was brought to Europe by the missionary Wolff who had been sent to Bokhara in 1843 for this purpose.

In 1850 the Russians established themselves at the mouth of the Sir (Jaxartes), where it flows into the Sea of Aral, and in 1864 they found it necessary to proceed further up the river. They made themselves masters of the two towns Turkestan and Aulie-ata, and after bringing them into communication with one another, invested Chemkend, Niazbek, and Chinab. The land thus occupied, which up to that time had formed the N. half of the khanate of Khokand, was, along with some other districts that had previously been annexed to Russia, erected into the Russian government of Turkestan, and incorporated with the general government of Orenburg, by the ukase of Feb. 14 (26), 1865. By a subsequent ukase, dated July 11 (23), 1867, this territory was constituted a general government. Soon after the Khan of Khokand invaded the Russian territory, in conse-

quence of which the Russians advanced still farther S. and attacked Tashkend, which they took on June 28, 1865. They did not, however, incorporate Tashkend with the Russian territory, but declared it an independent khanate under the protection of Russia. This arrangement was opposed by Muzaffer-Eddin, Emir of Bokhara, whereupon the Russian general Romanovski again assumed the offensive, and marching into Bokhara took Khojend by storm on June 5, 1866. In this way Russia came into the possession of the whole basin of the Sir. Not long after Tashkend was incorporated with the Russian territory by the desire of the inhabitants. Meanwhile the war with Bokhara still went on, and peace was not concluded till the beginning of 1867. This peace, however, did not last long. The war was renewed in the spring of the following year, and it was only in July, 1868, that the terms of peace between Russia and Bokhara were finally agreed upon. Bokhara was to give up Samarcand and Katti Kurghan, along with the surrounding districts (constituting the tract of land watered by the Zerafshan), and at the same time promised to pay an indemnity to Russia and to protect her trade. Since then the peace has not been broken, but the Emir of Bokhara has sunk more and more into a position of entire dependency on Russia. During the autumn the Russians intervened against the emir's son, who had risen in revolt against him, and on Oct. 12 in the following year the emir sent an embassy with presents (tribute) to the czar at St. Petersburg. In the meantime Muzaffer-Eddin had fallen into a dispute with Afghanistan. Shere Ali Khan, of Kabul, had given a favorable reception to the rebellious son of the emir, and Muzaffer-Eddin, probably in consequence of encouragement from Russia, now thought himself able to make good his former claim to Badakshan, and the territory lying about the sources of the Oxus, especially since the Khan of Kabul seemed to have but a slight hold of these parts. He had accordingly already sent out an army with the view of conquering those parts, when, toward the end of 1869, pressure being put upon him by Russia, he concluded a treaty with Kabul by which the Oxus was fixed as the boundary of the contiguous States, and this boundary was afterward recognized by Russia and England. After the Russian expedition to Khiva in 1873 an agreement was come to between Russia and Bokhara on Sept. 28 of that year, according to which Bokhara received a portion of the territory that had been ceded by Khiva to Russia, while the Russians received various privileges in return. Muzaffer-Eddin died in 1885, and was succeeded by his son Abd-ul-Ahad. Bokhara will probably soon be completely placed under Russian administration, for what lit-



the power it had lapsed in 1884 by the practical absorption of the country, resulting from the annexation of Merv. Since 1885 the troops, which were formerly ill trained and badly armed, have been drilled by Russian instructors and armed with rifles.

**Bokhara**, the capital of the above khanate, in lat. 39° 48' N.; lon. 64° 26' E.; is 8 or 9 miles in circuit, and is surrounded by a mud wall. It is poorly built, consisting of extremely narrow streets and paltry houses. The principal edifices are the palace of the khan, crowning a height near the center of the town and surrounded by a brick wall 70 feet high; and numerous mosques, the largest of which is enameled with tiles of azure blue, and has a tower 210 feet high. The trade was formerly large with India, but has now been almost completely absorbed by Russia. The pop. is estimated at 75,000.

**Bolas**, a kind of missile, consisting of a single stone at the end of a rope, two or more stones connected by a rope, or anything similar, one kind or other of which is used by the Patagonians, the Paraguay Indians and the Spanish and Portuguese inhabitants of South America. In war a Patagonian uses a one-stone bolas, hurling the stone at his adversary while retaining the string in his own hand. The Eskimo bolas is made of a number of walrus' teeth at the end of strings knotted together.

**Boldrewood, Rolf**, pseudonym of THOMAS ALEXANDER BROWNE, an Australian author, born in England in 1827. He is a son of Capt. Sylvester J. Browne, a founder of Melbourne, Australia. He was educated in Sidney College, and has written "Ups and Downs: a Story of Australian Life" (London, 1879); "Robbery Under Arms: Life and Adventures in the Bush" (1888); "A Squatter's Dream Story" (1890); and "A Modern Bueeaner" (1894).

**Boleyn, Anne**, second wife of Henry VIII. of England, was the eldest daughter of Sir Thomas Boleyn, and Elizabeth Howard, daughter of the Duke of Norfolk. She was born according to some accounts, in 1507, but according to more probable ones about 1501. She attended Mary, sister of Henry, on her marriage with Louis XII., to France, as lady of honor. On the return of that princess, after the king's death, she entered the service of Queen Claude, wife of Francis I., and after her death that of the Duchess of Alençon, sister of the French king. Young, beautiful, gay, and witty, she was an object of great attraction in the gallant court of Francis I. She returned to England about 1522, and became lady of honor to Queen Catharine, whom she soon supplanted. The king, passionately enamored of her, found an unexpected opposition to his wishes, and Anne firmly declared that she could be had on no terms but those

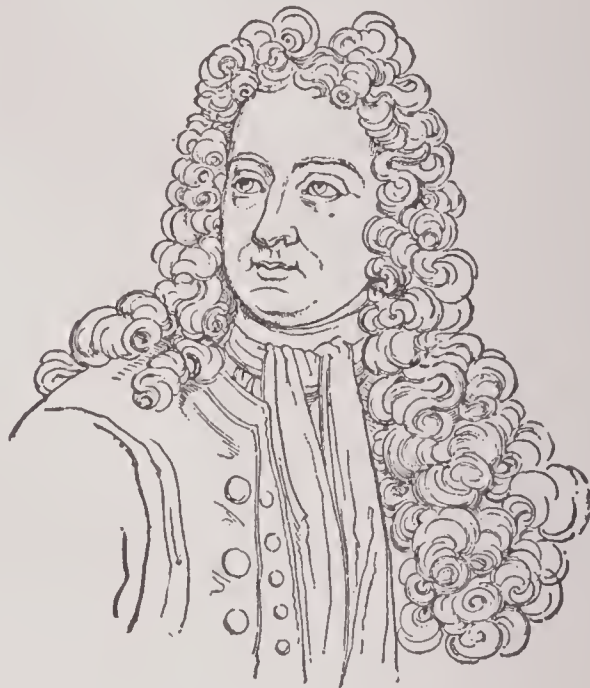
of marriage. She knew that the king already meditated a divorce from his wife, Catharine of Arragon; but she also knew what difficulties the Catholic religion opposed to the execution of this plan. Cranmer offered his services to bring about the accomplishment of the king's wishes, and thus gave the first occasion to the separation of England from the Roman Church. But the impetuous Henry did not wait for the ministers of his new religion to confirm his divorce; on the contrary, he married Anne in January, 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void, and the second valid, and Anne was crowned queen at Westminster with unparalleled splendor. In 1533 she became the mother of the famous Elizabeth. She could not, however, retain the affections of the king, as inconstant as he was tyrannical; and as she had supplanted her queen while lady of honor to Catharine, she was now supplanted herself by Jane Seymour, her own lady of honor. Suspicions of infidelity were alleged, which appear to have had no foundation in truth, but were doubtless eagerly laid hold of by Henry as a color for his violent proceedings. In 1535 she was accused, and brought before a jury of peers. Smeaton, a musician, who was arrested with others, asserted that he had enjoyed the queen's favors, and May 17, 1536, she was condemned to death by 26 judges. Anne in vain affirmed that she had long before been contracted to the Duke of Northumberland, and therefore had never been the lawful wife of Henry. Cranmer in vain declared the marriage void. The sentence of death was executed by the command of the inflexible Henry, who esteemed it a great exercise of clemency to substitute the scaffold for the stake. The last day of the life of this unhappy woman, May 19, 1536, presents many interesting moments. She sent for the wife of the lieutenant of the Tower, threw herself upon her knees before her and said, "Go to the Princess Mary (daughter of Catharine) in my name, and in this position beg her forgiveness for all the sufferings I have drawn upon her and her mother." "She sent her last message to the king," says Hume, "and acknowledged the obligations which she owed him in uniformly continuing his endeavors for her advancement." "From a private gentlewoman you have made me first a marchioness, then a queen, and as you can raise me no higher in this world, you are now sending me to be a saint in heaven."

**Bolingbroke, Henry St. John, Viscount**, an English statesman and political writer; born in Battersea, near London, of an ancient family, in 1678. He completed his studies at Oxford, where he early exhibited uncommon talents and attracted general attention. On entering the world he



displayed a rare union of brilliant parts and elegance of manners, with beauty of person, dignity, and affability, and such fascinating eloquence that, according to the unanimous testimony of his contemporaries, nobody could resist him. Unfortunately the passions of his youth opposed the development of his talents; and in his 23d year he was distinguished principally as an accomplished libertine. His parents, supposing that marriage would have a salutary influence upon him, proposed to him the daughter of Sir Henry Winchcomb, a lady the heiress of a million, who united with a charming figure a cultivated mind and noble birth. But the young couple had lived but a short time together when irreconcilable disputes arose between them, in consequence of which they separated forever. Another plan was adopted to give a better direction to the impetuous character of Bolingbroke. By the influence of his father he obtained a seat in the House of Commons. Here his eloquence, his acuteness, and the strength of his judgment attracted universal attention. His former idleness was changed at once into the most incessant activity. In 1704 he was made secretary of war, and came into immediate connection with the Duke of Marlborough, whose talents he discerned and whose enterprises he supported with all his influence. When, however, the Whigs gained the ascendancy in 1708, Bolingbroke gave in his resignation. Now followed, as he said himself, the two most active years of his life, in which he devoted himself to study, but by no means neglected public affairs. He continued to maintain a constant intercourse with the queen, who preferred him to her other counsellors. The Whig ministry was overthrown to the astonishment of all Europe in 1710, and Bolingbroke received the department of foreign affairs. In 1712 he was called to the House of Lords by the title of Viscount Bolingbroke, and in 1713, against much popular opposition, he concluded the peace of Utrecht, of which he was always proud. In concluding this peace everything was unfavorable to him—the Whigs, the peers, the bank, the East India Company, Marlborough, Eugene, the emperor, Holland, the jealousy of all the European powers, the weakness of his own queen, the irresolution, imprudence, and even the envy of his colleagues. Bolingbroke afterward became a prey to the impetuosity of his passions, and exhibited a fickleness of conduct that has rendered his loyalty, his patriotism, and his whole character suspected. The collision of the Whigs and Tories produced such a general excitement that the ministers were attacked, the peace was derided as disastrous, and the Protestant succession was declared in danger. At this moment a fatal contention broke out between the lord-high-treasurer (the Earl of Ox-

ford) and Bolingbroke, immediately after the conclusion of the peace. Swift, the friend of both, but particularly intimate with the lord-high-treasurer, accused Bolingbroke of having principally contributed to the ruin of their party. Be this as it may, Queen Anne, provoked to the utmost by Oxford, dismissed him four days before her death, and made Bolingbroke prime minister. But the death of Anne changed the whole scene. George I. of Hanover ascended the throne, and the Whigs triumphed more completely than ever. Bolingbroke,



LORD BOLINGBROKE.

who could not impose on the Hanoverian court by his plausible pretences, and who was as much envied as he was hated, was dismissed by King George while yet in Germany, and fled to France in March, 1715. In August of the same year he was attainted. James III., the Pretender, as he was called, invited him to Lorraine, and made him his secretary of state. But when Louis XIV. died Bolingbroke lost all hope of the success of the Pretender, and repented of having entered into so close a connection with him. Whatever the feelings and plans of Bolingbroke may have been, his intentions with regard to James III. were doubtless honest. Nevertheless, the latter deprived him of his dignity and transferred it to the Duke of Ormond. Thus it was the strange fate of Bolingbroke to be charged with treachery both by the king and the Pretender. Offers were made to him by King George, on condition of his revealing the secrets of the Pretender. This proposal he at first declined, but he afterward yielded so far as to promise a decisive blow against the cause of the Pretender on condition of the total oblivion of what had already passed, and of an entire confidence for the future. Walpole, however, was afraid of Bolingbroke's influence in Parliament, and opposed his recall. Bolingbroke,



## Bolivar

in order to forget his situation, applied himself to writing philosophical consolations after the manner of Seneca, but soon found sweeter ones in his marriage with a rich and amiable lady, niece of Madame de Maintenon. In 1723 the Parliament which had been so hostile to Bolingbroke was at length dissolved, and he was permitted to return to England. His estates, however, were not restored until two years after by a particular act of Parliament. On his return he lived at first retired in the country, maintaining, however, a correspondence with Swift and Pope. But no sooner was the voice of opposition heard in Parliament than he hastened to London, and, as the restoration of his seat in the House of Lords was still denied him, attacked the ministry during eight years in the journals or in pamphlets with great success. He drew himself powerful enemies, against whom he directed his "Treatise on Parties," which is considered as his masterpiece. He then returned to France with the intention, as even Swift supposed, of throwing himself into the arms of the Pretender's party, against which charge Pope defended him, and declared that he had himself advised his noble friend to leave an ungrateful country, by which he was suspected and persecuted. In France, Bolingbroke wrote (1735) his "Letters on the Study and Use of History," which are admired even at the present day, but in which the individual character of the author appears to the exclusion of general views, and which were blamed, in particular, for attacking revealed religion, which he had once warmly defended. In 1729 in the midst of his contest with Walpole, he had suggested to Pope his "Essay on Man," and supplied him with the most important materials. He wrote (1738) his "Idea of a Patriot King" under the eyes of the heir-apparent. From 1746 he lived in Battersea, where he died in 1751.

**Bolivar, Simon**, an American military officer and statesman (named EL LIBERTADOR, from his having rescued Central South America from the Spanish yoke), born in Caracas, July 24, 1783. He descended from a noble and wealthy family, received his university education at Madrid, traveled extensively on the European continent, married, and returned to South America, where, shortly after his arrival, his wife died, when he once more visited Europe, and did not return till the following year, when he dedicated himself to the freedom of his country, and, at Venezuela, entered upon his military career as a colonel in the service of the newly founded republic. In June, 1810, he was in London, endeavoring to induce the British cabinet to assist the Independent Party against the Royalists and, in the following year, he was acting as

## Bolivia

Governor of Puerto Cabello, the strongest fortress of Venezuela. He was now fairly committed to the revolutionary cause, serving under General Miranda, whom he afterward accused as a traitor, and who subsequently died in a dungeon in Spain. The war continued to rage, and, after many reverses and changes, he gradually won his way. At length, in 1821, the Independent troops were successful in the battle of Carabobo, where the Royalists lost upward of 6,000 men, and which decided the cause against Spain. On Aug. 20 of the same year a Republican Constitution was adopted, and decreed to continue, as then defined, till 1834. Bolivar was chosen President, and he turned his attention to the internal administration of the country. In 1823 he assisted the Peruvians to obtain their independence, and was declared their liberator, and invested with supreme authority. On Feb. 10, 1825, however, he convoked a Congress, and resigned his dictatorship. He now visited the Upper Provinces of Peru, which, calling a convention at Chuquisaca, gave the name of Bolivia to their country, in honor of their liberator, and appointed him Perpetual Protector, and to draw up a constitution. On May 25, 1826, he presented his Bolivian code to the Congress of Bolivia, which was afterward adopted, with some dissatisfaction, however, although it was also subsequently adopted by the Congress of Lima, where, under its provisions, he himself was elected President for life. He now set out for Colombia, where disaffection and party strife were at their height. His conduct here was misconstrued, and he was supposed to be assuming the powers of a dictator. In 1829 new disturbances arose, and, in 1830, a convention was called for the purpose of framing a new constitution for Colombia. The proceedings were begun by Bolivar, who once more tendered his resignation. This was his last act which had relation to public affairs. He died at San Pedro, near Carthagena, Dec. 17, 1830.

**Bolivia**, a republic of South America; bounded on the N. by Peru and Brazil; on the E. by Brazil and Paraguay; on the S. by the Argentine Republic and Chile; and on the W. by Peru and Chile; area 734,390 square miles; pop., English (based on census of Sept. 1, 1900, and estimates in 1908, excluding the aboriginal Indians), 2,049,083; capital, La Paz.

**Topography.**—The country is divided into two very marked regions, the high or Andean in the S. W. portion, and the lowlands of the E. and W., which extend into Paraguay and Brazil. The first of these regions is the highest on the American continent, the Plateau of Oruro having an average height of 13,000 feet. This extreme mountainous district was wholly within the



area of Bolivia prior to the treaty of 1884. In this region is Lake Titicaca, having an area of more than 3,200 square miles, and a depth of 120 fathoms; and containing several islands, the largest of which was the home of the founder of the Empire of the Incas. The highest elevation of Bolivia to-day is found in the Eastern Cordillera range, from which extend a large number of spurs inclosing some of the richest valleys of the country. The Rio Desaguadero, with a course of 160 miles, connects Lake Titicaca with the salt lake and swamps of Aullagas or Paria, and somewhat to the left lies the Laguna de Coiposa, a basin covered in the dry season with a thick crust of salt. The southern and lower tableland is chiefly a desert, where the mountain streams either sink into the sand, or flood, in the rainy season, what are salt pampas throughout the rest of the year. The eastern edge of the Eastern Cordillera is a series of terraces descending to the plain of

and produces wheat and maize in large quantities; and in the second tropical fruits begin to flourish. The *yungas*, or plains under 5,000 feet, have numerous streams, and in fertility and resources surpass most of the countries in South America. Agriculture is still in a backward condition. Wheat, maize, barley, beans, and potatoes are produced for local consumption; coffee is raised chiefly for export; sugar cane is grown for distillation; and rubber, cinchona, and cocoa are important and increasing products. Cattle, sheep, and llamas are extensively bred. Bolivia has a very large mineral wealth in silver, copper, tin, lead, zinc, antimony, bismuth, gold, borax and salt. In a single year the production of silver, the most valuable mineral resource, aggregated 14,579,296 ounces.

*Commerce.*—Official reports for 1897 showed imports to the aggregate value of 24,467,100 bolivianos (1 boliviano = 42.7 cents in United States gold), chiefly hardware, wine and spirits and cotton, linen, woolen, and silk goods; exports, 23,121,320 bolivianos, chiefly silver, tin and bismuth, copper, rubber, wool, hides, and skins, gold, coffee, cocoa and cinchona. The import trade in 1900 was chiefly in the hands of Germans.

*Finances.*—The revenue for 1898 was estimated at 5,194,593 bolivianos, and the expenditures at 5,713,891 bolivianos. The principal expenditures are for public instruction, public works, finances, and defense. The provincial revenue is about 600,000 bolivianos, and is applied to maintaining provincial authorities, and executing local works. The external debt, in 1898, was 1,084,555 bolivianos, to the extinction of which 40 per cent. of the customs collected at Arica is devoted. The internal debt was 3,707,541 bolivianos.

*Communication.*—A railway connects the Chilean port of Antofagasta with the Bolivian frontier at Ascotan, whence it proceeds on Bolivian territory as far as Uyuni. From the latter point branches have been completed to Huanchaca and Oruro, making nearly 500 miles of this railway on Bolivian territory. In 1900 concessions had been granted for four other lines, and a route for an international railway from Bolivia to the Argentine Republic was being surveyed. Non-metal roads were being constructed in many parts of the republic, and a number of suspension and other bridges had either been recently built or contracted for. There were 2,260 miles of telegraph lines and 328 postoffices in operation.

*Government.*—The constitution (Oct. 28, 1880) vests the executive power in a President, elected by direct popular vote, for a term of four years, and ineligible for re-election at the end of his term of office. The legislative authority rests in a Congress,



BOLIVIA.

Eastern Bolivia, which in the N. belongs to the Amazon basin; and in the S. to the pampas of the Plata.

*Climate and Productions.*—Bolivia possesses a remarkable range of climate and productions. The regions with an elevation of over 11,000 feet are called *punas*, while the *puna brava* is the region of snow and ice, above 12,500 feet. Here the climate is cold and dry but generally healthful. Vegetation is scanty and cultivation is principally confined to potatoes, barley and coarse grasses. The *cabezeras de valles* are the heads of valleys descending to the lowlands, between 9,500 and 11,000 feet; the *medio yungas*, or deeper valleys, have an altitude ranging from 5,000 to 9,500 feet. The first of these regions has a temperate climate,



comprising a Senate of 18 members, elected for six years, and a Chamber of Deputies of 64 members, elected for four years. There are also two Vice-Presidents, and a Ministry divided into the Departments of Foreign Relations and Worship, Finances and Industry, Government and Colonization, Justice and Public Instruction, and War. The suffrage is possessed by all who can read and write. The republic is divided into eight departments and these into provinces and cantons. The Roman Catholic is the recognized religion of the republic, and the exercise of other forms of worship is permitted. Primary instruction is free and nominally obligatory, and is under the care of the several municipalities. Late reports gave a total of 569 public and private primary and industrial schools, and 36,690 pupils. For secondary instruction there were 8 colleges, 5 clerical institutions, and 4 private lycées, with, in all, 91 teachers and 2,057 pupils; 4 superior institutions, 6 universities, a military school, and 3 schools of arts and trades. Public libraries are maintained in all the departmental capitals, and there is an interesting museum in La Paz. The judicial power is vested in a Supreme Court, eight District Courts, and the courts of local justices.

*History.*—It is believed that the oldest civilized empire on the American continent existed in the Titicaca basin, and that it was disrupted about the 8th century, a portion of the people remaining in the highlands of Bolivia till the 14th century, when they were subdued by the Incas of Cuzco. In 1559 this region was formed into the *audiencia* of Charcas, or Upper Peru, which was governed by judges under the direction of the Viceroy of Peru. Charcas was made a province of Buenos Ayres in 1776. Under long existing discontent the people revolted in 1809, but the effort for freedom was speedily crushed. The country was frequently invaded by patriotic armies from Buenos Ayres and Peru during 1811–1821, but all these movements also failed. Under the direction of SIMON BOLIVAR (q. v.), the Spanish troops in Charcas were subdued in 1825. On Aug. 6, of that year, the people declared their independence and adopted the name of Bolivia, in honor of their liberator, and made General Sucre their first President. In 1836 a Federal republic was established comprising the States of North Peru, South Peru, and Bolivia; but this confederation was dissolved by a revolution in 1839. The country was agitated by revolutions and internal dissensions for many years. In 1879 Chile declared war against Bolivia. Peru came to the aid of the latter and the Chileans defeated their allied opponents. As a result of this war Bolivia mortgaged to Chile the Littoral Department, which has an area of

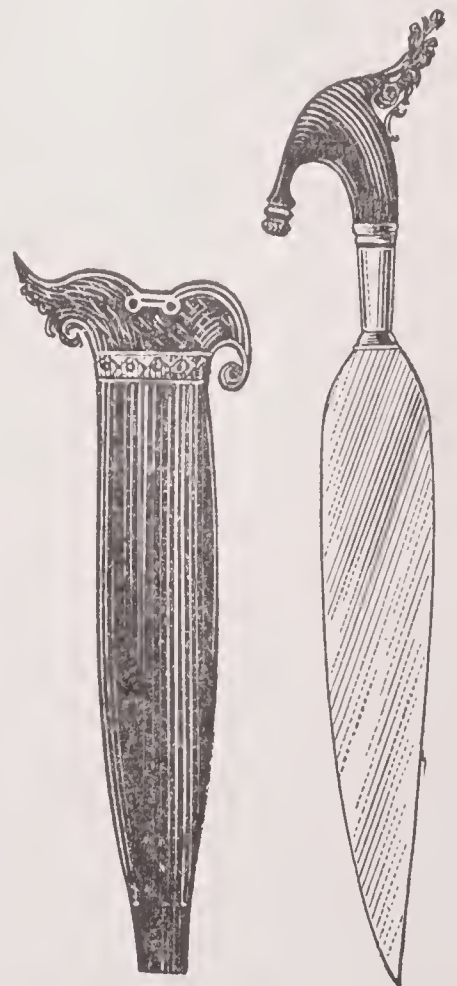
29,910 square miles, and contains the important port of Antofagasta, thus losing her entire seacoast. Conditions under this cession of territory, particularly those relating to the future nationality of a considerable portion, had not been fulfilled up to 1901.

**Bollandist**, pertaining to Bolland, a Jesuit of Tillemont, in Flanders, who commenced a large work, the "*Acta Sanctorum*," of which vol. I. was published in 1643. Five more were issued during his lifetime. After his death, in 1665, the work was continued by Henschen, a Jesuit of Antwerp, who died in 1682, and Papebroch, also an Antwerp Jesuit, who died in 1714. The word is also applied to the continuators of Bolland's work. A new association was formed in 1837 under the patronage of the Belgian government, and the publication of the "*Acta Sanctorum*" has been continued.

**Bolo**, a short, broad, lance shaped weapon; used by the Filipinos in their operations against the American troops. The blade is about 18 inches in length by nearly 3 inches in breadth at its broadest dimension. It tapers from the middle toward the haft as well as toward the point, making it strongly resemble the ancient short sword. It is

not double edged, however, but tapers from a thick back to an extremely keen edge. A magnificent specimen of the bolo was sent by Brigadier-General Corbin, the handle of which has a heavy silver ferrule, heavily chased, and is made of a beautiful piece of native mahogany, cunningly carved to fit the handle, and terminating with an exquisite specimen of ornate

carving in a conventional design. The scabbard of the bolo is made of a native wood with rough outlined designs carved upon it. The whole weapon is much more beautiful in outline and more formidable than the famous Cuban machete.

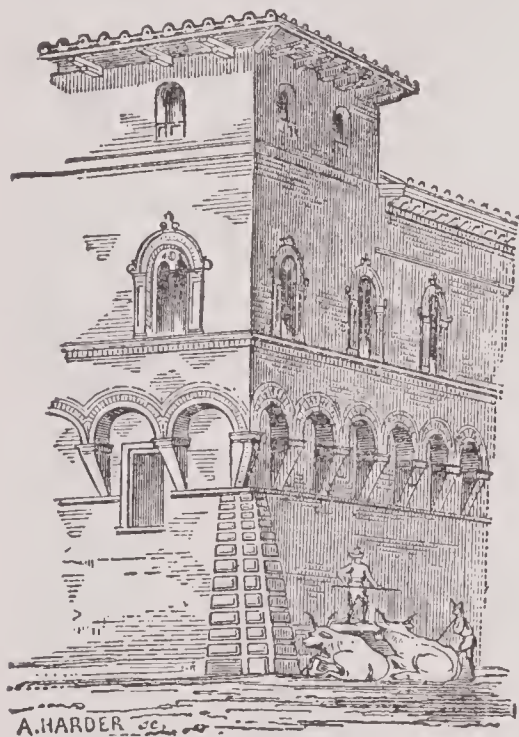


FILIPINO BOLO.



## Bologna

**Bologna** (bō-lōn'yä), one of the oldest, largest and richest cities of Italy, capital of the Province of same name, in a fertile plain at the foot of the Apennines, between the rivers Reno and Savena, surrounded by an unfortified brick wall. It is the see of an archbishop, and has extensive manufactures of silk goods, velvet, artificial flowers, etc. The older quarters are poorly, and the modern handsomely, built. There are colonnades along the sides of the streets, affording shade and shelter to the foot passengers. Among the principal buildings are the Palazzo Pubblico, which contains some magnificent halls adorned with statues and paintings; the Palazzo del Podestà; and the Church or Basilica of St. Petronio. Among the hundred other churches, St. Pietro, St. Salvatore, St. Domenico, St. Giovanni in Monte, St. Giacomo Maggiore, all possess rich treasures of art. The leaning towers, Degli Asinelli and Garisenda, dating from



PALACE IN BOLOGNA.

the 12th century, are among the most remarkable objects in the city; and the market is adorned with the colossal bronze Neptune of Giovanni di Bologna. An arcade of 640 arches leads to the Church of Madonna di St. Lucca, situated at the foot of the Apennines, near Bologna, and the resort of pilgrims from all parts of Italy. Bologna has long been renowned for its university, claiming to have been founded in 1088, and having a library, at one time in the care of Cardinal Mezzofanti, which numbers over 200,000 volumes and 9,000 MSS. The Instituto delle Scienze has a library which numbers about 160,000 volumes, with 6,000 MSS. The Church of St. Domenico has a library of 120,000 volumes. The Academy of Fine Arts has a rich collection of paintings by native artists, such as Francia, and the later Bolognese school, of which the Caraccis, Guido Reni, Domenichino, and Albano were the founders. Bologna was founded by the Etruscans under the name of Felsina; became, in 189 B. C., the Roman colony Bononia; was taken by the Longobards about 728 A. D.; passed into

## Bolton

the hands of the Franks, and was made a free city by Charlemagne. In the 12th and 13th centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles led to its submission to the papal see in 1513. Several attempts were made to throw off the Papal yoke, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of it. In 1860 it was annexed to the dominions of Victor Emmanuel. Pop. (1901) 152,009.

**Bolognese School**, an Italian school of painting, founded in the 14th century, probably by Franco. The great master of the school was Francesco Francia, a contemporary of Raphael, celebrated for the purity and serenity of his Madonnas. The Caracci, who painted the frescoes of the Farnese Palace, were the leaders of the later school, and introduced a reformed style patterned somewhat on that of Correggio.

**Bolometer**, a most sensitive electrical instrument invented by Langley in 1883 for the measurement of radiant heat.

**Bolor Tagh**, also **Bilaur**, or **Belut Tagh**, a mountain range formerly imagined to exist in Central Asia between Eastern and Western Turkestan, as the axis of the continent. At that point, however, there is really a lofty tableland called the Pamir.

**Bolsas**, a river of Mexico, which, after flowing W., enters the Pacific Ocean, 225 miles S. W. of Mexico City.

**Bolsena** (ancient VULSINIUM), a walled town of Central Italy, Province of Viterbo, 11 miles W. S. W. of Orvieto, on a lake of the same name. It is only noticeable for the ruins of the Etruscan goddess Nortia, a granite sarcophagus, ornamented with *bas reliefs*, and other remains of antiquity. This was anciently a place of great wealth and luxury, and Pliny says that when taken by the Romans, 266 B. C., it contained no less than 7,000 statues.

**Bolswert**, **Boetius Adam**, a Dutch engraver, born in Friesland in 1580; spent his life at Antwerp. His most noteworthy plates are "The Last Supper" and "The Resurrection of Lazarus." He died in 1634.

**Bolton**, or **Bolton-le-Moors**, an important English manufacturing town and parliamentary and municipal borough in South Lancashire, on the Croal, 11 miles N. W. of Manchester. The river Croal divides the town into Great and Little Bolton. It was celebrated as far back as the time of Henry VIII. for its cotton and its woolen manufactures, introduced by Flemish clothiers in the 14th century. Emigrants from France and the Palatinate of the Rhine subsequently introduced new branches of manufacture; and the improvements in cotton spinning in the middle of the 18th century



rapidly increased the trade of the town. It is the birthplace of the daily evening press ("Bolton Evening News"), and has three evening and three weekly newspapers. During the Civil War, the Parliament garrisoned Bolton; in 1644 it was stormed by the Earl of Derby. A canal was opened from Manchester to Bolton in 1791. Pop. (1901) 168,748.

**Bolton Abbey**, a notable English structure in Yorkshire; in a highly picturesque district on the river Wharfe, 6 miles E. of Skipton, and 21 N. W. of Leeds. Founded for Augustinian canons about 1150, it has been celebrated by Wordsworth in "The White Doe of Rylstone" and "The Force of Prayer."

**Bolton, Charles Knowles**, an American poet and miscellaneous writer, son of Mrs. Sarah Knowles Bolton, born in Ohio, in 1867; became librarian of the Boston Athenæum; and published in prose "Gossiping Guide to Harvard," "Saskia, the Wife of Rembrandt," etc.; in verse, "The Wooing of Martha Pitkin," "Love Story of Ursula Wolcott," etc.

**Bolton, Henry Carrington**, an American scientific writer, born in New York, in 1843; became Professor of Chemistry and Natural Science at Trinity College, Hartford, Conn. Besides works on chemistry he was author of "The Counting-Out Rhymes of Children, a Study in Folk-Lore" (1888); "Literature of Manganese," and "Students' Guide in Quantitative Analysis." D. 1903.

**Bolton, Sarah Knowles**, an American author, born in Farmington, Conn., Sept. 15, 1841. She married Charles E. Bolton, a merchant and philanthropist, and resides in Cleveland, O. She is the author of a number of books, including "Girls who Became Famous" (1886); "Famous American Authors" (1887); "Famous American Statesmen" (1888); "Famous Types of Womanhood" (1892); etc.

**Bolton, Sarah Tittle**, an American poet, born in Newport, Ky., Dec. 18, 1815. She is known for her patriotic and war poems, including "Paddle Your Own Canoe," "Left on the Battlefield," etc. "Poems" (New York, 1865; Indianapolis, 1886). She died in Indianapolis, Ind., Aug. 4, 1893.

**Boma**, city and capital of the Kongo Free State, on the left bank of the Kongo river, till 1876 was the extreme inland post of the Dutch and Portuguese traders. It contains the establishment of the governor-general and also the local government of the administrative district of the same name.

**Bomb**, in ordnance, the same as a bomb shell; a hollow iron ball, spheroid, or anything similar, filled with gunpowder, and provided with a time or percussion fuse. It is fired from a mortar or howitzer. Bombs

were used at the siege of Naples in 1434. Mortars for throwing bombs were first cast in 1543. Bombs are now generally called shells, though the word bomb is not the least obsolete in the words bombard, bomb-shell, bombardier, etc.

Modern political upheavals have induced a traffic in packages of explosives, which have been christened bombs. These terrific agents of destruction have been used with murderous effect in the larger European cities: St. Petersburg, Madrid and Paris; also in Chicago. The anarchists have regularly established factories for the production of these missiles, in which the elements are combined with great nicety and scientific precision. The usual method of construction is to fill a hollow sphere with some high explosive together with pieces of scrap iron, nails, bullets, or anything that will wound. The explosives used are generally nitroglycerine, fulminate of mercury, etc. The most deadly of all the agents, however, is a bomb made with chlorate of potash and picric acid. These substances are separated by a wadding of raw cotton (soaked in sulphuric acid) which acts as a time fuse; for when the picric acid soaks through the cotton and reaches the potash a terrific explosion ensues. The usual way of packing these bombs is in a tin cylinder with two glass compartments inside, one (the bottom one) containing the liquid acid and the top one the potash. To cause the explosion reverse the can and let the liquid soak through.

**Bomba**, a title popularly conferred upon King Ferdinand II. of Naples and by which he will be recorded in history. This appellation he received from the violation of his solemn oath to the citizens of Palermo, which city he perfidiously bombarded in 1849; thus outraging his own plighted word, the laws of humanity, and the constitutional policy he had sworn to observe.

**Bombardier Beetle**, a name applied to many coleopterous insects of the tribe *cara-bidæ*. They are divided into two genera—the *brachinus*, and the *aptinus*; the latter has no membranous wings under the wing sheath. Those found near the tropics are large and brilliantly colored, but those found in this country are generally small. They are called bombardier beetles on account of a remarkable property they possess of violently expelling from the anus a pungent acrid fluid, which, if the species be large, has the power of producing discoloration of the skin, similar to that produced by nitric acid. It also changes blue vegetable colors to red, and then to yellow.

**Bombardment**, an attack with bombs. Specifically, the act of throwing shells and shot into a town, fort, or ship. Sometimes carcasses, stink pots, rockets, hot shot, and



## Bombax

other incendiary missiles are used for this purpose. The bombardment of a town takes more effect upon the civilians than the garrison, as the latter, in any well constructed fortified place, are lodged in bomb proof buildings. Before bombarding a town, it is customary to give notice thereof, to allow women, children, and non-combatants to leave it.

**Bombax**, also known as the silk cotton tree; a genus of plants belonging to the order *sterculiaceæ* (sterculiads) and the section *bombaceæ*. *B. pentandrum* is the cotton tree of India. The fruit is larger than a swan's egg, and when ripe opens in five parts, displaying many roundish, pea-like seeds enveloped in dark cotton. This tree yields a gum, given in conjunction with spices in certain stages of bowel complaints. *B. ceiba*, the five leaved silk cotton tree, rises to a great height. Its native country is South America and the adjacent West India Islands, where its immense trunk is scooped into canoes.

**Bombay**, a Presidency and one of the eight great Provinces of British India; between lat. 14° and 29° N., and long. 66° and 77° E. It stretches along the west of the Indian peninsula, and is irregular in its outline and surface, presenting mountainous tracts, low, barren hills, valleys, and high tablelands. It is divided into a Northern, a Central, and a Southern Division, the Sind Division, and the town and island of Bombay. The Northern Division contains the districts of Ahmedabad, Kaira, Panch Mahals, Broach, Surat, Thana, Kolába; the Central Khandesh, Nasik, Ahmednagar, Poona, Sholapur, Satara; the Southern, Belgaum, Dharwar, Kaladgi, Kanara, Ratnagiri. Total area, 125,778 square miles; pop. (1901) 18,584,496, including the city and territory of Aden in Arabia, 70 square miles (pop. 44,079). The native or feudatory States connected with the presidency (the chief being Kathiawar) have an area of 69,045 square miles and a pop. of 8,059,298. The Portuguese possessions, Goa, Daman, and Diu, geographically belong to it. Many parts, the valleys in particular, are fertile and highly cultivated; other districts are being gradually developed by the construction of roads and railroads. The southern portions are well supplied with moisture, but great part of Sind is the most arid portion of India. The climate varies, being unhealthful in the capital, Bombay, and its vicinity, but at other places, such as Poonah, very favorable to Europeans. The chief productions of the soil are cotton, rice, millet, wheat, barley, dates, and the cocoa palm. The manufactures are cotton, silk, leather, etc. The great export is cotton. The administration is in the hands of a Governor and council. The chief source

## Bomb Lance

of revenue is the land, which is largely held on the ryotwar system. Like Bengal and Madras, the Presidency has its own army.

**Bombay**, the chief seaport on the W. coast of India, and capital of the Presidency of the same name; at the southern extremity of the island of Bombay; is divided into two portions, one known as the Fort, and formerly surrounded with fortifications, on a narrow point of land with the harbor on the E. side and Back Bay on the W.; the other known as the City, a little to the N. W. In the Fort are Bombay Castle, the Government offices, and almost all the merchants' warehouses and offices; but most of the European residents live outside of the mercantile and native quarters of the city in villas or bungalows. Bombay has many handsome buildings, both public and private, as the cathedral, the university, the secretariat, the high court, the post and telegraph offices, etc. Various industries, such as dyeing, tanning, and metal working, are carried on, and there are large cotton factories. The commerce is very extensive, exports and imports of merchandise reaching a total value of over \$300,000,000 annually. The harbor is one of the largest and safest in India, and there are commodious docks. There is a large traffic with steam vessels between Bombay and Great Britain, and regular steam communication with China, Australia, Singapore, Mauritius, etc. The island of Bombay, which is about 11 miles long and 3 miles broad, was formerly liable to be overflowed by the sea, to prevent which substantial walls and embankments have been constructed. The harbor is protected by formidable rock batteries. After Madras, Bombay is the oldest of the British possessions in the East, having been ceded by the Portuguese in 1661. Pop. (1901) 776,006.

**Bombazine**, a mixed silk and woolen twilled stuff, the warp consisting of silk and the weft of worsted. Black bombazine has been much in use for mourning garments.

**Bomb Chest**, a kind of chest filled with bombs, or in some cases only with gunpowder, buried in the earth, and designed to be exploded at a predetermined moment and blow up those who may be above and around.

**Bombidæ**, a family of hymenopterous insects, containing the humble or bumble bees.

**Bomb Lance**, a harpoon used in whale fishing which carries a charge of explosive material in its head. In one form of the weapon the arrangement is that when the harpoon strikes the fish, the bar, which is pivoted obliquely in the head of the instrument, shall serve to release a spring acting on the hammer, which then explodes the cap and bursts the charge chamber.



## Bombon

**Bombon**, a large, fresh water lake in Luzon, Philippine Islands, about 50 miles S. of Manila. It is 105 square miles in area. There is a small island in the center, from which rises the volcano of Taal, the lowest in the world, its height being only 850 feet. The waters of the lake find an outlet to the sea through the Pansipit river.

**Bombyx**, the genus of moths to which the silk worm moth (*B. mori*) belongs.

**Bom-Fim**, a town of Brazil, Province of Rio Janeiro, 65 miles W. of the city of the same name. There are several places of this name in Brazil.

**Bomilcar**, a Carthaginian general, lived about 310 B. C. Not satisfied with enjoying the highest dignity the republic could bestow, he aspired to sovereign power; and, taking advantage of the public alarm occasioned by the invasion of Agathocles, he entered Carthage at the head of 1,000 mercenaries, about 308 B. C. After being proclaimed king, his hireling troops turned against him, made him prisoner, and put him to death by crucifixion.

**Bomilcar**, a Numidian adventurer, died about 107 B. C. He was a favorite of Jugurtha, and the instrument of many of his cruelties. Having by his order murdered Massina, grandson of Massinissa, he fled to Africa. Here he had an interview with Metellus, who promised him immunity for his crime if he would either kill or betray Jugurtha. To this condition Bomilcar consented; but the plot having been discovered by Jugurtha, he caused Bomilcar and his accomplices to be put to death.

**Bonacci=Brunamonti, Maria Alinda** (bō-nä'chē brö-nä-mon'tē), an Italian poet, born in Perugia, in 1842. She was only 14 years old when her first "Collection of Poems" appeared and attracted much attention. Her "National Songs" (1859-1878) were inspired by Italy's struggle for freedom.

**Bona Dea**, a mysterious Italian goddess of fertility, who is variously described as the wife, sister, or daughter of Faunus. She was worshipped at Rome from the most ancient times, but only by women, even her name being concealed from men. Her sanctuary was a grotto on Mons Aventinus; but her festival (the 1st of May) was celebrated in the house of the consul. The solemnities were performed generally by high born vestals. At this celebration, no males were allowed to be present; even portraits of men were veiled. During the celebration in the house of Cæsar (62 B. C.), the infamous Clodius was discovered disguised as a female musician. The symbol of the goddess was a serpent, indicating her healing powers.

## Bonaparte

**Bona Fides**, literally, good faith; honesty, as distinguished from *mala fides* (bad faith). The law requires all persons in their transactions to act with good faith; and a contract, when the parties have not acted *bona fide*, is void at the pleasure of the innocent party.

**Bonald, Louis Gabriel Ambroise, Vicomte de**, a French philosopher, born in 1754. During the Revolution he joined the Royalist army under the Bourbon princes. He returned to France under Napoleon; became co-editor of the "Mercure" with Chateaubriand and Fiévée, and, in 1808, was appointed Minister of Public Instruction. After the Restoration—as the deputy for his department—he voted with the Ultramontane or Theocratic Party in the *Chambre Introuvable*, and in his political career, as in his philosophical works, was the ardent advocate of absolutism, of the infallibility of the Pope, and of the Jesuits. In 1830, he refused to take the oath of allegiance to the new dynasty. He died in 1840.

**Bonanno**, an Italian architect and sculptor of the 12th century. In 1174 he commenced, with Wilhelm of Innsbruck, the famous Leaning Tower of Pisa. He was also the designer of the celebrated bronze doors of the cathedral of that city, which were, all but one, destroyed by a conflagration in 1596.

**Bonaparte** (pronounced in Italian in four syllables; in French and English in three), the name of a famous family, which was spelt Buonaparte by the Emperor Napoleon and his father till 1796, though the more usual, modern form also occurs in old Italian documents. In the 13th century and afterward, several families named Bonaparte figure with distinction in Italian records—at Florence, San Miniato, Sarzano, and Genoa. But as the name of Bonaparte occurs in Corsica as early as the 10th century, it is probable that the island may have been their original home. In the 16th century mention is again found of the Bonapartes in Corsica, where in Ajaccio they occupied a respectable position as a patrician or leading family. In the 18th century this family was represented by three male descendants, all residing at Ajaccio: the archdeacon, LUCIEN BONAPARTE; his brother, NAPOLEON BONAPARTE; and his nephew, CHARLES.

CHARLES BONAPARTE, father of the Emperor Napoleon, was born at Ajaccio in 1746; studied law at Pisa; and married, in 1767,—without the consent of his uncles—a beautiful young patrician lady, named Letizia Ramolino. In 1768 he removed with his family to Corte, in order to assist General Paoli in defending the island against the French invasion. As the French prevailed, and further resistance was useless,



Charles Bonaparte attached himself to the French interest, and in 1771 was included by Louis XV. in the election of 400 Corsican families to form a nobility. In 1773 Charles Bonaparte was appointed royal counselor and assessor of the town and Province of Ajaccio. In 1777 he was a member of the deputation of Corsican nobles to the Court of France. In this capacity he resided for some time in Paris, where he gained for his son Napoleon, through the interest of Count Marbœuf, a



NAPOLEON BONAPARTE.

free admission into the military school at Brienne. In 1779 he returned to Corsica, and in 1785 went to Montpellier, for the benefit of his health, where he died the same year. He was a man of noble presence and amiable character.

By his marriage with Letizia he left eight children: JOSEPH BONAPARTE, King of Spain; NAPOLEON (q. v.), Emperor of the French; LUCIEN BONAPARTE, Prince of Canino; MARIA ANNA (afterward named ELISE), Princess of Lucca and Piombino, wife of Prince Bacciocchi; LOUIS BONAPARTE, King of Holland; CARLOTTA (afterward named MARIE PAULINE); PRINCESS BORGHESE ANNUNCIATA (afterward named CAROLINE), wife of General Leclerc, afterward of Murat, King of Naples; JEROME BONAPARTE, King of Westphalia. These members of the Bonaparte family, with the children of BEAUHARNAIS (q. v.), adopted by the Emperor Napoleon when he married Josephine, are distinguished as the *Napoleonidæ* of modern French history. By a decree of the Senate (1804), the right of succession to the throne was restricted to Napoleon and his brothers, Joseph and Louis, with their offspring. Lucien and Jerome were excluded on account of their unequal marriages. As Joseph, the eldest brother of the Emperor, had no son, the descendants of Louis became nearest heirs to the throne.

MARIA LETIZIA RAMOLINO, mother of Napoleon I., lived to see her family placed on the thrones of Europe, and also witnessed their downfall. She was born at Ajaccio in 1750. After the death of her husband she lived for some time in Corsica, and in 1793, when the island came under

British rule, removed with her family to Marseilles, where she lived in poverty, mainly supported by the pension given to Corsican refugees. After her son became First Consul she removed to Paris, and when her son was crowned in 1804 received the title Madame Mère, and was made patroness of all the benevolent institutions of the empire. A brilliant court household was given to her, which, however, was never pleasing to her modest tastes. Remembering former adversities, and foreboding reverses of the splendid success of her sons, she was prepared for all that followed. After the downfall of Napoleon, Letizia lived with her stepbrother, Cardinal Fesch, in winter at Rome, and in summer at Albano, and submitted to her change of fortune with remarkable dignity. She died in 1836, leaving a considerable property, the result of saving habits during her prosperity.

JOSEPH BONAPARTE, eldest brother of Napoleon, was born at Corte, in Corsica, in 1768. On the death of his father he exerted himself to support the younger members of the family, and in 1793 removed with them to Marseilles, where he prepared for the bar. In 1797 he was elected a member of the Council of Five Hundred, and, in the same year, was sent as Ambassador from the republic to Rome. In 1800, after he had proved his ability in several offices of State, he was chosen by the First Consul as Plenipotentiary to conclude a treaty of friendship with the United States of America. He signed the Treaty of Peace at Luneville, 1801, and that of Amiens, 1802; and, with Cretet and Bernier, conducted the negotiations relative to the *concordat*. After the coronation of Napoleon new honors fell to the share of Joseph Bonaparte, who was made commander-in-chief of the army of Naples: in 1805, ruler of the Two Sicilies; and in 1806, King of Naples. Though, during his reign, many beneficial changes of government were effected, these reforms were not managed judiciously; and his humane feelings brought him into frequent collision with his imperious brother, a fact which did not conduce to the efficiency of his rule. In truth, he was far too fond of the fine arts to be a vigorous ruler in stormy times; and he is accused of leaving affairs too much in the hands of his Minister, the subtle Salicetti. In 1808 Joseph Bonaparte was summarily transferred by his brother to the throne of Spain, and Murat took his place as King of Naples. For Joseph, this was no favorable change; he found himself unprepared to cope with the Spanish insurgents, and after the defeat of the French at Vittoria in 1813, he returned to his estate at Morfontaine, in France.

After the battle of Waterloo he accompanied Napoleon to Rochefort, whence they



intended to sail separately for North America. In his last interview with Napoleon, Joseph generously offered to give up the vessel hired for his own escape, but meanwhile Napoleon had determined to surrender himself into the hands of the English. Joseph became an American citizen, and lived for some years at Bordentown, N. J., where he employed himself in agriculture, and was highly esteemed by his neighbors. In 1832 he returned to Europe, and he died at Florence in 1844. Joseph was the only one of his brothers for whom Napoleon professed to care anything. He was a handsome, intelligent looking man, distinguished by the elegance of his manners and conversation. His wife, JULIA MARIE CLARY, born in 1777, was the daughter of a wealthy citizen of Marseilles, and the sister-in-law of Bernadotte, King of Sweden. She was a quiet, unambitious woman, with no taste for the splendors of royalty which fell to her share during a few weeks only at Naples, for she never went to Spain. Ill health appears to have prevented her accompanying her husband to America. She died at Florence in 1845. By her marriage with Joseph Bonaparte she had two daughters.

LUCIEN BONAPARTE, Prince of Canino, and brother of Napoleon, was born at Ajaccio in 1775, and received his education in the college of Autun, the military school at Brienne, and the seminary at Aix. In 1798 he was made a member of the Council of Five Hundred, and formed a party favorable to the views of his brother Napoleon. Shortly before the 18th Brumaire he was elected President of the Council of Five Hundred, and was the hero of that day. During the ferment which followed Napoleon's entrance, Lucien left his seat, mounted his horse, and, riding through the ranks of the assembled troops, called upon them to rescue their general from assassins. Afterward appointed Minister of the Interior, he was active in the encouragement of education, art, and science, and organized the prefectures. As Ambassador to Madrid (1800) he contrived to gain the confidence of King Charles IV. and his favorite, Godoy, and to undermine the British influence, which had until then been exercised at the Court of Spain. Lucien was a Republican in opinion, and, therefore, opposed to the absolute rule of his brother; and his second marriage to the widow of a stockbroker did not improve their relations. On condition that he would divorce his wife, the crowns of Italy and Spain were offered him; but he refused them, and preferred living in retirement at his estate of Canino, in the Province of Viterbo, near the frontiers of Tuscany, where he devoted his time to art and science. Here he enjoyed the friendship of the Pope, who created him Prince of Canino and Musignano;

but, having denounced in his private capacity the arrogant and cruel policy of his brother toward the Court of Rome, he was advised to leave the city in which he was at that period residing. In 1810 he took ship for America, but fell into the hands of the English. After the defeat at Waterloo, Lucien Bonaparte alone seems to have preserved his presence of mind. He immediately advised his brother to dissolve the Chambers, and assume the place of absolute dictator. After the second ascent of the throne by Louis XVIII., Lucien lived in and near Rome, and died at Viterbo in 1840. He possessed considerable talents and firmness of character. He was in his early years a keen Republican, but the weakness of the Directory convinced him that a military consulship was necessary to allay the social anarchy of France. He wrote poems of no particular merit. Lucien had a numerous family. By his first wife he had only two daughters.

His eldest son was CHARLES LUCIEN JULES LAURENT BONAPARTE, Prince of Canino and Musignano, born at Paris in 1803. He never exhibited any inclination for political life, preferring the more quiet and wholesome pursuits of literature and science. He acquired a considerable reputation as a naturalist, and especially as a writer on ornithology. He died in 1857. He was a member of the principal academies of Europe and the United States. His chief publications are a continuation of Wilson's "Ornithology of America," and "Iconografia della Fauna Italica." The second son, PAUL MARIE BONAPARTE, born in 1808, took a part in the Greek War of Liberation, and died by the accidental discharge of a pistol in 1827. The third son, LOUIS LUCIEN BONAPARTE, born in 1813, at Thorngrove, Worcestershire, during his father's imprisonment in England, early devoted himself with equal ardor to chemistry, mineralogy, and the study of languages, and became an authority of the first rank in Basque, Celtic, and comparative philology generally. His election for Corsica in 1848 was annulled, but he was sent to the Constituent Assembly for the Seine Department next year, and was made Senator in 1852, with the title of Highness in addition to that of Prince, which he already possessed from his birth. Most of his contributions to linguistic science have been privately printed, and, according to a "Catalogue" (8 parts, 1858-1888), the total number of separate books written either by himself or at his instigation and encouragement, amounted to no less than 222. Among these are a translation of St. Matthew's version of the parable of the sower into 72 languages and dialects of Europe (1857); a linguistic map of the seven Basque Provinces, showing the delimitation of the "Eus-



cara," and its division into dialects, sub-dialects, and varieties (1863); a Basque version of the Bible in the Labourdin dialect (1865); a masterly treatise on the Basque verb (1869); besides many papers of profound learning in the philological journals. A great work produced under his patronage from 1858 to 1860, was a version of the Song of Solomon in 22 different English dialects, besides four in Lowland Scotch, and one in Saxon. He long lived in England, where a Civil List pension of \$1,250 was granted to him in 1883. The fourth son, PIERRE NAPOLEON BONAPARTE, born in 1815, passed through many changes of fortune in America, Italy, and Belgium, and returned to France in 1848. In 1870 he shot a journalist, Victor Noir, a deed which created great excitement in Paris; and, being tried, was acquitted of the charge of murder, but condemned to pay \$5,000 to Victor Noir's relatives. He died in 1881. The youngest son, ANTOINE BONAPARTE, born in 1816, fled to the United States after an affair with the Papal troops in 1836, and returned to France in 1848, where he was elected to the National Assembly in 1849; he died in 1883.

LOUIS BONAPARTE, third brother of Napoleon, born in 1778, was educated in the artillery school at Chalons, where he imbibed anti-Republican principles. After rising from one honor to another he was made King of Holland in 1806; but, in fact, was never more than a French Governor of Holland, subordinate to the will of his brother. Yet he seems to have done his best to govern in the interests of his Dutch subjects, and when he found his efforts useless, he resigned in favor of his son in 1810. He returned to Paris in 1814, where he was coldly received by the Emperor. After living for some years in Rome—where he separated from his wife—he removed in 1826 to Florence, where he lived in retirement. He died at Leghorn in 1846. Louis Bonaparte was the writer of several works, "Marie, ou les Hollandaises" (1814), a novel, giving sketches of Dutch manners; "Documents Historiques sur le Gouvernement de la Hollande" (3 vols. London, 1821); "Histoire du Parlement Anglais" (1820); and a critique on M. de Norvins' "History of Napoleon." Louis Bonaparte was married in 1802 to Hortense Beauharnais, daughter of General Beauharnais by his wife, Josephine, afterward Empress of the French.

The amiable and accomplished HORTENSE EUGENIE BEAUHARNAIS, the adopted daughter of Napoleon, Queen of Holland and Countess St. Leu, was born at Paris in 1783. After the execution of her father, she lived for some time in humble circumstances, until Napoleon's marriage with

Josephine. In obedience to the plans of her step-father she rejected her intended husband, General Desaix, and married Louis Bonaparte in 1802. She lived mostly apart from her husband, even as Queen of Holland; and, on the downfall of the Napoleons, passed her time in various countries. She at last settled at Arenenberg, a mansion in the Canton Thurgau, Switzerland, where she lived in retirement, sometimes spending a winter in Italy. In 1831, when her two sons had implicated themselves in the Italian insurrection, the Countess traveled in search of them through many dangers, and found the elder deceased, and the younger, the late Emperor of the French, ill at a place near Ancona. She died at Arenenberg in 1837, and was buried near the remains of her mother, Josephine, at Ruel, near Paris. She was the author of "La Reine Hortense en Italie, en France, et en Angleterre, pendant l'année 1831," and wrote several excellent songs. She likewise composed some deservedly popular airs, among others, the well known "Partant pour la Syrie," which the late Emperor of the French, with a delicate union of political tact and filial pride, made the national air of France. Of her three sons, the eldest, NAPOLEON LOUIS CHARLES, born 1803, died in childhood in 1807. The second, LOUIS NAPOLEON, born in 1804, Crown Prince of Holland, married his cousin Charlotte, daughter of Joseph Bonaparte, and died in 1831. The third, CHARLES LOUIS NAPOLEON, became Emperor of the French. See NAPOLEON III.

JEROME BONAPARTE, youngest brother of Napoleon, was born at Ajaccio in 1784. After receiving his education in the college at Juilly, he served as naval lieutenant in the expedition to Haiti. When war broke out between France and England in 1803, Jerome was cruising off the West Indies, and was compelled to take refuge in the port of New York. While in the United States he married Elizabeth Patterson (1785-1879), daughter of a merchant in Baltimore. He fought in the war against Prussia, and in 1807 was made King of Westphalia. His administration of his kingdom was careless, extravagant, and burdensome to his subjects. The battle of Leipsic brought the reign of Jerome to a close. He fought by the side of the Emperor at Waterloo. After his brother's abdication he left Paris and visited Switzerland and Austria, but ultimately settled in Florence. At the outbreak of the February Revolution (1848), Jerome Bonaparte was in Paris, where he was appointed Governor of the Invalides, and in 1850 was made a French marshal. He died in 1860.

His marriage with Elizabeth Patterson having been declared null by Napoleon, Jerome was forced, after he had gained the



Westphalian crown, to marry Catharine, daughter of King Frederick I. of Würtemberg. After the battle of Waterloo, her father wished to annul the marriage; but she declared her resolution to share through life the fortunes of her husband. Jerome Bonaparte left in the United States one son, Jerome Napoleon (1805-1870), by his first marriage, who was a wealthy resident, though he never became a naturalized citizen. He left two sons, (1) JEROME NAPOLEON BONAPARTE, born in Baltimore in 1832. He served with credit in the United States and French armies. (2) CHARLES JOSEPH BONAPARTE, born in Baltimore in 1851; graduated at Harvard, and became a lawyer. He has taken a prominent part in public affairs. By his second wife Jerome Bonaparte had three children. The elder son, JEROME BONAPARTE, born in 1814, died in 1847. MATHILDE BONAPARTE, Princess of Montfort, born at Trieste, 1820, married the Russian Count Anatol Demidoff, and lived at the court of Louis Napoleon during his Presidency. The younger son, NAPOLEON JOSEPH CHARLES PAUL BONAPARTE, born at Trieste in 1822, passed his youth in Italy; entered the military service of Würtemberg in 1837; afterward traveled in several countries of Europe; and was banished from France (1845) on account of his intercourse with the Republican Party. After February, 1848, he was elected to the National Assembly. He commanded an infantry division at the battles of Alma and Inkermann. In 1859 he married the Princess Clotilde, daughter of Victor Emmanuel, by whom he had two sons and a daughter. After the fall of the Empire he took up his residence in England, but returned to France in 1872. On the death of the Prince Imperial, son of the Emperor Louis Napoleon, in Zululand in 1879, the eldest son of Prince Napoleon became the heir of the Bonapartist hopes. When, in 1886, the chiefs of the Bourbon family were, by a vote of both chambers, expelled from France, Prince Napoleon and his eldest son

were exiled also as pretenders to the throne. He died in 1891. See NAPOLEON.

*The Bonaparte Pretenders.*—Of the Emperor Napoleon I. and his brothers, Joseph and Louis, male issue is now extinct. The Emperor's brothers, Lucien and Jerome, are represented by the following living descendants, and they constitute the present Imperialist House of France:

Prince Victor Napoleon (of the house of Jerome), born July 18, 1862, is the son of the late Prince Napoleon (who died March 18, 1891) and the Princess Clotilde, sister of King Humbert of Italy. The Prince has been recognized by his party as the undisputed head of the Bonaparte family. He lives in Brussels and is unmarried. His only brother, Prince Louis Napoleon, born in 1864, is an officer in the Russian army. His sister, born in 1866, is the widow of Prince Amadeus of Italy, her own uncle, by whom she had a son, Prince Humbert, born in 1889.

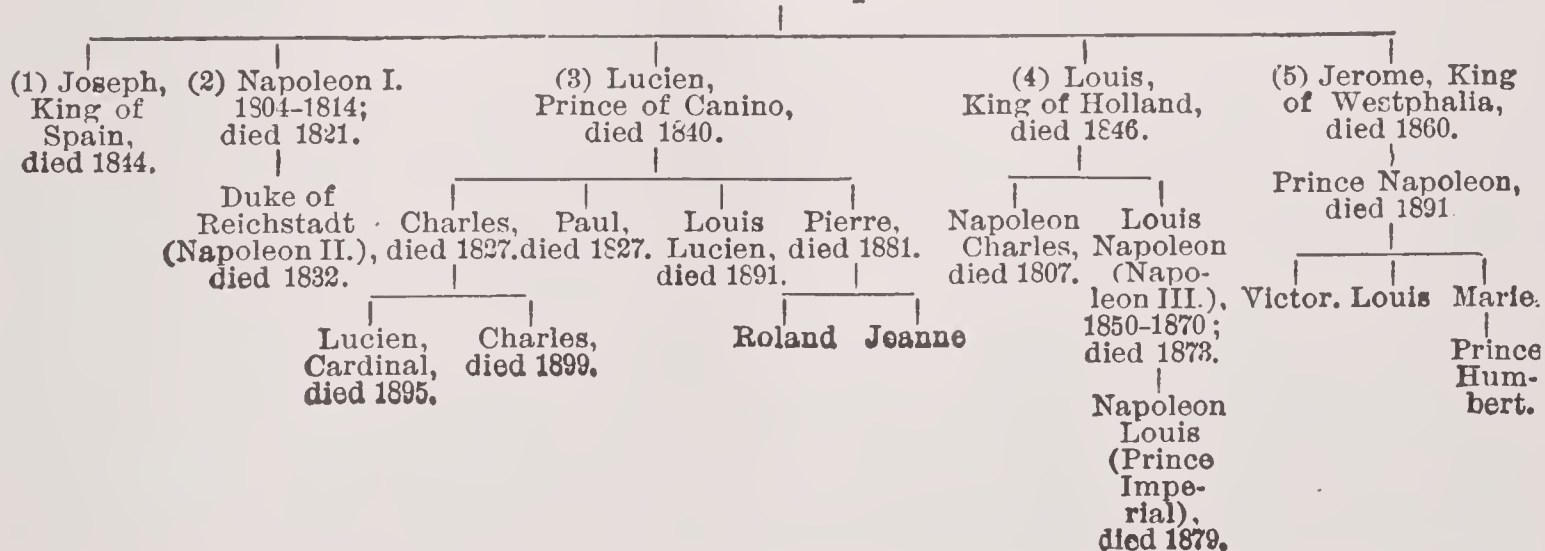
The living aunt of Prince Victor Napoleon is the Princess Mathilde, born in 1820, married, in 1840, Prince Demidoff, of Russia; now a widow without children.

Prince Charles Napoleon, brother of the late Cardinal Bonaparte, who died Feb. 12, 1899, was the last representative of the eldest son of Napoleon's brother, Lucien, in the male line. He was born in 1839; was married and had two daughters—Marie, wife of Lieutenant Giotti, of the Italian army, and Eugénie, unmarried. He had three sisters, married, respectively, to the Marquis of Roccagivoino, Count Primoli, and Prince Gabrelli.

Prince Roland Bonaparte is the only living male cousin of Prince Charles Napoleon. He is a son of the late Prince Pierre Napoleon Bonaparte; was born in 1858; married in 1880, the daughter of Blanc, the proprietor of the Monte Carlo gambling establishment. His wife died in 1882, leaving him a daughter and a fortune. He has one sister, Jeanne, born in 1861, and married to the Marquis de Villeneuve.

#### THE BONAPARTE FAMILY.

##### Charles Bonaparte.





## Bonar

**Bonar, Horatius**, a celebrated Scotch hymnist, born in Edinburgh, Dec. 19, 1808; wrote "Hymns of Faith and Hope," many of which have been taken into the hymnals of most of the Protestant Churches. He also wrote more than 20 volumes on theological and religious subjects. He died July 31, 1889.

**Bonaventura, St.**, an Italian friar of the Order of St. Francis, born in Tuscany in 1221. He was sent by his superiors to Paris, where he, as well as Thomas Aquinas, of the Dominican Order, became involved in contentions with the university, which denied the academical honors to individuals of the mendicant orders. It was not till 1257 that he received his doctor's degree. He had already been elected General of his Order, in which capacity he enforced a strict discipline, giving himself the first example of implicit adherence to the monastic rule. He retired to the convent of Mt. Alvernia in Tuscany, where he wrote "Vita Santi Francisco," and also an ascetic work, "Itinerarium mentis in Deum," for which last he received the appellation of the "Seraphic Doctor." He died July 15, 1274, from sheer ascetic exhaustion. Dante, who wrote shortly afterward, places him among the saints of his "Paradiso." In 1482, he was formally canonized by Sixtus IV., and in 1587 was ranked by Sixtus V. as the 6th of the great doctors of the Church.

**Bona Vista**, a bay, cape, and town on the E. coast of Newfoundland. The town is a port of entry, and one of the oldest settlements in the island.

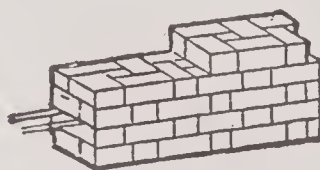
**Bonchamp, Charles** (bôn-shän'), **Marquis de**, a Vendean leader, was born in Anjou, May 10, 1760. He served as a volunteer in the American Revolutionary War, and was a captain in the French army at the outbreak of the French Revolution. A strong Royalist, he naturally disliked the Revolution, and consequently lived in retirement until chosen leader of the Anjou insurgents. In conjunction with La Roche-jacquelin and Cathelineau he fought with great bravery and frequent success, but his superior knowledge of military tactics was not sufficiently made use of by the insurgent army. In the encounter at Cholet, Oct. 17, 1793, Bonchamp received a fatal shot in the breast, and when his followers vowed to revenge his death on 5,000 Republican prisoners, the dying hero exclaimed: "Spare your prisoners. I command it!" This last command was obeyed.

**Bond**, a written acknowledgment or binding of a debt under seal. The person who gives the bond is called the obligor, and he to whom it is given the obligee. A bond is called single when it does not contain a penalty, and an obligation when it does. If two or more persons bind themselves in

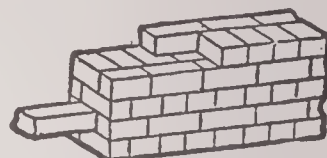
## Bond

a bond jointly and severally, the obligee may sue them jointly or single out any one of the number he pleases to sue; but if they are bound jointly, and not severally, he must sue them jointly or not at all. Bonds of an immoral character are void at law.

**Bond**, in masonry, a stone or brick which is laid with its length across a wall, or extends through the facing course into that behind, so as to bind the facing to the backing. Such stones are known also as binders, bond stone, binding stones, through stones, perpent stones and headers. In brick lay-



MASONRY BOND.



ENGLISH BOND.

ing, a bond is a particular mode of disposing bricks in a wall so as to tie and break joint. The English bond has courses of headers alternating with courses of stretchers. In the Flemish bond each course has stretchers and headers alternating.

**Bond, George Phillips**, an American astronomer, born in Dorchester, Mass., May 20, 1825; a son of William Cranch Bond; assisted his father in the Harvard College Observatory, and at the time of the latter's death was appointed director. He discovered independently 11 new comets, and was the author of an elaborate memoir on the appearance of Donati's comet in 1858, and of important investigations on the subject of perturbations of cometary orbits, as well as an investigation into the theory of the constitution of Saturn's rings. His drawing of the nebula in Orion, of which a fine steel plate engraving was made, was also remarkable work, and astronomical photography received its first impulse at his hands. He died Feb. 17, 1865.

**Bond, William Cranch**, an American astronomer, born in Portland, Me., Sept. 9, 1789; began life as a watch maker, and constructed the first ship's chronometer made in the United States. He established a private observatory at Dorchester, Mass., which was at the time the finest in the country. Invited to move his observatory to Cambridge, he accepted the invitation of the Harvard College authorities, and in 1840 was appointed Astronomical Observer to the university, and later to the directorship of the observatory erected there in 1843-1844. He was the inventor of the method of registering the beats of a clock by galvanic circuit, together with the observed transits of stars over the wires of a transit instrument, upon a chronograph, and he invented the spring governor, which



bears his name, for controlling the motion of the chronograph barrel. His most important work was in connection with the determination of longitudes, both of points in the United States from the Harvard College Observatory, and that of the observatory itself from Greenwich by the observation of a vast number of occultations of stars by the moon, both at Dorchester and Cambridge. While the observatory was under his direction the dusky ring of Saturn was discovered there as well as its satellite, Hyperion. He died Jan. 29, 1859.

**Bonded Warehouses**, places where taxable imports or manufactures may be left in government custody, under bond for payment of the duty, till the importer or manufacturer is prepared to make full payment of duty. The system was designed to promote commerce and certain manufactures by lessening the pressure on the importer or manufacturer by means of instalment payments of duty.

**Bondi, Clemente**, one of the most popular poets of modern Italy; born in Mizzano, in the duchy of Parma, June 27, 1742; became Jesuit shortly before the suppression of the order, and was appointed Professor of Eloquence in the University of Parma. He afterward provoked the hostility of the order by publishing an ode in praise of their suppression, and was obliged to seek an asylum in the Tyrol, where the Archduke Ferdinand took him under his protection, appointed him his librarian at Brünn, and intrusted him with the education of his sons, one of whom afterward succeeded to the duchy of Modena. In 1816 Bondi was appointed Professor of History and Literature at Vienna. He was an easy and elegant versifier, and cultivated with success almost all varieties of poetry. Among the most important poems are: "La Giornata Villereccia," "La Conversazione," and "La Felicità." He also executed a metrical version of the "Æneid," which some consider his best work. He died in Vienna, June 20, 1821.

**Bond Spring Governor**, a device invented by William C. Bond for controlling the motion of a chronograph barrel or any moving train of wheels, a light revolving arm being slightly checked at each revolution by a stop on the rod of a pendulum, and the slight shock which would otherwise be given to the constant motion of the train being smoothed out by having this arm attached to a long spiral spring through which the control check is transmitted to the train, the impulse given to the pendulum as the arm slides off the stop being also sufficient to maintain a nearly constant are vibration of the pendulum.

**Bondu**, a country of West Africa, belonging to the French territory of Senegal, on

the W. of the Falémé, a tributary of that river. Its length is about 115 miles, its breadth about 100. Its surface is but little diversified, and the land as a whole is not very fertile, nor is the climate good. The ordinary African animals occur, but the lion is becoming scarce. The ass is the chief domestic animal. The population, which consists of Fulahs and other tribes, is rather sparse, having been reduced by frequent wars, but under French rule is beginning to increase. Agriculture, manufactures, and commerce are alike unimportant.

**Bone**. The bones are the hardest and most solid parts of animals; they constitute the frame, serve as points of attachment to the muscles, and afford support to the softer solids. They are the instruments, as muscles are the organs, of motion. In the mammalia, birds, fish, and reptiles, the whole system of bones united by the vertebral column is called the skeleton. In the ætus they are first a vascular gelatinous substance, in different points of which earthy matter is gradually deposited. This process is perceptible toward the end of the second month, and, at the time of maturity, the bone is completely formed. After birth the bones become gradually more solid, and, in the temperate zones, reach their perfection in men between the ages of 15 and 20. From this age till 50 they change but slightly; after that period they grow thinner, lighter, and more brittle. Those of the two first classes of animals are harder on their exterior than they are internally. Their material is nearly the same throughout. Their structure is vascular, and they are traversed by the blood-vessels and the absorbents. They are hardest at the surface, which is formed by a firm membrane called the periosteum; the internal parts are cellular, containing a substance called marrow. The use of the marrow is to prevent the too great dryness and brittleness of the bones.

Chemistry decomposes bone into gelatin, fat, cartilage, and earthy salts. A fresh bone boiled in water, or exposed to the action of an acid, gives out its gelatin; if boiled in water, on cooling the decoction a jelly is formed which makes a good portable soup. The earth of bones is obtained by calcination; that is, by exposing them to a red heat, by which they are deprived of the soft substances. It consists principally of calcic phosphate, with small quantities of magnesian phosphate, and of calcic carbonate and fluoride. The composition of human bones, as analyzed by Berzelius, is:

|   |       |
|---|-------|
| Animal matter soluble by boiling.....                   | 32.17 |
| Vascular substance .....                                | 1.13  |
| Calcium phosphate, with a little calcium fluoride ..... | 53.04 |
| Calcium carbonate.....                                  | 11.30 |
| Magnesium phosphate.....                                | 1.16  |
| Soda, with a little common salt.....                    | 1.20  |



## Bone

The bones of animals contain slightly different proportions. Bones are now very extensively used as fertilizing agents. See BONE MANURE.

**Bone, or Bona**, a town and seaport of Algiers, 85 miles N. E. of Constantine, at the mouth of the Seybouse river. It is built on the site of Aphrodisium, the port of ancient Hippo. The Vandals having destroyed Aphrodisium, an Arab town arose on its ruins. The city having outgrown its former limits, the present ramparts are beyond the old walls. Bone has been modernized to some extent, many old buildings being removed to make room for new ones. The surface is irregular and some of the streets steep. There are mosques, a cathedral and other churches and a synagogue.

**Bone Ash**, ash made of calcined bones. It consists chiefly of tricalcic phosphate  $\text{Ca}''_3(\text{PO}_4)_2'''$ , mixed with about one-fourth its weight of magnesium phosphate and calcic carbonate.

**Bone Bed**, in geology, a bed containing numerous fragments of fossil bones, teeth, etc. Excepting teeth, no part of a vertebrated animal is more indestructible than bones, and these are so correlated to the teeth, digestive organs, external covering, etc., that in many cases the finding of a single bone will enable a skilled anatomist to reconstruct the whole animal.

**Bone Black**, animal charcoal. It is obtained by charring bones. It contains about 10 per cent. of finely divided carbon disseminated through the porous phosphate of calcium. It has the power of absorbing gases, removing the coloring matter and alkaloïds, etc., from their solutions. It is used to disinfect ulcers, etc., also to decolorize sugar and other organic substances; its properties can be restored by heating it to redness in closed vessels. If treated with dilute hydrochloric acid, HCl, for two days the mineral matters are removed, and a black, pulverent substance is obtained, which has been used as an antidote in cases of poisoning with vegetable alkaloïds.

Among the volatile products obtained when bones are calcined in close vessels is a peculiar oil, which is burned in lamps in close chambers; while the soot which accumulates on the sides is collected and forms the pigment known, according to quality, as bone black or ivory black. Bone black cleaning apparatus is a device for purifying, screening, and cooling bone black after treatment in the revivifying retort; bone black cooler, an apparatus for cooling animal charcoal after its removal from the furnace; bone black furnace, a form of furnace for revivifying bone black; bone black kiln, a chamber or retort mounted in a furnace for reburning bone black to remove impurities with which it has become satu-

## Bongabong

rated or impregnated during its use as a defecator and filtering material.

**Bone Manure**, one of the most important fertilizers in agriculture. The value of bones as manure arises chiefly from the phosphates and nitrogenous organic matters they contain; and where the soil is already rich in phosphates bone is of little use as manure. It is of most service, therefore, where the soil is deficient in this respect, or in the case of crops whose rapid growth or small roots do not enable them to extract a sufficient supply of phosphate from the earth, turnips, for instance, or late sown oats and barley. There are several methods for increasing the value of bones as manure, by boiling out the fat and gelatine, for instance, the removal of which makes the bones more readily acted on by the weather and hastens the decay and distribution of their parts, or by grinding them to dust or dissolving them in sulphuric acid, by which latter course the phosphates are rendered soluble in water. Bones have long been used as manure in some parts of England, but only in a rude, unscientific way. It was in 1814 or 1815 that machinery was first used for crushing them in Yorkshire and Lincolnshire, and bone dust and dissolved bones are now largely employed as manures, great quantities of bones being now imported into Great Britain for this purpose. Before being utilized in agriculture they are often boiled for the oil or fat they contain, which is used in the manufacture of soap and lubricants.

**Boner, John Henry**, an American poet and literary worker, born at Salem, N. C., Jan. 31, 1845. A contributor to the magazines, he was on the editorial staff of the "Century Dictionary" and the "Standard Dictionary," and was once literary editor of the New York "World." He has written "Whispering Pines" (1883), a volume of verse.

**Boneset, or Thoroughwort** (*eupatorium perfoliātum*), a useful annual plant, natural order *compositæ*, indigenous to the United States, and easily recognized by its tall stem, 4 or 5 feet in height, passing through the middle of a large, double, hairy, leaf, and surmounted by a broad, flat head of light purple flowers. It is much used as a domestic medicine in the form of an infusion, having tonic and diaphoretic properties.

**Bongabong**, a town in the S. E. part of Luzon, Philippine Islands, with an estimated population of 20,000. It lies in a mountainous district, and attained military importance as the headquarters of a regiment of United States troops. The town has a municipal government based upon popular election.



## Bonghi

**Bonghi, Ruggero** (bōn'gē), an Italian scholar and publicist, born in Naples, March 21, 1826. The commencement of his brilliant career indicated scholarly activities only, for he made fine studies and versions of Aristotle and Plato; but latterly he took up such subjects as "The Financial History of Italy, 1864-1868" (1868); "The Life and Times of Valentino Pasini" (1867), and "The Life of Jesus" (1890); the popularity and value of these and other works giving him great prominence. He held professorships in several Italian universities; was Minister of Public Instruction in 1874-1876; and presided over the International Peace Congress held in Rome in 1891. He died Oct. 22, 1895.

**Bongo, or Obongo**, the name of a negroid people in the basin of the Ogowe river, in the French Kongo.

**Bonheur, Rosalie** (bôn-êr'), commonly called Rosa, a French artist, born in Bordeaux, March 22, 1822. Her studies were directed by her father, himself an artist of ability, and her first two pictures, "Chèvres et Moutons," and "Les Deux Lapins," which were exhibited in 1841, attracted much attention. In 1849 a fine work, "Labourages Nivernais," by her, was purchased by the French Government for 3,000 francs

and placed in the Luxembourg collection. In 1855 "The Haymaking Season in Auvergne" was hung at the Universal Exposition in Paris, and in the same year she sent the "Horse Fair" to the French Exhibition in London, where it was the center of attraction for the season. It is now in the Metropolitan Museum in



ROSA BONHEUR.

New York. After this work she stood at the very head of delineators of animal life, showing a wonderful power of representing spirited action. Near her studio she had an antechamber as a stable for the convenient study of animals, of which she collected some noble specimens. She also attended horse markets and fairs; generally wearing masculine dress, which was not unbecoming to her strong and marked features. After 1849 she directed the Free School of Design for Young Girls in Paris. During the siege of Paris the Crown Prince of Prussia especially ordered that her studio and resi-

## Boni

dence at Fontainebleau should be spared and respected. She received a first class medal at the French Salon in 1849, and another in 1855; and the decoration of the Legion of Honor in 1865; was made a member of the Institute of Antwerp in 1868; received the Leopold cross from the King of Belgium in 1880, and the same year received from the King of Spain the Commander's Cross of the Royal Order of Isabella the Catholic. In 1892 a celebrated painting by her, entitled "Horses Threshing Corn," was sold for \$60,000. It is the largest animal picture ever painted, showing ten horses large as life. In 1896, on her 74th birthday, she furnished a painting representing the historical combat between two stallions to which Lord Godolphin invited his friends in 1734. She died at Fontainebleau, May 25, 1899.

**Bon Homme Richard** (bôn-um-rê-shär'), a famous American warship, that, under the command of John Paul Jones, engaged in a terrific battle with the British ship "Serapis" in British waters, off Flamborough Head, on Sept 23, 1799. Jones lashed the vessels together and compelled the "Serapis" to strike her colors. The "Bon Homme Richard" sank two days afterward.

**Boni**, a State on the E. coast of the S. W. peninsula of the island of Celebes, in the Pacific Ocean, with an estimated area of 935 square miles. It was formerly the most powerful State in Celebes, but since 1859 has been practically a Dutch dependency. In the N. the scenery is fine, and the soil fertile—rice, sago, and cassia being produced. The inhabitants, called Bugis, have an allied language to the Macassars, with a literature of their own. Their towns and villages dot the coast, and as enterprising merchants and sailors the Bugis are found in every port of the East Indian Archipelago; they also engage in agriculture and in the manufacture of cotton and articles of gold and iron, in which they have a large trade. They are well built, active, and brave, and are lighter skinned, as well as superior in honesty and morality to other Malay races. Their institutions, said to be very ancient, partake of the character of a constitutional monarchy. The British have twice attacked the Bonese for injuring their commerce, and selling the crews of British ships into slavery. In the second attack, in 1814, the Bonese king was killed. The number of the population is unknown; some estimates give as much as 200,000. The capital, called Boni, stands on the coast of the S. W. peninsula. The Gulf of Boni separates the S. E. and S. W. peninsulas of Celebes. It is 200 miles long, and 40-80 miles broad.



## Boniface

**Boniface I.**, a Pope, elected after the death of Zozimus, 418, and maintained in the pontifical chair by the Emperor Honorius, against his rival Eulalius. He died in 422.

**Boniface II.** succeeded Felix IV., in 530. He was born at Rome, his father being a Goth. He compelled the bishops in a council to allow him to nominate his successor, and accordingly he named Vigil; but another council disavowed the proceedings of the first. He died in 532.

**Boniface III.** succeeded Sabinianus, in 607, and died a few months after his election; but he obtained from the Emperor Phocas the acknowledgment that the See of Rome was supreme over all other churches.

**Boniface IV.** was the son of a physician, and came to the tiara in 608. He converted the Pantheon into a church. He died in 615.

**Boniface V.** succeeded Adeodatus in 617, and died in 625.

**Boniface VI.** succeeded Formosus in 896, and died 18 days after his election.

**Boniface VII.**, whose surname was Franccone, assumed the chair after murdering Benedict VI. and John XIV. He was acknowledged sovereign pontiff in 974, and died in 984. His corpse was exposed in the public streets, and trodden under foot.

**Boniface VIII.**, in 1294, terrified his predecessor Celestine into a resignation, by denouncing to him, at midnight, eternal damnation if he did not quit the pontifical chair. The credulous Pope, thinking this a supernatural voice, obeyed the command next day, and the crafty cardinal was elected. He commenced his pontificate by imprisoning his predecessor, and laying Denmark under an interdict. He also behaved in a haughty manner toward the Colonnas, a distinguished Roman family, who protested against his election, and called a council to examine the charge. Boniface excommunicated them as heretics, and preached a crusade against them. He incited the princes of Germany to revolt against Albert of Austria; and also issued a bull, in which he asserted that God had set him over kings and kingdoms. Philip the Fair caused this bull to be burned at Paris; on which Boniface laid France under an interdict. Philip appealed to a general council, and sent his army into Italy, which took Boniface prisoner. The pontiff's behavior on this occasion was bold enough, for, putting on the tiara, and taking the keys and the crosier in his hands, he said, "I am a Pope, and a Pope I will die." He died at Rome, a few months afterward, in 1303. He wrote several works. His persecuting qualities are alluded to by Dante, in the 27th chapter of the "Inferno."

## Bonington

**Boniface IX.** was a Neapolitan by birth, and of a noble family. He was made cardinal in 1381, and Pope in 1389. He died in 1404.



BONIFACE IX.

**Boniface, St.**, a saint of the Roman calendar, and a native of England, who was sent by Gregory II. to convert the Germans. Gregory III. made him an archbishop. Born in Devonshire in 680; slain by some peasants in Friesland, in 755. His letters were printed in 1616.

**Bonifacio** (bō-nē-fä'chē-ō), **Strait of**, the Fretum Gallicum of the Romans, lies between Corsica and Sardinia. At the narrowest part it is only 7 miles wide. The navigation is difficult owing to the great number of rocks, which, however, are favorable to the production of coral.

**Bonin**, or (Japanese) **Ogasawara, Islands**, a volcanic group in the Pacific Ocean, 700 miles S. S. E. of Japan, stretching between 26° 30'—27° 45' N. lat., and between 159°—155° E. long. Area, 32 square miles; population about 200. Discovered by Quast and Tasman in 1639, they were taken possession of for Great Britain in 1827 by Captain Beechey; but in 1878 the Japanese reasserted their sovereignty, with the view of making them a penal settlement. The harbor is named Port Lloyd.

**Bonington, Richard Parkes**, an English painter in oil and water colors, born near Nottingham, Oct. 25, 1801. His father placed him under Louis Francia, the water color painter, in Calais; and he afterward studied in Paris—in the Louvre, at the Institute, and under Baron Gros. In 1822 he began to exhibit in the Salon, and received a premium from the Société des Amis des Arts for his views of Havre and Lillebonne; and two years later he was awarded a medal at the Salon. He then occupied himself with lithography; many of his sketches were reproduced by this method in such works as Baron Taylor's "Voyages Pittoresques dans l'ancienne France," and



## Bonito

he occasionally drew upon the stone himself, from his own designs and those of other artists. A fine collection of his work of this kind is preserved in the print room of the British Museum. About 1825 he took to oil painting, and in that year visited England, accompanied by Delacroix, in whose studio he worked after his return to Paris; and having visited Italy, he produced his splendid Venice views of the "Ducal Palace" and the "Grand Canal," which figured in the Salon of 1827, along with his "Francis I. and the Queen of Navarre" and his "Henry III. receiving the Spanish Ambassador." He also exhibited in the Royal Academy and the British Institution. He died Sept. 23, 1828.

**Bonito**, a fish, *thynnus pelamys*. It belongs to the family of *seomberidæ* (mackerels), and is nearly allied to the tunny. It is found in the Mediterranean, and is a great foe to the flying fish. The belted bonito is the *pelamys sarda*, and the plain bonito, the *alexis vulgaris*.

**Bonivard, François de** (bō-nē-vär'), a younger son of a family which held large possessions under the House of Savoy, was born about 1496 at Seyssel, on the Rhone, and in 1513 became prior of St. Victor at Geneva. Falling under the suspicion of the Duke of Savoy, he was taken prisoner by him in 1519. After 20 months' imprisonment he was set free, but in 1530 he was again seized, and taken to the castle of Chillon at the E. end of the Lake of Geneva, where he was imprisoned for six years, the last four in that subterranean vault which the genius of Byron has made famous by his poem on the sufferings of "The Prisoner of Chillon." He died in 1570, leaving the town his books, which were the nucleus of the Geneva library. Bonivard was an indefatigable writer. His chief works are his "Chroniques de Genève" (1551; new ed., 2 vols., 1831), and "De l'Ancienne et Nouvelle Police de Genève" (1555).

**Bonn**, a German town in the Rhenish Province of Prussia, beautifully situated on the left bank of the Rhine, with magnificent promenades and prospects in the environs. It has some trade and manufactures, but is chiefly important for its famous university, founded in 1777 by Elector Maximilian Frederick of Cologne, and for its cathedral, which has a crypt of the 11th century and mediæval wall paintings. Enlarged and amply endowed by the King of Prussia, in 1818, the university is now one of the chief seats of learning in Europe, with a library of more than 200,000 volumes, an anatomical hall, mineralogical and zoological collections, museum of antiquities, a botanical garden, etc. The teachers in the five faculties, in 1898, numbered 147,

## Bonner

and the students 1,671. Lange, Niebuhr, Ritschl, Brandis, and other names famous in science or literature are connected with Bonn, and Beethoven was born here. Bonn was long the residence of the Electors of



BONN UNIVERSITY.

Cologne, and finally passed into the hands of Prussia by the arrangements of the Congress of Vienna, in 1815. Pop. (1905) 81,996.

**Bonnat, Leon Joseph Florentin**, a French painter, born in Bayonne, June 20, 1833; studied under Madrazo at Madrid, and under Léon Cogniet at Paris. He paints portraits and genre subjects; many of these are reminiscences of his visits to Italy and Egypt. His portraits of Thiers and Victor Hugo are much esteemed. He became a member of the Institute in 1874.

**Bonnechose, Emile Boismormand de** (bôn-shōz'), a French poet and historian (1801-1875), born at Leyerdorp in Holland. His one notable poetical composition is "The Death of Bailly" (1833). Besides a "History of France" he is author of "Reformers before the Sixteenth Century Reformation" (1844); "The Four Conquests of England" (2 vols., 1851); "History of England" (4 vols., 1859).

**Bonnemère, Joseph Eugene** (bôn-mar), a French historian, born in Saumur, Feb. 21, 1813. In early life he wrote a number of plays; but owes his reputation to a series of historical publications, "History of the Peasants" (1856); "Vendee, in 1793" (1866); "Popular History of France" (1874-1879); "History of the Religious Wars in the Sixteenth Century" (1886), etc. He died Oct. 31, 1893.

**Bonner, Edmund**, an English prelate of infamous notoriety, was born about 1495, of obscure parentage. He took a doctor's degree at Oxford, in 1525, and, attracting the notice of Cardinal Wolsey, received from



him several offices in the church. On the death of Wolsey he acquired the favor of Henry VIII., who made him one of his chaplains, and sent him to Rome to advocate his divorce from Queen Catharine. In 1540 he was consecrated Bishop of London, but on the death of Henry (1547), having refused to take the oath of supremacy, he was deprived of his see and thrown into prison. On the accession of Mary he was restored to his bishopric, and he distinguished himself during this reign by a persecution of the Protestants, 200 of whom he was instrumental in bringing to the stake. After Elizabeth succeeded he remained unmolested until his refusal to take the oath of supremacy, on which he was committed to the Marshalsea (1560), where he remained a prisoner until his death in 1569.

**Bonner, Robert**, an American publisher, born near Londonderry, Ireland, April 28, 1824. He came to the United States in early youth, and learned the trade of a printer, and, in 1839, was employed in the office of the Hartford "Courant," and was known as a very rapid compositor. In 1844 he removed to New York, and, in 1851, purchased the "Ledger," then an insignificant paper. By energy and talent he made it remarkably successful, adding to its reputation by securing the contributions of Fanny Fern, Edward Everett, Henry Ward Beecher, and other eminent persons. He became very wealthy, and gratified his taste for fast horses by purchasing the most celebrated trotters in the world, though withdrawing them from the race course. Among these are "Peerless," "Dexter," "Maud S.," which he bought from William H. Vanderbilt for \$40,000, her record of speed being 2.09¾, which he afterward reduced to 2.08¾, and "Sunol." He made large gifts of money to Princeton University and was widely known for his many benefactions. He retired from active control of the "Ledger" in 1887, giving it into the hands of his sons. He died in New York city, July 6, 1899. He prided himself on the facts that he had never raced a horse for money, never made a bet, never borrowed a dollar, and never gave a note in his life.

**Bonnet**, a head dress; a dress or covering for the head worn by women; a cap or head covering, much used before the introduction of hats, and still worn by the Scotch Highlanders.

In fortification, the elevation of the parapet about the salient angle of a bastion or ravelin above the general level of the work. The name is also given in permanent defensive works to a little outwork with two faces, forming a salient angle, intended to protect the angle of a ravelin, the faces of which are defended by tenaillons or lunettes. An outwork of a similar kind, used in field fortification, having three salient

angles instead of one, is called a *bonnet de prêtre*, or priest's bonnet.

In mechanics, a cast iron plate to cover the opening in the valve chamber of a pump; the opening is made so that ready access can be had when the valves need repairing; also a frame work of wire netting over the smoke stack, or chimney, of a steam locomotive, to prevent the escape of sparks.

In navigation an additional piece of canvas attached to the foot of a jib, or to a schooner's foresail, by lacings, and taken off in bad weather.

**Bonneval** (bôn-väl'), **Claude Alexandre, Comte de**, a singular adventurer, born in 1675 of an illustrious French family. In the war of the Spanish Succession he obtained a regiment, and distinguished himself by his valor as well as by his excesses. On his return to France he was obliged to fly in consequence of some expressions against the Minister and Madame de Maintenon. Received into the service of Prince Eugene he now fought against his native country, and, after performing many signal services, he was raised, in 1716, to the rank of Lieutenant Field Marshal in the Austrian service, and distinguished himself against the Turks at Peterwardein. But his reckless and impatient spirit brought him into conflict with the superior authorities, and he finally took refuge in Constantinople, where he was well received. He was now converted to Mohammedanism, submitted to circumcision, received the name of Achmet, was made a pasha of three tails, and, as general of a division of the army, achieved some considerable successes against Russians and Austrians. He died in 1747. The memoirs of his life published under his name are not genuine.

**Bonneville, Benjamin L. E.**, an American soldier and explorer, born in France, in 1793; explored in the Rocky Mountains and California; fought in the Mexican War; was wounded at Churubusco; served as superintendent of barracks and recruiting officer in Missouri during the Civil War of 1861-1865. His explorations were written up from his journal by Washington Irving in a work entitled "Adventures of Captain Bonneville." He died in Fort Smith, Ark., June 12, 1878.

**Bonneville, Lake**, a lake that once filled a now desert basin of Utah; at its greatest dimensions had an area of 20,000 square miles, and was 1,000 feet deep.

**Bonnières, Robert de** (bôn-yâr), a French journalist and novelist, born in Paris, April 7, 1850. He began his literary career as contributor to Paris journals of spirited but waspish biographies of contemporary men; these were collected and published in three successive volumes of "Mem



## Bonny

oirs of To-day." His novels are full of transparent allusions to noted persons, and have had a very great vogue. In one of them, "The Monarch," he portrays high Jewish society in Paris.

**Bonny**, or **Boni**, a town and a river of Guinea, now in the British Niger protectorate. The river forms an E. débouchure of the Niger, and falls into the Bight of Biafra, in about 4° 30' N. lat., and 7° 10' E. long. It is accessible at all times of the tide to vessels drawing as much as 18 feet of water, and safe anchorage at all seasons of the year is found within its bar. Its banks are low, swampy and uncultivated. On the E. side near its mouth, is the town of Bonny, notorious from the 16th to the 19th century as the rendezvous of slave trading ships. The houses forming the town stand in a swamp where fever prevails; European traders generally take up their quarters on river boats moored in the current of the Bonny. It exports considerable quantities of palm oil.

**Bonnycastle, Charles**, an Anglo-American mathematician, born in Woolwich, in 1792; was Professor of Mathematics at Woolwich Military Academy, Professor of Natural Philosophy in the University of Virginia (1825-1827) and of Mathematics there from 1827. His publications included "Elements of Geometry," "Elements of Algebra," "Mensuration," etc. He died in Charlottesville, Va., October, 1840.

**Bonnycastle, Sir Richard Henry**, an English military engineer, born in 1791; spent the greater part of his life in British North America; and was author of "Spanish America" (1818); "The Canadas in 1842" (1842); "Canada and the Canadians in 1846" (1846); and "Canada as It Was, Is, and May Be" (1846). He died in 1848.

**Bononia**. (1) The ancient name of Bologna, Italy; a Roman town of Gallia Cispadana, originally Felsina; belonged to the Boii and then to Rome; enlarged and adorned by Augustus. (2) The ancient name of Boulogne, a town in Northern Gaul. (3) Anciently, a town of Pannonia on the Danube.

**Bonomi, Joseph** (bon-ō'mē), an Italian artist, born in Rome, Oct. 9, 1796; son of Joseph Bonomi, the architect. He studied art in London, and became famous as a draftsman, especially of Egyptian remains. He repeatedly visited Egypt and the Holy Land, and illustrated important works by Wilkinson, Birch, Sharpe, Lepsius and other Egyptologists. He also published a work of his own on Nineveh, and at his death, March 3, 1878, he was curator of Soane's Museum.

**Bonpland, Aimé** (bôn-plän'), a French botanist, born in Rochelle, Aug. 22, 1773.

## Bony Pikes

While pursuing his studies at Paris he made the acquaintance of Alexander von Humboldt, and agreed to accompany him in his celebrated expedition to the New World. During this expedition he collected upward of 6,000 plants, previously unknown, and on his return to France, in 1804, was made Director of the Gardens at Navarre and Malmaison. On the Restoration he proceeded to South America, and became Professor of Natural History at Buenos Ayres. Subsequently, while on a scientific expedition up the river Paraná, he was arrested by Dr. Francia, the Dictator of Paraguay, as a spy and detained for eight years. He afterward settled in Brazil, where he died in 1858. Among his works are "Plantes Equinoxiales" (2 vols., 1808-1816); "Monographie des Mélastomées," etc. (2 vols., 1809-1816); and "Description des Plantes rares de Navarre" (1813-1817).

**Bonsal, Stephen**, an American journalist, born in Virginia in 1863. He was educated at Concord and Heidelberg. In the Bulgarian-Servian War he was special correspondent of the New York "Herald," serving in the same capacity in Macedonia and Cuba. He has been Secretary of Legation of the United States in Pekin, Madrid, Tokio, and Korea. He has written "The Real Condition of Cuba" and "The Fight for Santiago."

**Bonstetten, Karl Victor von** (bôn'-stet-en), a Swiss publicist, born in Bern, Sept. 3, 1745; studied at Leyden, Cambridge and Paris; entered the Council of Bern, and became district governor, and, in 1795, a judge in Lugano. He lived in Italy and at Copenhagen from 1796 to 1801, and after his return settled at Geneva, where he died, Feb. 3, 1832. Among his larger works are "Recherches sur la Nature et les Lois de l'Imagination" (Geneva, 1807); "Pensées Diverses" (1815); "Études de L'Homme" (1821), and "L'Homme du Midi et L'Homme du Nord" (1824), an examination of the influence of climate. Several volumes of his correspondence have been published.

**Bontebok**, the pied antelope (*alcelaphus pygarga*), an antelope of South Africa, with white markings on the face, allied to the blesbok.

**Bony Pikes**, a recent fish, genus *lepidosteus*, of great interest from its being of the order *ganoidei*, of which nearly all the species are extinct. It belongs to the sub-order *holostææ*, and the family *lepidosteidæ*. Among other peculiarities the bony pikes have the antique pattern of heterocercal tail, so common in the Old Red Sandstone period. They inhabit the rivers and lakes of temperate and tropical America, grow some of them 3 feet in length, and are used for food. Called also gar pikes.



**Bonze**, the name given by the Portuguese to any member of the Buddhist priesthood in Japan. Thence the name spread to the priests of the same faith in China and the adjacent regions.

**Booby**, a name for a natatorial bird, the soland (*i. e.*, solent), or channel goose, *sula bassana*. It is of the family *pelican-*



BOOBY.

*idæ*. These birds are found, as their specific Latin name imports, on the Bass rock, in the Frith of Forth, Scotland. They exist also in other places. They are looked on as stupid in character. The word is also applied to any other natatorial bird of similar form and stupidity.

**Book**, the general name applied to a printed volume. The volume which the reader has at present in his hands is a normal specimen of what is now understood by a printed book. Printed matter occupies both sides of a certain number of leaves of paper, which are so arranged that, beginning at the upper end of the left side of the first page, he may proceed without dislocation of thought always from left to right till he reach the lower end of the last page. The first page, or *recto*, of the first leaf or folio, is technically known as a bastard or half title page; the next page, or *verso*, of the first folio is left blank. Then follows the title page proper, usually with a blank page at the back. In many books, there intervenes a preface or introduction, a dedication, and a table of contents before the main body of the book begins. If any portion of the book has got out of its place, there are two ways by which the true order can be discovered. At the outer corner, or in the center above the reading matter, of each page is a number — 1, 2, 3, etc.; this is the pagination or numerical order of pages. At the bottom of certain pages are numbers, 8, 16 and 32 numbers apart, which show the first page of the printed sheet of paper after it has been folded into 8, 16 or 32 pages. A, B, etc., are often used for

numerals; and if the book goes beyond the number of letters in the alphabet, the series is continued — AA, BB, etc., or 2A, 2B, etc.

To understand the historic origin of this normal modern book, one must go back to a remote antiquity. The word "book" itself (Saxon *boc*, German, *buch*, Dutch, *boek*) appears originally in Gothic as a plural noun meaning primarily, as is generally believed, the runes inscribed on the bark of separate branches of the beech tree (Saxon, *boc*, German, *buche*, Dutch, *beuke*) for the purposes of divination, etc. *Liber*, the Latin equivalent (which has been adopted by all the Romance and Celtic tongues — French, *livre*, Italian, *libro*, Gaelic *leabhar*, Welsh, *leor* — and is the source of our English word library), properly meant bark, and was applied to prepared papyrus tissue from its barklike appearance. The Greek *biblia*, in like manner, is associated with *byblos* — *i. e.*, papyrus.

As is now well known, the ancient Babylonians and Assyrians had a wide and varied literature. This was preserved in two ways; either painted on the leaves of the papyrus which grew in abundance on the banks of the Euphrates, or impressed on clay shaped into tablets or cylinders. Such skill was displayed in the treatment of this latter material that the inscribed characters by their minuteness "suggest that they must have been written with the help of a magnifying glass." A representation of a typical polygonal Assyrian cylinder will be found in Sayce's "Assyria" (1885). The defects, as well as certain advantages, of this form of book are obvious. It has no direct connection with the modern European book. The case is different, however, with the ancient Egyptian book. The sequence may be maintained from the volume at present in the reader's hands back for thousands of years to the oldest Egyptian volume still extant (in a sense the oldest book in the world) — the "Papyrus Prisse," which must be assigned to a very early period of Egyptian history, according to Chabas and to Virey, "Études sur le Papyrus Prisse" (Paris, 1887), to a date probably prior to the 12th dynasty — *i. e.*, at least 2000 B. C. Owing to its wonderful adaptability to literary purposes, the prepared papyrus tissue (see PAPHYRUS) spread to Greece (at least before the time of Herodotus) and to Rome; and though it was so far supplanted, especially in certain regions, by the finer kinds of prepared skins — the material used by the Jews, Persians, and other Oriental nations — it maintained its position as a book material down to the 10th century A. D. Ali Ibn el Azhad, in 920, describes the different kinds of pen required for writing on paper, parchment, and papyrus (see Dr. Joseph Karabacek's "Das Arabische



Papier," Vienna, 1887). The ancient papyrus book, whether Egyptian, Greek or Roman, was got up very much like a modern mounted map. A length of the material, written on one side only, was fastened to a wooden roller, round which it was wound; this formed a *tama* (Egyptian), *kulindros* (Greek), or *volumen* (Latin); hence our volume. Specimens of Egyptian rolls still exist, extending to upward of 20 and even 40 yards (see Birt's "Das antike Buchwesen," p. 439); but the great inconvenience attaching to the consulting of such enormous scrolls made it much more usual to break up any lengthy literary production into sections, each on a separate roll. Certain suitable sizes became normal, and this conventional length of the roll exercised a considerable influence on the length of what are still called the books — *i. e.*, divisions of the classical authors. In Egypt the rolls were kept in jars (holding say 9 or 10 each); in Rome in wooden boxes or canisters (often of costly workmanship), or in parchment cases. The change from the rolled to the folded form of book appears to have taken place in the ancient world after the adoption of the parchment or vellum, though practically the same arrangement of successive surfaces had been in vogue in the books or tablets of waxed wood used for notes and letters. *Codex*, the Latin name for such a parchment volume, is still retained as the designation of the more important ancient MSS., as "Codex Alexandrinus." The form remained practically unaltered throughout the Middle Ages, and being even more suitable for paper than for vellum, was ready, on the invention of printing, to facilitate the full development of the new art.

*Sizes of Books.*—The vellum, and afterward the paper book of mediæval times, was made up in the following way: Quires or gatherings were formed sometimes of four sheets folded in the middle and placed one within the other, so as to furnish eight leaves, sometimes of 5 sheets yielding 10 leaves, sometimes of 6 yielding 12. These groupings were known as quaternions (*tetradia*), quinterns or quinternions (*pentadia*), and sexterns (*hexadia*). This same method was adopted by the early printers, who at first indeed only printed as the copyists had written, one page at a time. In the colophons (see below) of many of the older books, a register or collation, as it is called, of all the quires—whether ternions, quaternions, or so on—is supplied for the guidance of the bookbinder. The signatures on the several quires were at first inserted by hand, and were first printed at Cologne, in 1472. When it became usual to print a certain number of pages at once, the paper was not folded and cut up till it had passed through the press. The number of

times it required to be folded afforded a ready means of distinguishing, in a general way, the different sizes of books as long as the paper continued to be made by hand, in frames the size of which did not greatly vary. The nomenclature is still in vogue, though it has ceased in these days of machine-made paper to be a correct guide to the real sizes of books. In the United States, the proposal to distinguish sizes by an actual measurement of height and breadth of paper has met with some acceptance; but the old fashion still prevails in Europe. A sheet being folded in the middle forms two leaves or four pages; and a book composed of such sheets is styled a folio, whether it measure  $1\frac{1}{2}$  feet or 4 feet in height. When the sheet is again folded it makes a quarto. In hand-made paper (*i. e.*, the paper used in nearly all books of purely bibliographical interest) the water line runs either across or down the page, according to the number of foldings. The following scheme is serviceable:

|                    | Times. | Pages. |                           |
|--------------------|--------|--------|---------------------------|
| Folio, folded..... | 2=4    |        | water-line perpendicular. |
| Quarto..... (4to)  | 4=8    |        | horizontal.               |
| Octavo..... (8vo)  | 8=16   |        | perpendicular.            |
| Duodecimo. (12mo)  | 12=24  |        | horizontal.               |
| Octodecimo (18mo)  | 18=36  |        | perpendicular.            |

Less ordinary, and, of course, diminutive, sizes of books are produced and known as 32mo (water line perpendicular), 36mo (horizontal), 48mo (horizontal), 64mo (horizontal), 72mo (perpendicular), 96mo (perpendicular), 128mo (perpendicular). In Great Britain for a long period printing paper was chiefly of three sizes—royal, demy and crown; and according as any one of these was employed the size of the book was large or small. Demy, however, was the most commonly used; and the demy 8vo may be said to have become the established form of standard editions. Among books, as among men, there are giants and dwarfs. Certain Church books in the Escorial are described as 6 feet in height by 4 in breadth; and the "Antiquity" volumes, for example, of the Napoleonic "Description de l'Égypte" measure  $37\frac{1}{2}$  inches in height. The "Thumb Bible" is, on the other hand, not much bigger than a postage stamp; Pickering's diamond edition of "Tasso," measures  $3\frac{1}{2}$  inches high by  $1\frac{7}{8}$  wide; and Hoepli's (1878) "Divina Commedia" is less than  $2\frac{1}{4}$  inches by  $1\frac{1}{2}$ .

*Colophons.*—The scribes employed by Assur-banipal (680 B. C.) used to place the account of their documents at the close of the last column on their cylinders. In like manner, the early European printers often gave details about their books in the closing paragraph, now technically known in



English as the colophon (from a Greek word for apex or terminus), in French as *souscription*, in German as *schluss-schrift*. Caxton varies his colophon from the simplest *Explicit, Hic finis*, or "Here endeth," to elaborate epilogues or post faces. Quaintest of all, perhaps, is his rhyming conclusion to the "Moral Proverbs:"

Go thou litil quayer and recōmaund me  
Unto the good grace of my special lorde  
Therl Ryueris, for I have emprinted the  
At his cōmandement, folowying ury worde  
His cōpye as his secretaire can recorde.  
At Westmestre of feuerer (February) the xx daye  
And of Kyng Edward the xvij yere vraye (truly).

Abundant examples of the colophon will be found in Mr. Blade's "Caxton," and Le-grand's "Bibliographie Hellénique" (1885).

*Title Pages.*—Though Caxton's work affords no instance of a title page—unless "The Chastising of God's Children" (1491?) be his, and it contains simply three lines of ordinary print—this does not represent the general stage of typographic development. As early as 1474 Pictor, Loslein, and Ratdolt, in Venice, issued a "Calendario" by John de Monteregio, with a quaint rhyming title page, with place, date, and names at the foot (see facsimile in Bouchot's "The Printed Book"). With the adoption of the title page, the colophon naturally disappeared, though instances are found well into the 16th century. The treatment of the title page has varied enormously at different periods: in the 16th and 17th centuries becoming at times so crowded with details as to lose half its value as a ready means of determining the purport of the book. Laudatory descriptions of the author and his work were freely introduced: "Very Necessary To Be Known," "Very Pleasant and Beneficial," "A Book Right Rare and Strange," are among the phrases familiar to all book lovers. Except in the case of works of fiction and popular theology, the tendency of the present time is to make the title brief and business-like. Dickens' "Adventures of Oliver Twist," even, contrasts curiously with the title page of the first edition of, say, "Robinson Crusoe." Metaphorical titles (so abundant in the Elizabethan and Jacobian periods) are serviceable as distinctly individualizing a book, but are very apt (as in Mr. Ruskin's "Notes on the Construction of Sheepfolds") to mislead the unwary. Double titles (as in Mr. Ruskin's "Prosperpina: Studies of Wayside Flowers") are equally dangerous; and open to strong objection is the habit of reissuing an old work with a new title. The title of a book is by English law as much the property of an author as any other part of his book. Consequently, a lawsuit may be the result of even unsuspectingly using a title already appro-

priated. Compare the facsimile title pages in Könnecke's "Bilderatlas" (1887); Le Petit's "Principales Editions originales d'Ecrivains Français" (1888), and A. Lang's "Old French Title Pages" in "Books and Bookmen."

*Dates.*—In the dating of their books the early printers, like the scribes, were extremely negligent. "Of 21 works," says Mr. Blades ("Caxton," i, p. 31), "known to have been issued from the press of Colard Mansion, not more than five have any date to them; and, of nearly 100 publications attributed to Caxton's press, considerably more than two-thirds appear without any year of imprint." At other times we find the date given with great precision: thus, "The Book of the Knight of the Tower" has "and enprynted at Westminstre the last day of Janyuer, the fyrst year of the regne of Kynge Richard the thryd." In the present day nearly all respectable publishers put the correct year in which their books are issued at the foot of the title page, either in ordinary figures or in the Roman notation. When a book is not dated, one suspects a desire on the part of the publisher to sell his old stock as if it had newly seen the light. Unfortunately, the device of attaching a new title page with a fresh date to matter that has lain in the warehouse for many years is adopted by firms whose reputation ought to be above reproach. The following are among the more important deviations from the normal methods of Roman notation to be found in the colophons or title pages of early printed books (see Brunet's "Connaissances nécessaires à un Bibliophile"):

M CCCC iiiij XX VIII = 1483 (i. e. 1000 + 400 + 4 × 20 + 8).

M iiiij Ciiii XX Viiij = 1483 (i. e. 1000 + (4 × 100) + (4 × 20) + 8).

M CD XCV = 1495 (i. e. 1000 + (500 - 100) + 95).

M iiiij D = 1494 (i. e. 1000 + 500 - 4).

M IIID = 1497 (i. e. 1000 + 500 - 3).

CIO IO CXX VI = 1626 (i. e. 1000 +  $\frac{1000}{2}$  + 100 + 26).

In many cases the older printers indulged in curious chronograms; sometimes using them to repeat in the preface a date already distinctly stated on the title page. An extreme instance is the "De spIrItaLi IMItatIone ChrIstI saCræ et VtILes pIIIs In LVCeM Datæ, a R. P. Antonio Vanden Stock Societatis Jesu, Ruræmundæ. Apud Gasparem du Pres"—a book which contains upward of 1,500 chronograms on the date 1658; and James Hilson's "Chronograms, 5,000 and More in Number" (4to, London, 1882); and "Chronograms Continued" (1885).

When dates are wanting, the age of a book may often be approximately determined by certain external characteristics, which must, however, be used with caution. Water marks (German, *wasser-zeichen*; French, *filigranes*), for examples, are of im-



portance, but their evidence has been frequently strained. Compare article PAPER, and see the works of Fisher (1804), Boyer (1860), Midoux and Matton (1868), and Sotheby's "Principia Typographica."

*Place of Publication.*—Even when the name of the place of publication is given in full, it may require some knowledge to recognize it under the several forms current in different languages and at different periods. Thus Cologne may appear as Colonia, Colonia Agrippina, Cueln, Ceulen, Keulen, Köln, etc.; or the periphrasis *in civitate Coloici* may be employed, the *n*'s being represented by strokes above the vowels; Venice may be more or less disguised as Venetia, Venetiæ, Venezia, Venedig (German), Venez (in the local dialect), Enetiai (in Greek), and Mleezi, Bnezieh, Muezik, and Mljetka (in Slavonic). Well known places may be concealed under some pseudo classical translation of, or pun upon, the true name; thus, Herbiopolis stands for Würzburg; Leucopetra, for Weissenfels; Probatopolis for Schaffhausen; Eleutheropolis for Freystadt, Francheville, Franeavilla, etc. This latter is a good instance of a difficulty that may arise. Not only may Eleutheropolis represent one of many towns, but from the meaning of the word it has frequently been employed by printers who did not wish to declare the true place of publication. Another instance is Irenopolis (City of Peace), which is, historically, an equivalent of Berœa. The following list will be convenient: Argentoratum, Strasburg; Augusta Vindelicorum (often only Augusta), Augsburg; Basilea, Basel; Bipontum, Deux-Ponts; Bononia, Bologna, or Boulogne; Cadomum, Caen; Cæsaraugusta, Saragossa; Cantabriga, Cambridge; Corona, Cronstadt; Dortracum or Dordrechum, Dort; Eboracum, York; Gippesvicum, Ipswich; Gratianopolis, Grenoble; Hafnia, Copenhagen; Hala, Halle; Holmia, Stockholm; Insula or Insulæ, Lille; Ispalis, Seville; Leodicum, Liège; Lipsia, Leipsie; Lugdunum, Lyons; Lugdunum Batavorum, Leyden; Lutetia, Paris; Massilia, Marseilles; Matisco, Macon; Mediolanum, Milan; Moguntiaecum, Mainz; Mons Regalis, Mondovi; Mussipons or Pontimussum, Pont-à-Musson; Neapolis, Naples; Neapolis Casimiriani, etc., Neustadt an der Hardt; Ænipons, Innsbruck; Olisipo, Ulyssipo, Ulyssipolis, Lisbon; Oxonia, Oxford; Petropolis, St. Petersburg; Regiomontium, Königsberg; Rotomagus, Rouen; Sarum, Salisbury; Tarvisium, Treviso; Tornacum, Tournai; Trajectum, Ultrajectum, Utrecht; Trecæ or Civitas Tricassina, Troyes, Tridentum, Trent; Turoni, Tours. See "Dictionnaire de Géographie Ancienne et Moderne à l'usage du Libraire" (Paris, 1870).

To divert suspicion, printers have often put totally erroneous names on their title pages; hundreds of European books seem to have been issued at Pekin; thousands of the products of the Parisian presses claim The Hague (La Haye) or some other Dutch town as their birthplace. Quite recently Burton's literal translation of the "Arabian Nights" is represented as having been printed at Benares. In the earlier centuries printing and publications were so much the same thing that to know the place where a book was printed was practically to know where it was published, and *vice versa*. At present it is not uncommon for a work to be printed in one country and published in another. When publishing firms have houses or agencies in different cities, all may be mentioned on the title page, and precedence accorded rather in keeping with the importance of the cities. Thus, "London and Edinburgh" frequently appears in books which were entirely produced in the lesser city. With the introduction of stereotype or electrotypes it has become possible for a book to be printed in more places than one with only one setting-up of type.

*Pagination.*—At first the printed book was issued like the manuscript—without any numbering of the pages. Before long it was found convenient to number the leaves; the numbering of the pages followed. In many modern books, when the page contains two or more columns, each column is numbered consecutively. When a book consists of several volumes, each has usually its own pagination; but in some great treatises, running through several volumes, it expedites reference from the index to number right through from the beginning to the end of the whole series. In the old folios and quartos letters were not infrequently inserted on the margin, so as to break each page into distinct portions without interfering with the continuity of the text. The marginal letters from the first editions of the classics are often reproduced in modern editions just as they originally stood, and form a convenient method of reference.

*Preface, etc.*—The preface is the introductory address of the author, in which he explains the purpose and scope of his book, and, as it were, introduces himself to his readers. Our ultra-Saxonists prefer to call it a foreword, in keeping with the German *vorwort*. Formerly it was usually headed "To the Reader," "To the Gentle Reader," "To the Courteous Reader," etc.

In the times when the professional author depended largely on the patronage of some person of rank, the dedication was an integral and indispensable part of a book. If he made sure of his Mæcenæ he could let the many go. At present being for the most part a mere expression of personal esteem or affection, the "I dedicate" has become



as simple in form as, in the 17th and 18th centuries, it was elaborate with all the rhetorical artifice to which flattery could attain.

*Pictorial Imprints or Printers' Devices.*—One of the happiest passages in the "Book Hunter" deals with the trade emblems of the old printers. The subject on which it



merely touches has been treated at length in such works as Silvestre's "Marques Typographiques" (2 vols., Paris, 1867); Roth-Scholtz's "Thesaurus Symbolorum ac Emblematum, id est, Insignia Bibliopolorum et Typographorum" (Norimbergæ, 1730); Berjeau's "Early Printers' Marks" (London, 1866). It is enough here to mention



the boldly drawn three-mast ship of Mathis van der Goes, Antwerp (1472-1494); the windmill of Andrew Myller, Edinburgh (1508, etc.); the curious wild men and fruit laden tree of Thomas Davidson, Edinburgh (1541); the olive tree of the Stephenses; and the sphere of the Elzevirs. In many instances

there is a punning allusion to the printer's name: Froschover has his frogs (*frosch* in German), and Le Chandelier his seven branched candlestick; Nicholas Eve gives us a picture of the presentation of the forbidden fruit. Others make use of the arms of the cities in which they worked. Leeu shows the castle of Antwerp, R. Hall the half eagle and key on a shield of Geneva, Stadelberger the lion rampant of Heidelberg and the shield diapered of Zurich, etc. Ascensius (1462-1532) has "bequeathed to posterity the lively and accurate representation, down to every nail and screw, of the press in which the great works of the 16th century were printed, with the brawny pressman pulling his proof." His device, with the inscription, "*Prelū Ascēsiānū*" was adopted by Josse Bade, Paris (1501-1535), who added his initials at the foot; by De Gourmont (1507-1515); Le Preux (1561-1587); and in a modified form by De Marnef (1567), and De Roigny (1565). The anchor and dolphin of the Aldi was employed by Turrisan, De Chenney, Brillard, Tardif, Coulombel, sometimes, as in the last instance, with the divided Aldus.

*Decoration of the Book.*—Leaving out of view the pictorial illustration devoted to the elucidation of the subject treated of in a book, there are certain forms of illustration which are merely decorative appendages to the book itself. Besides the ornamental treatment of the title page with peculiar letters, the use of red or blue ink, and the insertion of a printer's emblem or some appropriate vignette, we must mention the engraved title page (in the 16th and 17th centuries often a most elaborate and costly piece of work), the frontispiece or engraving placed opposite the title page; ornamental initial letters for chapters; headpieces or vignettes for the blank space generally left before the beginning of a new chapter; and tailpieces at the end of the chapters. The amount of artistic effort lavished on these apparent trifles will best be understood by consulting Niedling's "Bücher-ornamentik" (1888); Bouchot's "The Printed Book," and Austin Dobson's chapter in A. Lang's "The Library" (see also the works *supra* at "Title-pages"). By the earliest printers the insertion of decorative details was left to a special artist—the rubricator (so called from the red ink which he mainly employed). Space was often left for his initial letters, and at most only a small letter inserted to guide him.

Many books originally printed in thousands (*e. g.*, school books) have become rare and even unique; others have been so from the first through limitation of the number issued. A common device to enhance the market value of a book is to issue only a few copies and promise to destroy the plates.















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